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The impact of art therapy on mental health and well-being

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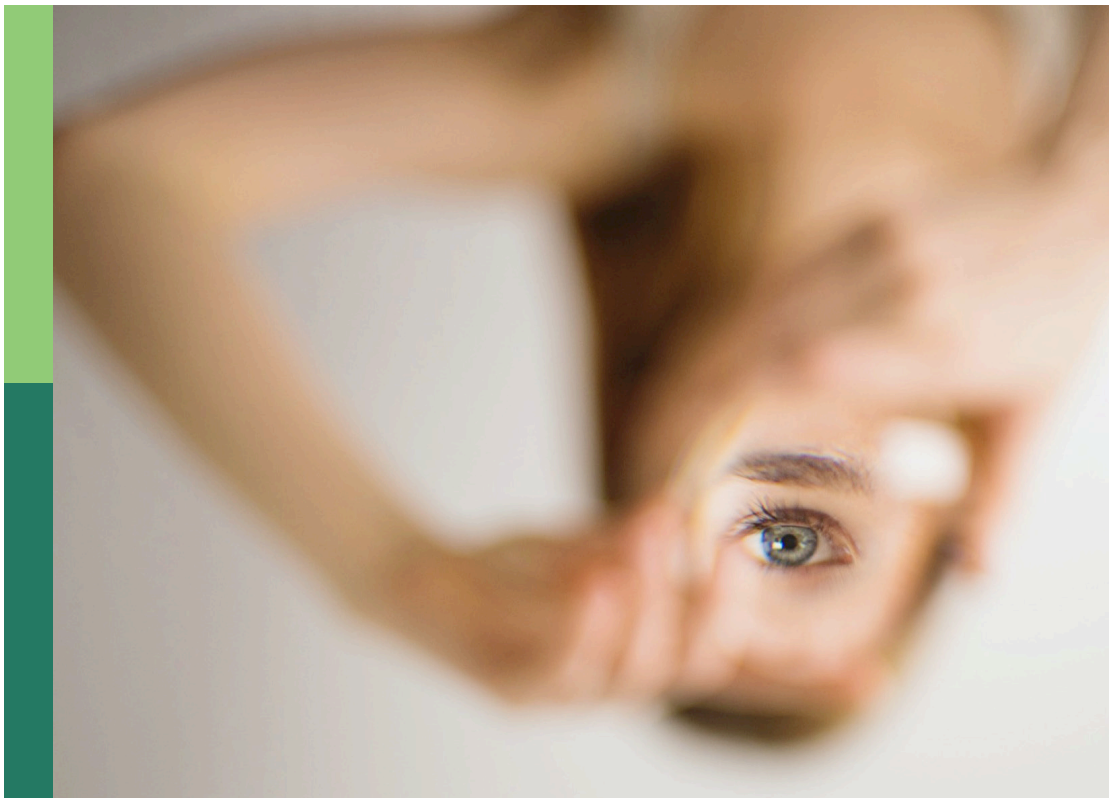

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The impact of art therapy on mental health and well-being

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Table of contents

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Editorial: The impact of art therapy on mental health and well-being

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art therapy, approach, integrative, health, well-being

Editorial on the Research Topic
The impact of art therapy on mental health and well-being

We are currently observing a concerning escalation in mental health issues. Consequently, it's crucial to tailor interventions that enhance mental health and well-being, as societies acknowledge the profound influence of psychological well-being on overall life quality.

Indeed, we are in an era where traditional therapeutic methods are being supplemented by integrative interventions. Art therapy is emerging as a promising and increasingly significant approach, especially for individuals with dementia. It's gaining substantial recognition as an effective and suitable therapeutic intervention for mental health conditions. Art therapy operates on the premise that creative expression can foster emotional well-being. "*The Impact of Art Therapy on Mental Health and Well-being*" is a compilation of papers discussing integrative care, primarily employing art as an innovative approach. It utilizes quantitative and/or qualitative methodologies to explore art therapy and the artistic heritage available for promoting mental health and well-being.

The primary objective of this topic was to provide a comprehensive view of art's role in promoting mental health and well-being across various settings. The articles published under this topic elucidate the specific mechanisms through which art therapy facilitates emotional expression, self-discovery, and resilience development among diverse individuals, primarily in educational or care settings.

We anticipate that the findings of this topic will significantly contribute to the broader context of care in Psychiatry, particularly in mental health and the field of integrative therapies, aligning with the World Health Organization's appeal.

The articles published on this topic unequivocally suggest that art therapy can bridge the gap between conventional therapeutic modalities and creative expression. By establishing a clear understanding of art's therapeutic benefits, we can foster collaboration between mental health professionals and artists, promoting an interdisciplinary approach to treatment and support across various contexts.

This topic has garnered 16k views and 2,339 downloads, indicating immense interest. It involved 52 authors, with 18 articles submitted and 14 published. These articles underscore

the role of creativity and art in promoting well-being and mental health in education and healthcare. By clarifying the psychological processes involved in art therapy, this topic aims to destigmatize mental health issues and advocate for art as a valuable tool for self-discovery and emotional growth.

Moreover, the articles published here can inform policy decisions and facilitate the integration of art therapy into mainstream mental health care. They can also enlighten policymakers to recognize art therapy as a valid and beneficial therapeutic modality, potentially broadening its accessibility to a wider range of individuals in need.

In conclusion, as editors of the topic "*The Impact of Art Therapy on Mental Health and Well-Being*," we hope to provide a comprehensive overview of art therapy's impact on mental health and well-being. By contextualizing the findings, we aspire to advance mental health care and promote holistic healing through the transformative power of art. With increased awareness and appreciation of art therapy's potential, we can progress toward a society that prioritizes mental health and adopts strategies to assist individuals in any situation or context.

Author contributions

HJ: Writing—original draft. JA: Supervision, Writing—review and editing. LV: Writing—review and editing. LS: Writing—review and editing.

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Museums and art therapy: A bibliometric analysis of the potential of museum art therapy

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In this paper, the current promotion of art therapy in museum development and the potential value of the combination of museum and art therapy on mental health are explored. Individuals who usually evade any treatment may experience art therapy in a museum setting as a release from their suppressed emotions. Furthermore, art therapy may enable them to discover how to express themselves, thereby reducing anxiety and promoting a sense of social belonging, which may be unattainable in other healing settings. Moreover, this literature review afforded us a preliminary understanding of issues in museum education and art therapy, which require further examination, including implications for China's museum art therapy in practice and future research directions.

KEYWORDS

art therapy, museum education, healing, mental health, aesthetic intervention

Introduction

The significance of museums, which are an essential component of a lifelong learning system, has gained considerable recognition in recent years. In *Education 2030 Framework for Action* (Willockx and Dom, 2022), which was released by the United Nations Educational, Scientific and Cultural Organization, expands the mission of education to comprise an inclusive and equitable quality education and lifelong learning for all, affording everyone a fair opportunity. Museum education has an influence on the development of education. As an essential institution of social education, a museum's education focus has shifted from spreading information about the protection and value of cultural relics to attracting the public to participate in meaningful experiences to achieve the purpose of healing and improving life (Kannangara, 2017). Visiting museums can inspire long-term self-reflection and cognitive outcomes, especially in relation to social awareness (Jackson et al., 2015). Anechini et al. found that museum environment experience plays an important role in children's psychological recovery. In the museum learning and experience, they provided an assessment of the aesthetic attributes of the museum environment and benefits to children's recovery (Mastandrea et al., 2021). It is a process of acculturation that relies on pedagogical methods, development, fulfillment, and the acquisition of new knowledge (Diaz, 2012).

Museum has gradually become a new medium to help human beings to connect with society and move toward "equality and inclusiveness." Family therapists, art therapists, and social workers have all advocated for the effectiveness of museums in therapy. Van Lith (2016) spent many years employing museum resources to enhance relationships between individuals, families, and groups. Through the "Speak Objects" practice, McGhie (2008) created opportunities for troubled teenagers from various backgrounds to converse, think, and debate about museum objects, thereby assisting their self-actualization and self-exploration. In a case study, by assessing the impact of the Rovereto Museum of Contemporary Art on children's learning and experience, it was demonstrated that children would get a sense of relaxation and happiness through aesthetic experience in museum education activities (Mastandrea et al., 2021). Research shows that museums provide a safe environment for the art therapy experience, thus promoting the process of cultural adaptation and providing health and experience with self-discovery.

During the COVID-19 pandemic, WHO has emphasized that new measures such as self-isolation have affected people's normal activities, and it is necessary to prevent the increase of mental disorders and psychosocial problems, such as loneliness, anxiety, depression, and self-injury (Holmes et al., 2020). However, prevention to reduce the risk of mental disorders alone is not sufficient. It is imperative to determine various means to promote mental health (Keyes, 2007; Keyes et al., 2010). The guidelines for psychiatry and schizophrenia, which the National Institute for Health and Clinical Excellence in the United States published, indicate that art therapy can alleviate adverse symptoms such as psychosis (Attard and Larkin, 2016). The British Association of Art Therapy defined art therapy as "a form of psychotherapy that uses art media as its primary mode of expression and communication." In such a context, art is not employed as a diagnostic tool but as a medium to address confusing and agonizing emotional problems (Wood et al., 2011). The focus of art therapy is its process, which tends to emphasize non-verbal communication and creative processes. In addition, art therapy can promote a safe environment of trust, thus empowering individuals to acknowledge and express strong emotions (Deshmukh et al., 2018).

Since the 21 st century, many academic papers on museum education and art therapy have been published. However, these substantive scientific achievements are not conducive to our rapid grasp of insight into the future direction. In order to illustrate the importance of museum education and art therapy more fully, rigorous quantitative analysis and statistical analysis based on mathematical models are needed. Bibliometrics, citation analysis is a widely used new method of data-driven map literature (Chen et al., 2012), is widely used in research trend detection, agencies, national cooperation analysis, field changes (Carve et al., 2021), and may carry on the quantitative analysis model in the scientific literature, as well as to a research review and analysis of the emerging trends, It knows oriented quantitative function (Zhou et al., 2018; Tan et al., 2021). Early discussions on bibliometrics began in the 1950s (Wallin, 2005), suggesting that bibliometrics methods are not new. The use of bibliometrics is gradually expanding to all disciplines. Compared with the traditional review, the scientometric review is more systematic, comprehensive, and objective. In this paper, CiteSpace software is used to conduct a bibliometric analysis of 1,211 articles in the core database of the Web of Science and analyze the knowledge structure and trend direction of this field. The specific methods and retrieval strategies are shown in Figure A1. This database was chosen because it is more representative than the Scopus and Pubmed databases and reports articles in medicine, ecology, economics, and other fields.

Methodology and data

Data source and retrieval

To avoid bias due to daily database updates, the search was conducted on October 12, 2022, for articles published in the Web of Science Core Collection (Science Citation Index Expanded (SCIE), The Social Sciences Citation Index (SSCI), the search was conducted in the 21st century (January 1, 2000 to December 31, 2021), and articles published after January 1, 2022, were excluded because any collection from that year onwards would include incomplete bibliometric data from that year. The specific search parameters are: (TS = [("museum*") and ("art*" OR "artistic*") and ("treatment*" OR "cure *" OR "treat*" OR "therapy* "). A total of 337 publications were obtained by precise search, retaining only research-based articles and excluding reviews and other articles, yielding 312 articles.

Scientometric analysis

In this paper, the analysis tool of Web of Science (WOS) and CiteSpace software were used to make visual analysis and map drawing of museums and art therapy fields. CiteSpace, based on Java application program, is used for data analysis and visualization. It focuses on finding the key points, especially the turning points, in the development of a field, and converts the labor burden of some traditional content analysis into computer algorithms and interactive visualization, so as to facilitate a comprehensive analysis of the development of the field (Chen, 2006). The identified documents are extracted in WOS in plain text format and then imported into CiteSpace 6.1.R3.

Outline of review

In this review, the theoretical origins of art therapy and the status of art therapy research in China are examined. A comprehensive assessment and comments on museum art therapy research results are provided. The purpose of this paper is to explore (a) the theoretical basis of art therapy for mental health

TABLE 1 The theoretical basis of art therapy research.

Theoretical basis	Research content	Research outcome
Freud's classical psychoanalysis and art therapy	Freud merged art perspectives into his psychoanalytic theory, providing a valuable theoretical foundation for the therapeutic function of art	Freud revealed that the process of art creation is conducive to the expression of the subconscious and simultaneously noted that creation itself is a process of sublimation. He suggested that art provides an alternative satisfaction of fantasy that individuals cannot attain in reality, thus reducing distress and initiating healing
Jung's analytical psychology and art therapy	Jung further developed Freud's theory and developed analytical psychology. He proposed that personality comprises consciousness, the individual unconscious, and the collective unconscious. The goal of psychotherapy is to help individuals reveal the components of personality and subsequently integrate and perfect them to achieve self-realization	Jung proposed the therapeutic effect of imagery creation and the role of painting in the communication between consciousness and subconsciousness, supporting the healing function of art from a psychological perspective
New psychoanalysis and art therapy	The new psychoanalytic school essentially discusses personality structure and psychotherapy from aspects such as social environment, interpersonal relationships, and culture	The new psychoanalysis is not a tightly unified school. Its representatives demonstrate different theoretical preferences while also sharing common ground. First, the influence of social and cultural factors on individuals' psychology and behavior is highlighted. Second, the vital role of family background and childhood experience (20)
Humanism and art therapy	Humanism advocates people-oriented practices. It regards the whole person (the uniqueness of each individual) as the research object, cares about human nature, values, and dignity, and studies healthy personality and self-realization	Humanistic-oriented art therapists reveal the healing effect of creativity. They have revealed that during the process of creating and sharing art, individuals can attain self-awareness, self-discovery, and self-integration so as to clarify the meaning of life and achieve self-realization (21)
Transpersonal psychology and art therapy	Transpersonal psychology emerged in the late 1960s and is currently flourishing. It mainly explores the ultimate value of the human mind (spirit), its potential, and self-fulfillment (22)	Transpersonal-oriented art therapy recognizes that imagery is healing and uses artistic expression as a way of exploring oneself and entering a non-ordinary (transcendent) state of consciousness

recovery; (b) the potential value of museum art therapy; (c) the effect of museum art therapy on mental health.

Literature review

Theoretical origins of art therapy

Art therapy theory and psychoanalysis appear frequently in psychology theory. Gollnick's (Gollnick, 1993) classical psychoanalytic theory revealed that art provides an "alternative satisfaction" of fantasy that individuals cannot attain in reality, thus reducing distress and initiating healing, Brownstein's (Brownstein, 2017) analytical psychology verified the therapeutic effect of imagery creation. The new psychoanalytic school emphasized the integrating and adjusting effects of art therapy to the self. Moreover, while the humanism-oriented art therapists (Thomas, 2003) demonstrated the healing effect of creativity from educational practices, the transpersonal psychology school elaborated on the ultimate value of the human mind (spirit), its potential, and self-fulfillment. These provide the theoretical foundation of psychology for art therapy research (Table 1). Furthermore, research results have been applied to support the therapeutic properties of art (Franklin, 1999; Schure et al., 2008; Schimmels, 2020).

The potential valuable role of museum art therapy

Museums as restorative environments

Attention restoration theory (ART; Kaplan and Kaplan, 1989) postulates that museums as restorative environments have the potential to promote mental health. Several studies have shown that there is a clear association between the characteristics of museums and the features of creating restorative experiences proposed by Kaplan (1995). Kaplan et al., presented four pieces of evidence that verify museums' restoration properties. First, individuals display fascination because of extraordinary treasures in museums. Second, being away involves taking a break from ordinary daily life. Third, extent, both range, and coherence relates to the rich and coherent collections that are waiting to be explored. Finally, compatibility is related to how well the environment supports individuals' visiting intentions and goals. Of the four, fascination, which is considered to be the core restorative characteristic necessary for a good environment, plays a vital role in ART (Kaplan, 1995). By providing a fascinating environment, museums attract the attention span of children effortlessly. This may facilitate their self-reflection. Studies have highlighted that museums provide adolescents with support for restoration as well as assistance that augments or optimizes adolescents' mental

health, which is clearly beneficial to children (Kaplan et al., 1993; Kelz et al., 2015; Laddis, 2019) analyzed the restorative qualities and benefits of art museums that are deemed as the essential public institutions of learning: learning and discovering, passive enjoyment, restoration, socialization, and self-actualization. Museum education can give people a sense of relaxation and make them positive again to deal with the stress and difficulties in life (Kaplan et al., 1993).

Research status of museum art therapy

According to the bibliometrics theory, keywords represent research status and trends in a research field (Li et al., 2016). They reflect the focus of an article or an author (Liu et al., 2012). Based on Figure 1, the connection between nodes represents the interrelation between keywords, the color of the connection represents the time and year of its occurrence, the size of the node represents the occurrence frequency of a keyword, and the larger the node is, the higher the occurrence frequency of the keyword is, and vice versa. Thus, it can be seen that "art," "museum object," "art therapy," and "cultural heritage" are popular research topics, indicating that art projects and museum exhibits in museum art therapy are a current area of research focus.

Burst keywords can test whether a research area is a research priority at a particular time (Yan et al., 2020) and explore emerging topics. Therefore, we used CiteSpace software to analyze the top 30 keywords with the strongest citation bursts (Table 2). Since 2016, when "contemporary art," "care," and "reminiscence" broke out, researchers started to attach the importance of the recovery effect of art to human mental health. The sustained burst of "cultural heritage" and "art" in 2021 shows that museum art therapy would become a focus in this field in future research. It can also be demonstrated from some examples that museum art therapy still has great potential. For example, Canada's oldest museum, the Montreal Museum of Fine Arts (MMFA), has always been regarded as avant-garde. In such a surreal era, as the pandemic rampaged through humanity, many North American museums, including the MMFA, acted to help people overcome the confusion and darkness of global isolation, thus museum therapy has developed rapidly (Picard, 2001).

By looking at the size of the nodes and the thickness of the lines, the contributions of individual countries and their relationships can be determined (Figure 2). The larger the circle, the more publications the country has in that field. Research shows that the United States occupies a central position in this field, along with the United Kingdom and France. In this area, the United States often cooperates with the United Kingdom, France, Germany, and Italy, and the United Kingdom has extensive cooperation with Switzerland, the Netherlands, Italy, and China.

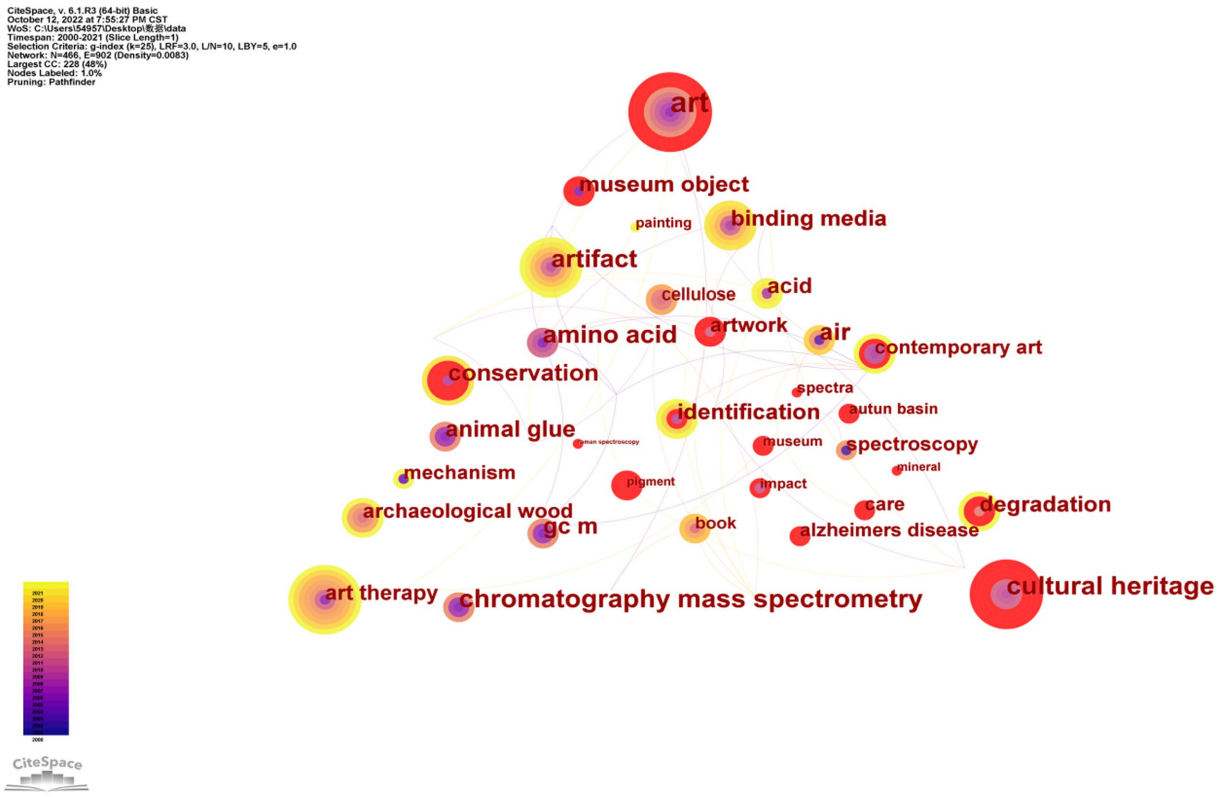

FIGURE 1
Co-occurrence analysis of keywords ($n \geq 3$). (The nodes represent the categories of keywords. The size of nodes is proportional to the number of keywords. Links represent the connections between different keywords. The color of rings and links corresponds to the year. Purple rings indicate high centeredness.)

TABLE 2 Top 30 Keywords with the strongest citation bursts.

Keywords	Year	Strength	Begin	End	2000–2021
Medical history	2000	1.35	2001	2001	
Rheumatoid arthriti	2000	1.3	2001	2002	
Phylogeny	2000	1.3	2011	2011	
Museum object	2000	1.73	2012	2013	
Radiation	2000	1.29	2012	2012	
Conservation	2000	1.27	2012	2015	
Raman spectroscopy	2000	1.91	2014	2014	
Identification	2000	1.62	2014	2014	
Resin	2000	1.27	2014	2014	
Media	2000	1.27	2014	2014	
Spectra	2000	1.89	2015	2015	
Mineral	2000	1.89	2015	2015	
Autun basin	2000	1.71	2015	2016	
Elderly people	2000	1.26	2015	2015	
Dementia	2000	1.26	2015	2015	
Contemporary art	2000	1.68	2016	2016	
Degradation	2000	1.61	2016	2018	
Care	2000	1.58	2016	2018	
Reminiscence	2000	1.27	2016	2016	
Atr ftir	2000	1.27	2016	2016	
Iron corrosion	2000	1.27	2016	2016	
Cultural heritage	2000	2.51	2017	2021	
Museum	2000	2.27	2018	2019	
Artwork	2000	2.14	2018	2019	
Impact	2000	1.85	2018	2018	
Alzheimers disease	2000	1.7	2018	2019	
Caregiver	2000	1.27	2018	2018	
Intervention	2000	1.27	2018	2018	
Art	2000	1.36	2019	2021	
Pigment	2000	3.35	2020	2021	

Each blue node in the table represents 1 year, a total of 22 blue nodes (22 years), where the red nodes represent the year in which the keyword outbreak occurred.

The role of museum art therapy on mental health

The ability to offer meaningful experiences for individuals of different backgrounds may be regarded as museums' social value. Marxen (2009) referred to the museum environment as a "potential space" for art therapy, fostering creative expression in "a safe empathic atmosphere" (p. 133). Among others, Hamil, Alter-Muri, McNiff, Marxen, and Salom (Trent, 1992; Fulcheri, 2002; Marxen, 2009; Salom, 2011; Ali and Haen, 2019) considered museums as protective places for healing and transformative experiences. These experiences include supporting a cohesive sense of self (identity), a sense of universality (belonging), and the meaning of relationships (validation) (Fulcheri, 2002). Art therapy has been shown to possess enhanced healing potential in promoting mental health through partnerships with museums and galleries (March et al., 2004). Museums address health issues by providing "non-traditional instructional services, gaining a vital role in community connection," (Ioannides, 2016; Thaler et al., 2017) which has been confirmed by the art psychotherapy program at EMST (National Museum of Contemporary Art Athens). Research has revealed that museum collections increase participants' self-esteem, confidence, and creativity. They also validate their experiences, promote critical thinking, increase open-mindedness, and stimulate intelligence (Linesch, 2004; Beel, 2009; Leonard, 2010; Bennington et al., 2016). From a psychological perspective, it is evident that the museum environment is a crucial part of the *perceived experience*. Every experience is part of an individuals' interaction with their human and physical environments (Penfold, 2017). Museum inspires children's feelings and emotions when activities and experiences related to art therapy are organized, allowing their minds to be receptive to new ideas. Tröndle and Tschacher (2012) found that artistic experiences in a museum are closely related to the visitors' tour through the museum space. British Alain De Botton and John Armstrong held the *Art Is Therapy* exhibition, which aimed to present a series of emotional themes vividly that are conducive to restoring mental balance. Alain De Botton asserted that art therapy in museums can assist in finding solutions to

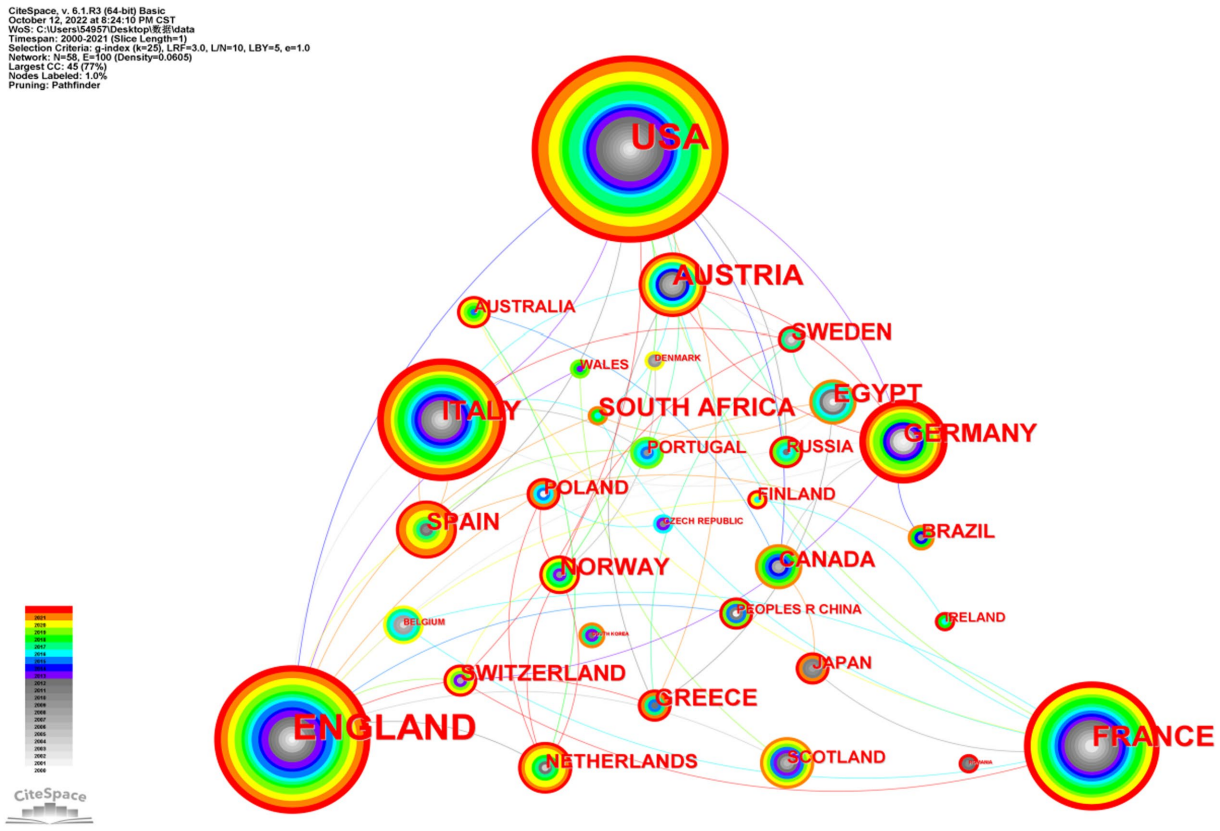

FIGURE 2
Country cooperation knowledge graph ($n \geq 3$). (Nodes represent the category of countries. The size of nodes is proportional to the number of documents in the country. Links represent cooperative co-occurrence relationships between different countries. The color of rings and links corresponds to the year. Purple rings indicate high centeredness.)

numerous problems in life such as reducing forgetfulness, bringing hope, demonstrating dignified sorrow, expressing painful feelings, promoting mind connections, helping one achieve mental balance, and guiding one in self-awareness (Serretti et al., 2004). The *See You at the Museum* project, which was presented by The Museum of Modern Art of New York, focused on guided tours and interactions. It was a healing exhibition for patients and their families. Canadian Doctors prescribed a *museum prescription* (Salom, 2011) and announced the collaboration between the Association of French-speaking Physicians of Canada and the MMFA. Helena Boyle, vice president of the Association of French-speaking Physicians, related that visiting museums has been proven to increase the secretion of serotonin, which is a neuroregulatory hormone that makes one feel happy. It is commonly known as the *happy factor*.

Research has demonstrated that appreciating abstract modern painting in art galleries, that is, in an artistic context that requires a distant artistic perspective may evoke strong aesthetic emotions, improving individuals' sense of well-being (Freedberg and Gallese, 2007; Leder et al., 2014; Consoli, 2019). Such experiences leave visitors with a sense of temporary separation from reality. Subsequently, they return to everyday life with a new awareness, specifically a feeling of being a part of "something bigger" (Kaplan et al., 1993). The combination of museum and art therapy, an innovative project, can help children connect with those who have similar feelings of loss, anger, and sadness so that they can regain their sense of security and control (Rochford, 2017). In accordance with the noted testimonies and based on restorative principles, it can be concluded that museum art therapy could possess realistic therapeutic functions. At the same time, the function of art therapy is strengthened. The value of this method includes alleviating the resistance of the community to treatment (Salom, 2011).

Discussion

In this paper, the current promotion of art therapy in museum development and the potential value of the combination of museum and art therapy on mental health are explored. Individuals who usually evade any treatment may experience art therapy in a museum setting as a release from their suppressed emotions. Furthermore, art therapy may enable them to discover how to express themselves, thereby reducing anxiety and promoting a sense of social belonging, which may be unattainable in other healing settings. Moreover, this literature review afforded us a preliminary understanding of issues in museum education and art therapy, which require further examination, including implications for China's museum art therapy in practice and future research directions.

Future research directions

The museum's distinct multi-media environment and various artifacts and art pieces are the most optimal place to conduct treatments. The education form of museums is linked to art therapies, which have demonstrated considerable potential in enhancing the treatment of psychological trauma during the COVID-19 pandemic and becoming an aesthetic intervention that can encourage positive changes in physiology and emotions.

The strength of museums can be found in creating new characters, stimulating new conversations, and inspiring new hopes. Currently, museums' roles are increasingly diverse, prominently as mediators of individuals' health and well-being and engines for social change (Betts, 2011). Some studies have shown that art is good for the soul and can improve both physical and mental well-being. Researchers in Canada investigated whether these art-based benefits could be delivered digitally through virtual museum tours (Beauchet et al., 2022). Amid the contemporary media background and in the process of intermingling with art therapy, the significance of the existence of museums and their unique educational function concerning things and benefits to people are recognized. Museums create significant interactions that encourage, support, and employ the relationship between people and things in new ways. This unique ability opens up imaginative and realistic frontiers for the healing potential of museums.

The relationship between museum education and art therapy is confirmed in this study. Furthermore, museum education's potential functions and specific practices in art therapy for treating mental health are highlighted. The findings encourage future research on the practical and beneficial psychological effects a museum visit could generate. Moreover, museum education should increase the use of augmented reality, virtual reality, and mixed reality technology, thus expanding the scope of museum art therapy beyond physical constraints and creating VR space for aesthetic experiences. Museum education should also take advantage of the online museum education community, allowing people in different countries and regions to enjoy artwork online, express different opinions freely, and listen to each other.

Limitations and conclusion

In this paper, a new bibliometric method was adopted to clarify the development and trends of this research to fill the gap in the research of museum art therapy. Thus, this field's main progress and new insights were identified more effectively. The results show that researchers are more and more interested in the research of museum art therapy. Through the combination of keyword co-occurrence, keyword burst analysis, and national co-occurrence network analysis, possible research directions in the future are proposed. In the future, the field of museum art therapy will gradually move towards more diversified cross-country cooperation, and more museum art therapy projects will be developed through scholars' cooperation and local cultural heritage characteristics. Therefore, further research is needed to solve the specific implementation mode of museum art therapy to demonstrate the participation mode and recognition of museums in art therapy.

This study is small-scale in nature. It is recommended that future research should explore the relationship between museum education modes in art therapy between patients with different clinical, physical, and mental states. Furthermore, follow-up studies are essential to assess the impact of museum art therapy on the short- and long-term effects of treatments in different treatment groups.

Author contributions

ZW and CZ performed the conception and design of study. ZW wrote the manuscript. CZ contributed to the manuscript revision. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Appendix

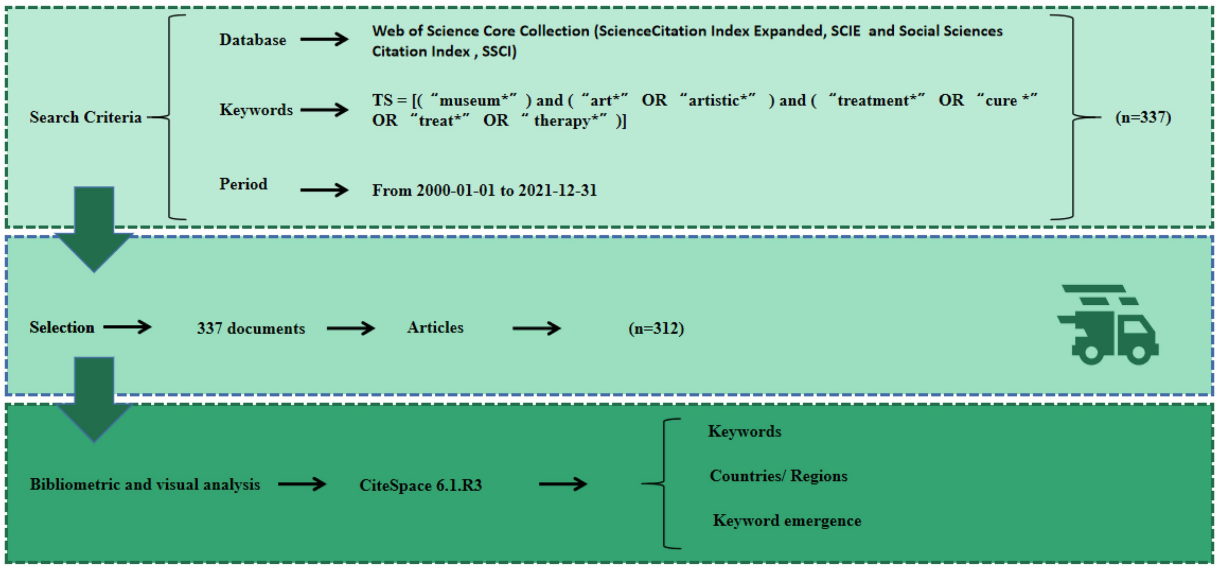

FIGURE A1
Search process overview. Document selection and flow chart for museum education and art therapy.

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The research focus and development trend of art therapy in Chinese education since the 21st century

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Since the 21st century, art therapy has made great progress and development in China's education. To find out the relationship between art therapy and special children, hundreds of related literatures were analyzed using co-word analysis software, which shows that art therapy is increasingly important in special children and their education. Expressive art therapy has a good development prospect in college students' mental health education and group counseling. The connotation of group painting therapy is constantly enriched. The theme research of mandala painting therapy is closely related, and painting art therapy focuses on the psychological counseling research of different groups, but the two are still in the marginal position in the whole research, and have not been paid attention to. Therefore, in the future research, firstly, we should continue to strengthen the research of art therapy and expressive art therapy in special education and individual mental health education; second, further broaden the depth and breadth of group painting therapy; third, strengthen the study of mandala painting therapy and painting art therapy.

KEYWORDS

art therapy, special education, health education, group painting therapy, mandala painting therapy

Introduction

Some introverted individuals or special groups are not good at expressing their emotions verbally or choose to keep their innermost emotions hidden. However, when emotions are not released or expressed for a long period of time, mental illness can be triggered. Art therapy can help individuals to express their emotions and feelings through external art forms such as painting and shaping. Art therapy is a therapeutic approach (Kaimal and Arslanbek, 2020), with the assistance of an art therapy, the individual engages in visual expression of mental images through painting, shaping and other forms of art, through which unexpressed thoughts and emotions are expressed outwardly. The mental images expressed and presented have a therapeutic and diagnostic function, providing an indicator of how the therapist and client are processing during therapy. During therapy, the client's emotions are often included in the artwork and are processed and resolved within the

therapeutic relationship. Art therapy was introduced by British artist Adrian Hill in 1942 and it became a stand-alone therapy in the 1960s. In the 1980s, it was introduced into the country, and its therapeutic effects are good for special groups with limited verbal and emotional expression (Richard et al., 2015). Since the 21st century, more and more attention has been paid to quality education (Crissien-Borrero et al., 2019), with its emphasis on the all-round development of students' morality, intellect, physique, esthetics and labor and on mental health education, which makes the art therapy increasingly important in education (Haeyen and Staal, 2021). In this context, it is important to explore the hotspots of art therapy in China's education since the 21st century and to clarify the direction of development of art therapy in China's education. In order to present the research results of art therapy in education in China since the 21st century in a more objective and intuitive way, and to provide knowledge support for the future research of art therapy in education in China, this study intends to draw a knowledge map of the hotspots of art therapy research in education in China since the 21st century with the help of scientific knowledge mapping technology, and to analyze the hotspots and trends of art therapy research accordingly, in order to provide some reference and guidance for the development of art therapy in education in China. This study aims to provide some reference and guidance for the development of art therapy in education in China.

Sources of information and research methodology

In this study, in terms of data collection, we searched hundreds of literatures on art therapy and painting therapy. In terms of data consolidation, data statistics and data analysis, we adopt the bibliometric analysis to show the hot spots and development trends in art therapy.

Sources of information

A precise search was conducted in the China National Knowledge Infrastructure (CNKI) journal database using the subject terms "art therapy" AND "painting therapy." We searched relevant articles from 2001 to 2021 and got 738 articles. Excluding non-standardized and non-subject related literature such as conference proceedings, announcements and school profiles, 462 articles were identified as valid. The key words in the valid literature were standardized, for example, the terms "group painting therapy" and "group drawing treatment" were combined into "group painting therapy."

Research tools

This study adopts the bibliometric analysis to show the hot spots and development trends in art therapy and use Bicomb 2.0 co-word analysis software and SPSS23, in which Bicomb 2.0 co-word analysis software can analyze the data in terms of core authors, main research institutions and so on. It can also visualize the most cutting-edge areas of educational research through images, revealing an overview of the development of educational research at different levels, allowing researchers to take a comprehensive look at the structure of the field of educational research and information on research hotspots and priorities.

Research process

Firstly, Bicomb 2.0 software was used to extract high-frequency keywords and generate a word-part matrix. Secondly, SPSS23 was used to cluster the word-part matrix to generate a similarity matrix and a dendrogram. In addition, the similarity matrix was used to conduct a multi-dimensional scale analysis and combined with the dendrogram to draw a knowledge map of research hotspots. Finally, the knowledge map was interpreted and analyzed for content.

Findings of the study

High frequency keyword statistics and analysis

The keywords of a paper are the words used by the author to precisely express the central idea of the paper. By analyzing the keywords of a paper, one can get a general idea of the topic of the paper and the author's core ideas. Therefore, the keyword count of the selected papers was conducted by Bicomb 2.0 co-word analysis software. Four hundred and sixty-two papers with a total of 1,688 keywords were standardized and analyzed for word frequency statistics. The keyword threshold was determined according to the Price formula $M = 0.749$, where M represents the high frequency threshold and N_{max} represents the highest value of the frequency of literature cited (Yang et al., 2019). The highest value of literature cited frequency in the selected literature is 128, i.e., $N_{max} = 128$. Then, the formula was used to calculate $M = 8.464$, so 8 was determined as the minimum frequency of high-frequency keywords, and keywords with a frequency greater than or equal to 8 were selected as high-frequency keywords, a total of 30. The results are shown in Table 1.

As can be seen from Table 1, the top 10 high-frequency keywords all appear more frequently than or equal to 20, in the order of painting therapy (129), art therapy (121), painting art therapy (41), schizophrenia (39), fine art therapy (35), expressive art therapy (32), university students (28), mental health education (22), autistic children (21), and depression (20). The remaining 20 high-frequency keywords all appear more frequently than 8. The above results tentatively indicate that art therapy approaches such as drawing therapy have become a hot spot and focus of research in art therapy to help university students and special groups such

TABLE 1 High frequency keywords.

No.	Keywords	Frequency	No.	Keywords	Frequency
1	Painting therapy	129	16	Children	13
2	Art therapy	121	17	Anxious	13
3	Painting art therapy	41	18	Quality of life	13
4	Schizophrenia	39	19	Self-respect	11
5	Fine art therapy	35	20	Group painting therapy	10
6	Expressive art therapy	32	21	Teenagers	10
7	University students	28	22	Special education	9
8	Mental health education	22	23	Self-efficacy	9
9	Autistic children	21	24	Emotional disorders	9
10	Depression	20	25	Datura painting therapy	9
11	Special children	19	26	Counseling	9
12	Group counseling	19	27	Psychological consulting	9
13	Psychotherapy	16	28	Art education	8
14	Recovery	15	29	Left-behind children	8
15	Fine art education	14	30	Application	8

TABLE 2 Similarity matrix of Ochiai coefficients for high frequency keywords (parts).

	Painting therapy	Art therapy	Painting art therapy	Schizophrenia	Fine art therapy	Expressive art therapy	University students	Mental health education	Autistic children
Painting therapy	1.000	0.008	0.057	0.179	0.015	0.112	0.137	0.154	0.099
Art therapy	0.008	1.000	0.000	0.090	0.015	0.000	0.120	0.155	0.079
Paint art therapy	0.057	0.000	1.000	0.104	0.000	0.000	0.060	0.000	0.069
Schizophrenia	0.179	0.090	0.104	1.000	0.000	0.029	0.000	0.000	0.000
Fine art therapy	0.015	0.015	0.000	0.000	1.000	0.000	0.032	0.108	0.111
Expressive art therapy	0.112	0.000	0.000	0.029	0.000	1.000	0.067	0.151	0.000
University students	0.137	0.120	0.060	0.000	0.032	0.067	1.000	0.363	0.000
Mental health education	0.154	0.155	0.000	0.000	0.108	0.151	0.363	1.000	0.000
Autistic children	0.099	0.079	0.069	0.000	0.111	0.000	0.000	0.000	1.000

as schizophrenics, autistic and depressed patients to carry out psychological treatment and rehabilitation. At the same time, art therapy methods such as group painting therapy and mandala drawing therapy are also receiving increasing attention from researchers in psychological counseling and consultation for other groups and fields.

Similarity matrix analysis of Ochiai coefficients for high frequency keywords

The closer the value in the Ochiai coefficient similarity matrix is to 1, the closer the two keywords are to each other. And the more similar they are. Conversely, it indicates that the more distant the keywords are from each other, the less similar they are. The word-part matrix was imported into SPSS23 to generate the Ochiai similarity matrix for high-frequency keywords, and the results are shown in Table 2.

As can be seen from Table 2, the various key words are in order of proximity to drawing therapy: schizophrenia (0.179), mental health education (0.154), university students (0.137), expressive art therapy (0.112), and children with autism (0.099), etc. This suggests that art therapy approaches based on drawing therapy, expressive art therapy and other art therapies have become an important part of art therapy in exploring art therapy for mental health education and treatment of different groups of people such as schizophrenics and university students. Figure 1 shows the number of Publications on art therapy from 2015 to 2021, it can be seen that this field is gradually attracting researchers' attention.

High frequency keyword clustering analysis

In order to show the relationship between keywords more intuitively, the Bicomb 2.0 co-word analysis software was used to

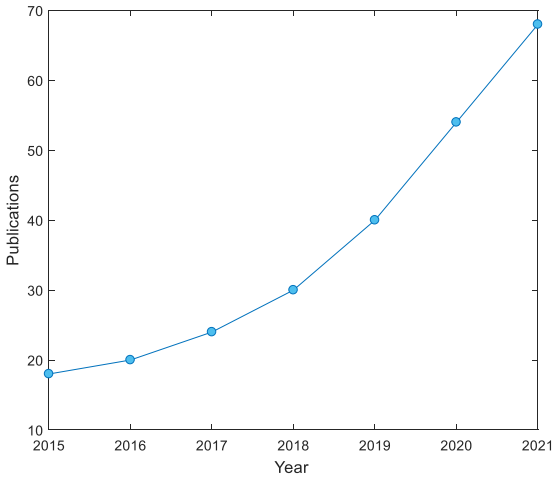

FIGURE 1
Number of publications on art therapy from 2015 to 2021.

import the word-part matrix generated from 30 high-frequency keywords into SPSS23 for cluster analysis, generating a cluster analysis dendrogram of high-frequency keywords, as shown in Figure 2.

In Figure 2, the numbers on the vertical axis indicate the corresponding 30 keywords, and the numbers on the horizontal axis indicate the distance between the keywords. When the number is smaller, it indicates that the distance between the two keywords is smaller. When the similarity is higher, the closer the relationship is (Wang et al., 2021). According to the genealogical relationship of high-frequency keywords, they can be divided into four categories. Category 1 is the research on the application of art therapy in special children and their education, including six keywords of art therapy, special children, art education, special education, psychological consultation and application. Category 2 is the research on expressive art therapy in mental health education and group counseling of university students, including expressive art therapy, group counseling, college students, mental health education, art therapy, art education. Category 3 is a study of group painting therapy and mandala painting therapy in the rehabilitation of schizophrenia and depression patients, including 9 keywords such as schizophrenia, rehabilitation, mandala painting therapy, depression. Category 4 is a study of the psychological counseling and treatment of painting art therapy in different groups, including painting therapy, left-behind children, art education, and application. It includes nine keywords such as painting therapy, left-behind children and psychological counseling.

Visual knowledge mapping for art therapy research

The Ochiai similarity matrix was analyzed on a multidimensional scale using SPSS23 and combined with a tree diagram to create a visual knowledge map of hotspots in art therapy research, as shown in Figure 3.

In Figure 3, the smaller circles represent the position of the corresponding keywords. The closer the spatial distance between the circles, the closer the relationship is. Conversely, the relationship is more distant. The closer the circles are to the center of the strategic coordinates, the greater the influence of the keyword they represent. The horizontal axis of the coordinates represents centripetalism, the strength of inter-domain influence. The vertical axis represents density, the strength of inter-domain influence. As can be seen in Figure 3, the research on the application of art therapy to children with special needs and their education (corresponding to category 1) in domain 1 is mainly located in the first quadrant. In particular, "special children" and "special education" are located on the horizontal axis. This indicates that this area is a hotspot for research in this period and that there is a strong interaction between the areas. Area 2, expressive arts therapy in mental health education and group counseling for university students (corresponding to category 2), is located across quadrants 1 and 2. Among them, "expressive arts therapy" is in the second quadrant, "group counseling" is on the vertical axis, and the rest of the keywords are in the first quadrant. This suggests that there is good scope for the development of expressive arts therapy. There are strong interactions within this field and it is a hot spot for research at the moment. The research on group painting therapy and mandala drawing therapy for rehabilitation in schizophrenia and depression patients (corresponding to category three) in domain three is located in quadrants two and three. This suggests that group-based drawing therapy to enhance self-esteem, self-efficacy and quality of life in schizophrenia patients is of greater potential importance throughout the research and is constantly enriched. The thematic research area of mandala-based drawing therapy for the rehabilitation of depressed patients is internally well connected and has a clear title. However, it is marginal to the overall research. The research on counseling and treatment of painting art therapy in different groups (corresponding to category four) in domain four is mainly located in quadrants three and four. This indicates that the field is more tightly connected internally and that there is a body of research that has conducted formal research on it (Lavey-Khan and Reddick, 2020). However, it is also marginal to the overall research and has not yet received much attention.

Trends in art therapy research

The growing importance of art therapy in children with special needs and their education

In Figure 3, the keyword "art therapy," which constitutes Domain 1, is in the first quadrant, while "special education" and "special children" are on the horizontal axis. This indicates that this area is a hot spot for research in this period and that there is a strong interaction between the areas. Art therapy is a form of

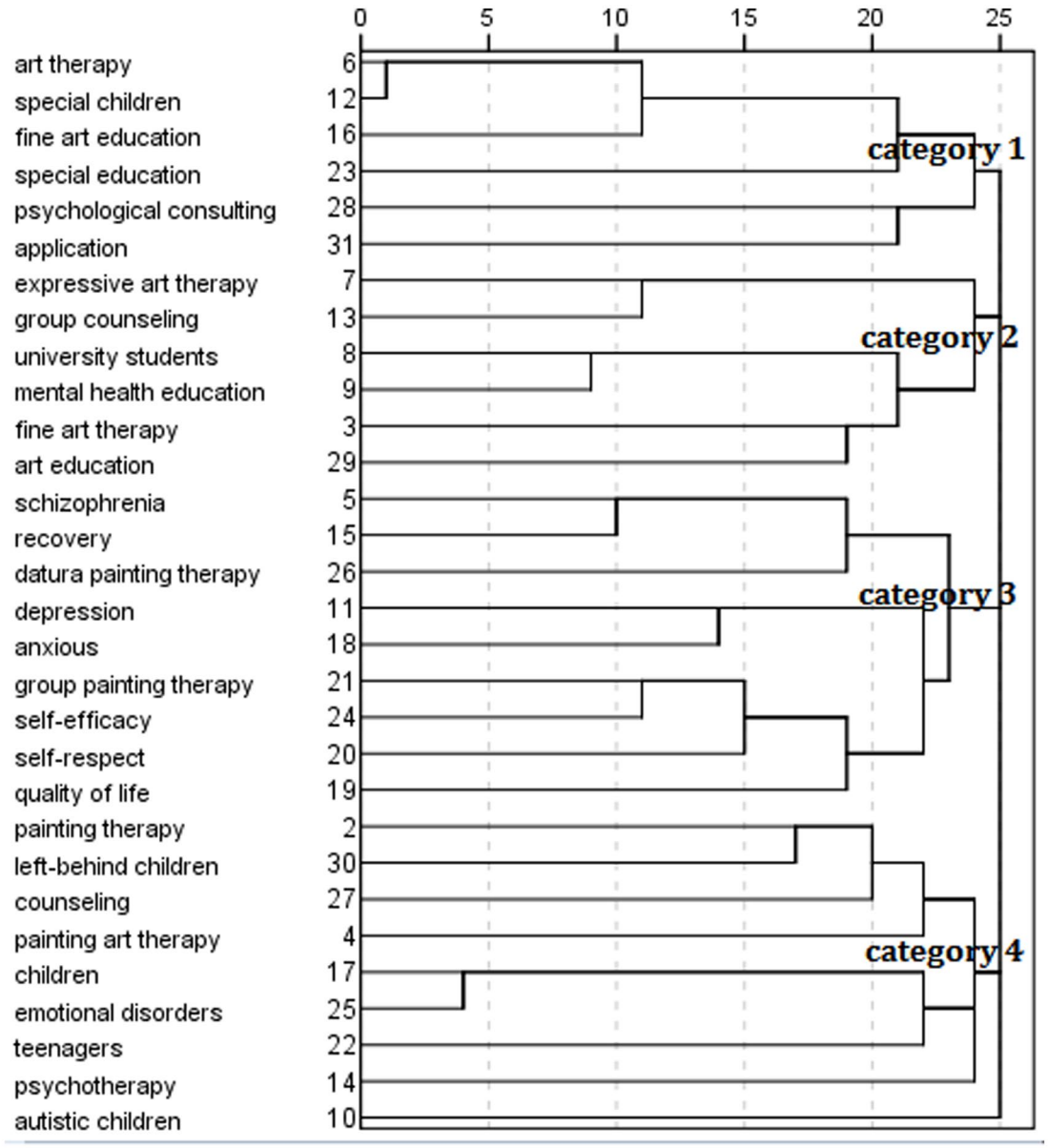

FIGURE 2
Cluster diagram of high–frequency keywords in art therapy research field.

therapy that integrates non-verbal expression, communication, communication and visual images. The art therapy method is applied to children with special needs. The application of art therapy to the education of children with special needs can help them to express their emotions through painting and to present their perceptions of their surroundings in a subjective way. As a "multi-focused intervention," art therapy is often used for children with symptoms such as lack of self-awareness, inattention, difficulties in self-expression and rigid behavior (Harpazi et al., 2020). Lee and Liu (2016) attempted to find the improving effect of art therapy on behavioral adjustment and self-motivation of special educational children, they found that although the art therapy has little effect on sense of autonomy and their learning ability, art therapy can improve their behavioral adjustment and emotional *via* their parents' reports. Art education is very important not only in general education, but also in special education. The integration of art therapy into special and general education to promote special students' skills, emotional regulation and self-expression has recently become more and more important (Allahverdiyev et al., 2017). For autism treatment, research has shown that the use of art therapy can help people with autism improve their social skills (Yücesoy et al., 2020). In additional, another research also pointed out that art therapy provides a non-verbal language advantage with effect of strong feeling, which

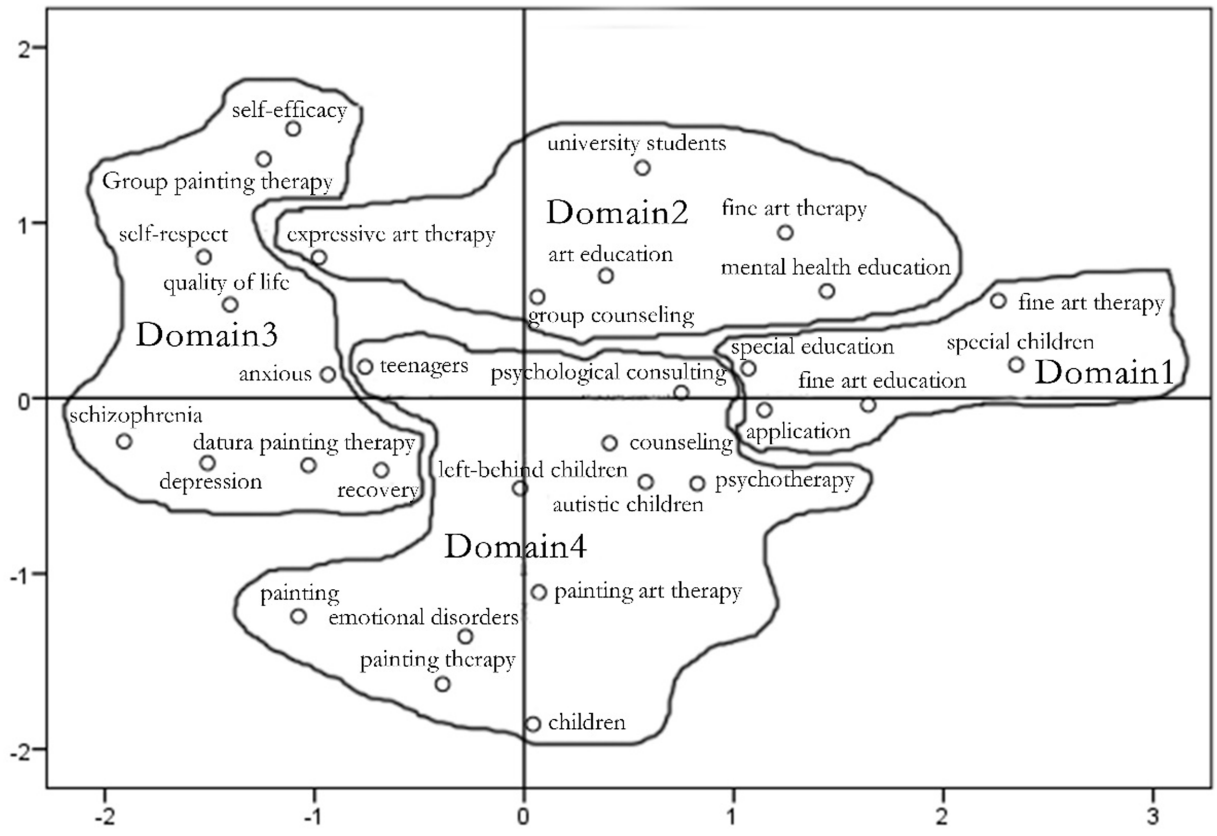

FIGURE 3
Knowledge map of hotspots in art therapy research.

can be used for special children treatment (Petruta-Maria, 2015). In summary (Srolovitz et al., 2022), it can be found that art therapy can effectively improve the physical and psychological problem behaviors of children with special needs, which makes it increasingly important in special education in China.

Expressive arts therapy has good prospects for development in mental health education and group counseling for university students.

In Figure 3, the keywords "art therapy," "art education," "mental health education" and "university students" are all located in the first quadrant. This indicates that this area is also a hotspot and focus of research, with strong interactions within the area and that expressive arts therapy has good potential for development. Expressive arts therapy originates from art therapy, a counseling and therapeutic approach that uses and integrates different art forms in psychotherapy to help clients express their inner emotions and improve their personality (Otting and Prosek, 2016). It generally consists of two working orientations, namely the art psychotherapy orientation and the art therapy orientation (Stuckey and Nobel, 2010). The former uses art as a medium of non-verbal communication to help visitors understand and resolve their emotional problems through artworks that express the inner world, together with verbal associations and explanations, focusing on non-verbal communication and interpretation between the therapist and the visitor in the process of art creation. The latter is a process of artistic expression that uses the power of artistic activity to alleviate the individual's internal conflicts and conflicts with the social environment, to raise awareness, to give vent to emotions and to sublimate emotions, and is more artistic in nature. Expressive arts therapy is an intuitive way of thinking that allows for the timely expression of repressed content in the visitor's subconscious in a non-verbal, symbolic manner. It also allows for a sense of safety, less impediment and facilitates the gathering of authentic information. It can be applied to a wide range of clients, breaking through the limitations of different visitors' ages, languages, cognitive ranges and artistic skills, which is highly flexible and versatile. It is also a safe way to release destructive energy, such as anger and hostility, in a way that is socially acceptable (Maiese, 2016). Expressive arts therapy is now widely used in individual counseling and

group counseling in colleges and universities. College counselors use professional working environments, such as counseling rooms, drawing therapy rooms, integrated group therapy rooms and other separate spaces to provide a comfortable and reassuring environment for students to express themselves. Based on the two working orientations of expressive arts therapy, counselors use these techniques to focus on the inner state projected by the visitor from therapy, using the work created as a tool to detect psychological states, and to guide the visitor to experience self-growth in expressive arts therapy. The integration of expressive arts therapy techniques into mental health education programs is an important way to promote reform of mental health programs in universities. Using the strong experiential sense of art to guide students to deeply engage with the theme of mental health education teaching not only increases student participation and leads to spontaneous thinking, but also enhances the fun of the classroom and increases student motivation. In addition, most cultural activities on campus are themed around creative artistic expression. The flexible use of expressive art therapy in campus activities can create a harmonious campus atmosphere through enriching activities, while helping students to present their problems in interpersonal relationships, academic stress and self-growth confusion through artistic creation, providing a platform for their psychological growth (Torgerson, 2018). Therefore, the therapy has good prospects for development in mental health education and group counseling for university students.

Group painting therapy continues to be enriched

In Figure 3, the key words "self-efficacy," "group drawing therapy," "self-esteem" and "quality of life," which make up Domain 3, are located in the second quadrant. The research subjects of this domain, "schizophrenia" and "depression," are located in the third quadrant. This indicates the potential importance of group drawing therapy in the overall study. However, research on people with schizophrenia and depression is still marginal. Schizophrenia is a complex mental illness that severely impairs life and social functioning, and one of its core features is cognitive deficits (Li, 2020). Patients with schizophrenia show varying degrees of abnormalities in personality traits, attention, memory, processing speed, executive functioning, language expression, thought perception, spatial ability and social cognitive ability (Wu et al., 2017). Depression is a common psychiatric disorder characterized by low mood and a lack of pleasure (Karyotaki et al., 2021), in which altered cognitive functioning is not only a typical symptom of depression, but also an important risk factor for depressive episodes (Mirza et al., 2017). Group painting therapy is a form of psychotherapy that uses drawing as a mediator and a group approach (Yuan et al., 2021). It allows patients to use non-verbal tools to reveal subconsciously repressed feelings and conflicts in the process of drawing, which can be expected to be uniquely useful for people with schizophrenia and depression who have emotional, cognitive and social impairments. The non-verbal imagery of drawing can also be used to avoid consciousness, defense mechanisms and impediments to a greater extent, enabling individuals to express a richer experience of psychological content and compensating for the lack of interview-based psychotherapy (Simon and Kovács, 2015). In addition, compared to individual drawing therapy, group painting therapy provides multiple perspectives on the experiences and feelings of others, enhances the ability to actively develop oneself (Lavey-Khan and Reddick, 2020). It also allows patients to enhance their creativity, promote emotional and cognitive recovery, improve social functioning and enhance their quality of life. The treatment has been widely used in developed countries such as Europe and the US (Joschko et al., 2022), which is generally recognized for its effectiveness in the rehabilitation of patients with schizophrenia and depression. Domestic studies on their group painting therapy have also found that group painting therapy helps to improve the symptoms of patients with schizophrenia and promotes the recovery of their self-esteem and self-efficacy (Yuan et al., 2021). It is also effective in improving the cognitive functioning of depressed patients, increasing their self-esteem levels, improving their sleep quality and reducing their negative emotions (Rointan et al., 2021). In summary, it can be found that the connotations in group painting therapy regarding schizophrenia and depression patients are constantly enriched, from the cognitive and emotional problems caused by the individual's physiology to a greater focus on their inner psychological enhancement such as self-esteem, self-efficacy and quality of life.

Research on the subject of mandala painting therapy is closely related, but research is marginal.

In Figure 3, the keywords "mandala painting therapy," "schizophrenia," "anxiety," "depression" and "recovery," which make up Domain 3, are all located in Quadrant 3. This indicates that the field is well connected and has a clear title, but is marginal to the overall research. Mandala painting therapy, developed by Carl Jung, the founder of the psychoanalytic school, refers to a non-verbal psychotherapy based on the principles of projection, expression, symbolism, sublimation and externalization, mediated by mandala painting tools, in which individuals paint mandalas in order to present the repressed content of their personality and subconscious and achieve catharsis, emotional improvement, trauma repair and personality integration in the process of painting (Kostyunina and Drozdikova-Zaripova, 2016). It is a widely used form of psychological assessment and therapeutic drawing psychotherapy, which has the function of projecting the inner world and healing the mind through drawing, reducing psychological disorders and maintaining inner order (Angellim

et al., 2020). Mandala painting includes both structural and non-structural forms, structural mandalas where the painter colors in a pre-designed mandala pattern and non-structural mandalas where the painter paints freely within the required blank circle (Lee and Kim, 2020). In current research, mandala painting therapy is mainly applied to the rehabilitation of anxiety and other emotions in schizophrenia and depression patients. It has been found that mandala painting therapy can effectively promote the alleviation of anxiety, improve mood, enhance their self-esteem, improve interpersonal and communication skills, and thus promote the recovery of their social functions in schizophrenia patients in recovery (Cox and Cohen, 2000). Mandala graphics present a cosmic outlook, and the process of painting helps to stabilize mood, alleviate depression and stimulate personal potential. Self-intervention in depressive states through mandala painting therapy helps depressed patients to regain their courage and self-confidence to overcome their illness and to regain their initiative in life, thus becoming more proactive in participating in functional training (Petrishscheva and Filatova, 2017). In addition, as a result of the active therapeutic intervention, the patient's neurological function is restored, the ability to perform daily activities is significantly improved, and the depressive symptoms are correspondingly improved, thus reinforcing the patient's confidence that he or she can overcome the illness, thus reaching a virtuous circle (Liu and Lu, 2018). However, research on mandala painting therapy is still marginal, probably due to the fact that there are fewer psychologists and related researchers specializing in mandala painting therapy, which has led to less research in this area and consequently to the marginalization of research in this field.

The focus of painting art therapy on the study of counseling for different groups of people has not received much attention in the overall study

In Figure 3, the keywords "painting art therapy," "emotional disorders" and "left-behind children," which constitute domain 4, are all located in the third quadrant. The first two keywords are close to each other, indicating that they are closely related to each other. The keywords "psychological counseling," "psychotherapy," "psychological counseling" and "autistic children" are all located in the fourth quadrant. The fact that they are in the fourth quadrant indicates that the field is well connected and has been formally studied by research institutions, but is also marginal to the overall research and has not received much attention. Mood disorders in children refer to a psychological disorder that occurs in childhood or adolescence, with anxiety, fear, depression and obsessions as the main clinical manifestations (Huang et al., 2012), which seriously affects the normal physical and mental health of children. In the past, children with mood disorders were often treated with medication, but the results were not satisfactory and the incidence of adverse effects in children was high. Art therapy is a non-verbal way of expressing and communicating with the child, in which the child is encouraged to express his or her emotions and bring out his or her subconscious emotions and inner conflicts. It is a form of psychotherapy that is closer to nature and relies on the individual to feel the environment. As a common form of art therapy, painting can not only help individuals to resolve or alleviate emotional problems or psychological disorders caused by psychological factors, but can also help clients to integrate their feelings, improve their self-understanding, promote growth and provide a comfortable and pleasant emotional experience through the process of painting (Bitton and Laufer, 2018). It has been found that children with emotional disorders can learn to re-conceptualize themselves, self-reflect and think through the process of drawing, which can also use drawing to vent their inner emotions and release their inner repression, thus facilitating their emotional expression, alleviating emotional disorders and changing their behavioral patterns (Paine et al., 2021). At the same time, the therapist can judge the child's psychological condition through the content of his or her drawings and provide him or her with targeted psychological guidance to enable him or her to better express his or her hidden emotions (Jalambadani, 2020). It has also been found that art therapy is beneficial to the emotional and cognitive development of children with autism, improving their social and verbal skills and enhancing their rehabilitation outcomes (Sampurno et al., 2020). For children left behind who are introverted, withdrawn, self-conscious and unsociable, drawing art therapy can also create a harmonious and calm psychological environment for them, enhance their self-confidence and self-esteem, and help them to vent their emotions and build good interpersonal relationships (Zhang et al., 2021). The art of drawing is also used to create a harmonious and calm psychological environment for children, enhance their confidence and self-esteem, and help them to vent their emotions and build good relationships. This shows that pictorial art therapy focuses on counseling and therapy for different groups of people to improve their psychological problems. However, this area has not received much attention in the overall research. Therefore, further research is needed in this area in future studies.

Conclusion

To explore the relationship between art therapy and special children, through the analysis of the knowledge map of research hotspots of art therapy in China's education since the 21st century, it is found that art therapy is increasingly valued in special children and their education. Expressive art therapy has good prospects for development in the mental health education and group counseling of university students. The connotation of group painting therapy is constantly enriched; mandala painting therapy is closely related to thematic research, and painting art therapy focuses on the study of psychological counseling for different groups, but these two are still on the periphery of the overall research and have not yet attracted attention. Since the 21st

century, the research progress of art therapy in education in China has made certain achievements. However, future research should also focus on the following areas. Firstly, continue to strengthen the research on art therapy and expressive art therapy in special education and individual mental health education. Secondly, the depth and breadth of group drawing therapy should be further broadened. Thirdly, research into mandala painting therapy and painting art therapy needs to be increased.

Author contributions

YC data analyzes and writing of the manuscript. FW critical review of the manuscript. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Art therapy practices in museum education: A mini review

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This article reviews the potential functions and approaches of museum education in alleviating psychological anxiety, particularly the psychological anxiety experienced by adolescents during the COVID-19 pandemic. We outline the main forms of museum education, highlighting how it supports the potential functions of art therapy for psychological anxiety. Thereafter, we review the representative research on museum art therapy practice for different populations to invite discussion, dialogue, and awareness of future directions for museum education and suggest gaps in the research that require further study.

KEYWORDS

art therapy practices, integrated art therapy, museum education, psychological anxiety, virtual reality

1. Introduction

Museums are important informal learning environments. The traditional one-way educational role of museums is changing, driven by new museology and related participatory practice research (Dewey, 1916; Vergo, 1989; Sandell, 1998; Davallon, 1999; Marstine, 2006; Mairesse and Desvallées, 2007; Simon, 2010; McSweeney and Kavanagh, 2016). Museums are also a key asset for community well-being, contributing to local health and welfare goals and maintaining public well-being (Lackoi et al., 2016). Indeed, a paradigm shift has occurred from simply displaying rare art collections to enriching visitor engagement; museums now offer art prescription programs and "hard-to-reach" museum audiences are engaged through museum education. These programs are designed to allow participants to communicate non-verbally through art, craft, photography, or design. In curating or participating in museum exhibitions to creatively express themselves, participants' selves are nurtured (Morse and Munro, 2018). Consequently, museums are interacting and influencing people in a richer way and asserting their role as a public service, with education at its center. Museum education can be defined as a set of values, concepts, knowledge, and practices designed to ensure visitors' development: It is a cultural adaptation process that relies on pedagogy, development, practice, and acquiring new knowledge (Desvallées and Mairesse, 2010, p: 31).

The COVID-19 pandemic continues to pose a global challenge to mental health. The World Health Organization (2019) warns that a lack of mental health care is a major cause of the global disease burden. One-fifth of children and adolescents worldwide have mental health problems. Their unmet psychosocial needs are exacerbated by war, adversity, discrimination, disease, and natural disasters. Surveys show an increasing trend in psychological distress among adolescents, manifesting as learning and somatic anxiety, and easily becoming sensitive and fearful (Qin et al., 2021). Such problems can seriously interfere with daily functioning (Bhosale et al., 2015; Veldman et al., 2015) and increase the risk of underperforming in school (Veldman et al., 2015). Hence, there is a greater need for psychotherapy to reduce the incidence of psychological problems (Li et al., 2020).

This mini review aims to invite discussion, dialogue, and recognition of the potential functions of museum education in therapy to expand the range of museum education services, explore the possibilities of museum involvement in art therapy through representative case studies of this

practice with diverse populations, and highlight the effectiveness of virtual reality (VR) museum education in providing distance therapy for adolescents. Our work in museums inspired us to better understand the literature on the use of art therapy approaches in museums.

2. Materials and methods

We screened representative literature for different populations in the Web of Science Core Collection database. Web of Science is a comprehensive multidisciplinary core journal database. Web of science database has the world's largest and most comprehensive academic information resources, covering more than 12,000 academic journals in natural science, engineering, biomedicine, social science, art, humanities and other disciplines. This article uses the Web of Science Core Collection [Science Citation Index Expanded (SCIE) and Social Sciences Citation Index (SSCI)] database as the data source. The search formula is: [TS = ('art *' OR 'artistic *') and ('treatment *' OR 'cure *' OR 'treat *' OR 'therapy *')] and ('museum *' OR 'museums *') and ('education *' OR 'educational *'). We did not restrict the publication year; however, the source language was limited to English. The search yielded 10 representative peer-reviewed articles citing museum education and art therapy practices, including theoretical and critical perspectives (Treadon et al., 2006; Salom, 2011; Ioannides et al., 2021), ethnography, qualitative analysis, and clinical treatment cases (Colbert et al., 2013; Mangione, 2013; Bennington et al., 2016; Zarrabi et al., 2020; Armstrong et al., 2021; Price et al., 2022; Wallen and Docherty-Hughes, 2022). Specific practices for different groups are reported, covering different benefits for anxiety, traumatic memories, self-disappointment, geriatric groups, Alzheimer's disease, chronic illness, and psychiatric patients (Table 1).

3. Results

3.1. Activity approach and therapeutic function of museum education

The educational purpose of a museum influences all the activities that take place within it and determines its therapeutic function. The visit experience can lead to long-term introspective and cognitive outcomes, especially in social awareness (DeWitt and Storksdieck, 2008; Annechini et al., 2020).

During the pandemic, various populations developed psychological problems such as anxiety, depression, and insomnia due to stress. Some patients experienced suicidal ideation or acute psychiatric disorders. Compared with traditional therapeutic interventions, the museum serves as a supportive place that embraces social inclusion, promotes cohesion by being open to people from all walks of life, and provides a space for reflection on ideas that combat discrimination and enhance well-being. These responsibilities demonstrate the value of museums as healing places (Ioannides, 2016; Figure 1). As Annechini et al. (2020) argue, museums have restorative effects on children's psychology.

3.2. Potential functions of museum education

Museum practices, museum professionals, and academics have gradually expanded the concept of education in museums for learning activities in museum settings (Allard and Boucher, 1998; Hein, 2002; Leinhardt et al., 2003). Current museum education practices can be categorized into universal, heuristic, exploratory, living, physical experience, and artificial intelligence educational activities (Table 2).

3.3. The art therapy function of museum education

Museums have noted the usefulness of art therapy for improving mental health (Stickley and Eades, 2013) and can work with the health care or higher education sectors. Multisectoral collaboration is effective in improving participants' mental health and well-being (Docherty-Hughes et al., 2020). However, the potential for art therapy to expand into new areas has not yet been fully recognized and its spiritual and mental health improvement effects not fully explored. There is an urgent need to strengthen the support given to museums and related cultural institutions for art therapy work, which can be widely applied to significantly help patients embarrassed about their disease or resisting treatment.

The combination of museum education and art therapy plays a vital role in improving psychological anxiety, and art therapy enables individuals to make connections between internal and external reality (Treadon et al., 2006; Shaer et al., 2008; Colbert et al., 2013; Betts et al., 2015; Salom, 2015; Ioannides, 2016; Coles and Harrison, 2018; Coles et al., 2019; Coles, 2020). This combination meets the needs of contemporary society and demonstrates the potential benefits of museums as non-traditional tools for art psychotherapy, providing help through meaningful connections and allowing individuals to "reflect on and share their past" (Salom, 2011, p: 83).

Museum educators (Froggett et al., 2011; Colbert et al., 2013) and art therapists (Treadon et al., 2006) believe that art therapy in museums has become an increasingly important endeavor, especially for mental health support (Treadon et al., 2006). The most popular types of museum programs are those designed to allow participants to express themselves creatively through art, craft, photography, design, curation, or participation in museum exhibitions (Morse, 2021). Museums help participants reflect on lived experiences, reconcile the past, and reconstruct narratives *via* educational and creative arts programs (Camic and Chatterjee, 2013). They provide a potential therapeutic opportunity (Salom, 2008) and a "caring" space (Morse, 2021) and offer opportunities for self-development, spiritual and artistic growth, and social connection (Roberson, 2011).

Additionally, art "can help guide, exhort, and comfort audiences to become better versions of themselves" (de Botton and Armstrong, 2013). The potential benefits of art therapy include memory, hope, grief processing, rebalancing, self-understanding, growth, and appreciation. Thus, art therapy in a museum setting may help adolescents increase their sense of belonging and support self-reflection and other psychological needs. Activation of autobiographical memories is associated with feelings of well-being (O'Rourke et al., 2011), and this function of art can be combined with the therapeutic effects of reminiscence. The process of sharing memories and praising one another supports group cohesion and improves mental health (Wadensten, 2005; Chiang et al., 2010). Thus, museum-based art therapy can potentially alleviate psychological anxiety among adolescents.

3.3.1. Mental restoration

Museum-based art therapy facilitates mental restoration by relieving physical tension and mental anxiety. Many people visit museums for

TABLE 1 Key findings.

Article Title	Author (year)	Treatment Topics	Research content	Key findings
Caring Spaces: Individual and Social Wellbeing in Museum Community Engagement Experiences	Wallen and Docherty-Hughes (2022)	Self-reflection	It is only possible to interpret art in a safe way through personal experience when their peers understand the challenges of living with mental illness or the reality of becoming homeless with safety knowledge.	The positive impact on the overall well-being of the "caring spaces" generated through museum community engagement work is achieved through a process of deep critical reflection, which enhances self-esteem and self-confidence, and raises participants' awareness of positioning ontology in the context of broader social inequalities and identity issues. Museum community engagement programs, when practiced and experienced as "spaces of care," play a key role in enhancing participants' own personal and social well-being, particularly in identifying long-term educational and self-worth legacies.
Exploring Trauma Responsive Educational Practices in a Museum	Price et al. (2022)	Trauma Responsive Education Practice (TRE)	How one museum learned about the presence and impact of trauma by exploring the framework developed by the Trauma Responsive Educational Practices (TRE) program.	They needed more support to adapt to the unique environment of the museum; evoked memories of personal trauma for some staff members, so they needed to rethink implementation.
Weaving Trauma Awareness into Museum Education	Armstrong et al. (2021)	Art Therapy for Trauma	This paper explores the dynamics of trauma-informed approaches to interacting with art, specifically detailing methods that can create new cognitive, emotional, and sensory experiences while outlining the key principles of Trauma-Aware Art Museum Education (T-AAME) as it relates to visitors.	Trauma-aware museum educators have a therapeutic role in helping visitors reintegrate into their lives. The dynamics of a trauma-aware approach to interacting with art are explored.
The "Third Object" in Palliative Care Education: Impact of a Novel Art Museum–Based Curriculum to Foster Reflection, Self-Awareness, and Teamwork Among a Multidisciplinary Palliative Care Team (S748)	Zarrabi et al. (2020)	Art Theme Experience	MBE pedagogy constructed around the themes of pain, healing, dignity, complexity, and legacy MBE pedagogy constructed around the themes of pain, healing, dignity, complexity, and legacy	Four themes were identified that exemplify the value of this educational experience: (1) using art as a "proxy" in a neutral setting to safely access emotions and work through difficult situations, (2) appreciating the value of experiential immersion in clinical development, (3) discovering the power of the multidisciplinary palliative care team, and (4) shaping work-life balance.
Contemporary artworks as transformational objects in art psychotherapy museum group work	Ioannides et al. (2021)	Art Psychotherapy	It examined two group art psychotherapy projects held at the National Museum of Contemporary Art (EMST) in Athens in 2017. It focused on three contemporary artworks from the EMST collection, by Kimsooja, Ilya Kabakov, and Sophia Kosmaoglou, and how working with these groups could be explored through object relations theory.	By linking contemporary art to existing object relations theory, contemporary art benefits when practicing psychotherapy in a museum setting. We conclude that professionals who run the museum and gallery-based psychotherapy groups will find the contributions of object relations theory and contemporary art beneficial in this way. Art psychotherapy can be beneficially implemented in a museum setting.

(Continued)

TABLE 1 (Continued)

Article Title	Author (year)	Treatment Topics	Research content	Key findings
Art therapy in art museums: Promoting social connectedness and psychological well-being of older adults	Bennington et al. (2016)	Art museum education increases well-being and social connection work	Explores the phenomenological perspectives of older adults who participate in museum art therapy groups and attempts to understand how the functions of art proposed by de Botton and Armstrong (2013) are reflected in the art and writing of older adults who visit museums. Museums with art therapists. Emergent categories in art and writing are integrated into de Botton and Armstrong's broader themes of art functioning. Outcomes related to mental health, quality of life, and perceived social support are also addressed.	We examined the use of art museums as a therapeutic tool for older adults. - Art museums offer a safe exploration of emotions, thoughts, and memories. - Qualitative data show increased well-being and social connectedness. - This study supports previous research on the therapeutic value of art museums.
Access to what? Alzheimer's disease and esthetic sense-making in the contemporary art museum	Mangione (2013)	Dialogue activities for art museum education	Using ethnographic fieldwork and in-depth interviews at the two Metropolitan Museums of Art outlets, we examined how educators and participants constructed the benefits of art museum programs for Alzheimer's disease patients.	Participating in recreational activities such as museum tours is an important way to stay on track in the face of chronic illness. Educators use relativist language to structure the arts to facilitate interaction, providing opportunities for greater dialogue between culture and the sociological study of health.
Opening the doors of art museums for therapeutic processes	Treadon et al. (2006)	Evaluation of art museums as effective therapeutic tools	An overview of the establishment of art museums and the history of art museum education. A similar examination of previous art therapy programs, and a framework for using art museums as effective therapeutic tools. The study concludes with a description and evaluation of a pilot project to incorporate art museums and their artifacts into art therapy.	The Art Museum is a new venue for art therapy. Museums can be valuable to art therapists by providing a wealth of resources for clients and art therapy. Art museum educators have a role in helping art therapists understand how to approach art museums for use by their clients.
The art-gallery as a resource for recovery for people who have experienced psychosis	Colbert et al. (2013)	Psychiatric Rehabilitation Intervention	To understand whether an art gallery-based group helped to modify key psychiatric narratives in participants' personal narratives, promoting recovery, well-being, and a subjective sense of social inclusion.	The findings suggest that some individuals used art-related concepts to modify dominant narratives in their personal narratives. Community narratives emerged from the groups about different employee-client relationships characterized by recognition, commonality, friendship, and sincerity. The intervention was described as promoting recovery and well-being primarily through achievement and was described as more successful in addressing the bonding of social capital than bridging it. Art gallery-based interventions show some promise of providing a safe haven where people with mental illness can engage in a recovery-oriented approach to mental health care, where a different kind of staff-client relationship may emerge.
Reinventing the setting: Art therapy in museums	Salom (2011)	Four metaphorical roles that museums can play to promote therapeutic goals	Using two cases that explore whether the life stages, museums, their environments, and the objects they care about can become effective allies in art therapy.	This paper proposes four metaphorical roles for museums to promote therapeutic goals. These roles are: museum as co-leader, as a group, as self, and as an environment. Examples of their practical implementation in therapy are presented.

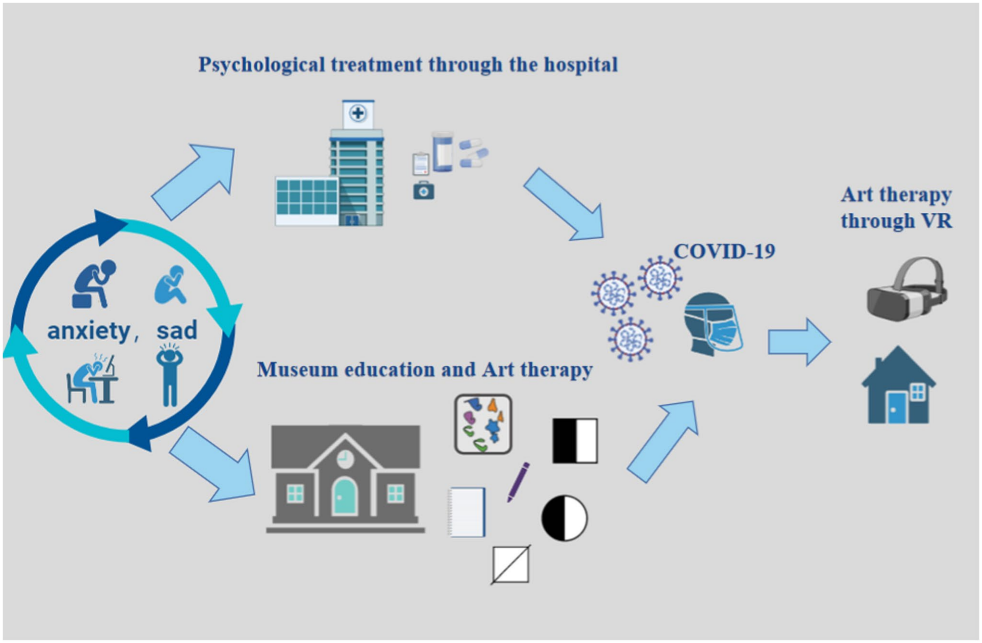

FIGURE 1
Generalized diagram of museum education and art therapy.

relaxation and physical rejuvenation because museums can repair "attention fatigue" and provide "restorative environment" conditions (Packer, 2008). They provide a place where young people can explore, unrushed and away from their usual environment and daily routines.

3.3.2. Self-reflection

Self-reflection is an important component of mental health, including the process of identifying, thinking about, and making sense of one's feelings, experiences, and ideas. "Adolescents naturally engage in the construction of individual meaning and self-exploration at museums by reflecting on the situations they face and engaging in discussions with others" (Wang, 2018, p:5).

3.3.3. Physical and mental balance

Museum-specific artwork can help people shift their focus from their anxieties to their bodies; they become aware of their existence, perceive the value of their being, and return to their bodies and minds. From the essence of "things," museums reflect both the uniqueness of the times and the differences in history. From the existence of "human beings," museums show that greatness and fragility have coexisted for generations of human beings, creating an atmosphere wherein young people can express different ideas and thoughts, and providing a "laboratory" to understand the close connection between "things" and "people."

3.4. Approaches of art therapy practice in museums

Art can provide "a visual link to a personal exploration of past and present experiences" (Stephenson, 2006, p: 24); this is particularly important because the activation of autobiographical memory is associated with a sense of well-being (O'Rourke et al., 2011). As viewing art provides a unique psychological experience, art therapy in museums offers the opportunity to restore health and well-being, especially for patients suffering from mental health issues (Colbert et al., 2013). De Botton and Armstrong (2013) describe the function of memory in art as a way of holding on to things deemed precious and fleeting.

The three theoretical perspectives highlight the role museums play in the art therapy process and the different supports they provide to promote therapeutic goals (Treadon et al., 2006; Salom, 2011; Ioannides et al., 2021). Ioannides et al. (2021) notes that contemporary artwork can serve as therapeutic transformative objects that can evoke a stronger sense of self-identity and help restore mental health. Salom (2011) summarizes four metaphorical roles museums play in therapy: co-leader, group, self, and environment.

Treadon et al. (2006) refers to the richness of artwork and cultural resources that art therapists provide to participants through museum education, emphasizing museums' efforts to engage non-traditional populations and the facilitative role of educators in art therapy. Similarly, Ioannides et al. (2021) emphasizes the intrinsic quality of specific artwork as an evocative element for individual participants. She outlines how participants can express their feelings, discuss difficult issues, and internalize the cultural world through contemporary artwork (works displayed in the museum as well as artwork created by participants) to understand, explore, and reveal their different aspects. This approach allows participants' emotional experiences to be better understood, facilitating their relationship with the external world and stimulating the presence of self-states in their spiritual lives because they contain "a layer of meaningful connections that stimulate" associations. These associations enable individuals experiencing personal or mental health problems to "recall and share their past" (Salom, 2011, p: 83). Salom (2011) suggests that curators pave the way for personal expression and transformation through interactive art exhibitions (Treadon et al., 2006). Museums are interested in increasing outreach by integrating clinical and educational knowledge (Linesch, 2004).

TABLE 2 Main forms of museum educational activities.

Education form definition	Activities conducted/content of activities	Remarks
Universal, lifelong educational activities	All people share museum resources and plan different types of educational activities for different categories of visitors. To expand the educational function, we take the initiative to serve in schools and community activities.	Traveling exhibitions, teaching aids and materials lending services, etc.
Inspiring and entertaining educational activities	Instead of the traditional window display and solemn atmosphere, museum displays and activities are now more active and diversified, replacing the passive learning method of only "seeing" with many models, audio-visual aids, games, and various participatory and interactive designs in open displays.	Scavenger hunt competition, role play, audio-visual appreciation, demonstration performance, etc.
Self-directed, exploratory educational activities	Unlike traditional school-based learning, today's museums offer guided tours, tour information systems, and activity sheets, as well as themed activities, to encourage audiences to find answers and gain a sense of accomplishment and self-confidence through personal experience.	"Discovery Room," "Self-Awareness Room," or other theme-based exploration activities.
Lifestyle educational activities	Activities are designed to deepen the audience's impressions and enhance their learning, not only by exploring past events but also by focusing on the way participants' perceptions and experiences are formed.	Guidance in learning to live, face prejudice, and violence, etc.
On-site, physical experience-based educational activities	Through the physical scenery, scenario shaping, or site restoration in three dimensions, human history or art from a distant time and space can be recreated, leaving the audience with an immersive and moving experience.	Cultural scene restoration activities in village museums.
Artificial intelligence-style educational activities	The use of artificial intelligence in museum education is a new trend in the development of the interconnected era. Artworks can reproduce multiple spatial and temporal dimensions through artificial intelligence, which not only brings more direct sensory enjoyment, but also provides audiences with an immersive art experience. Although this form is in the early stages of development, it will have a broader impetus for the development of museum education forms.	Common pop-up screen presentation of multiple virtual space dimensions and intelligent art element data analysis and evaluation.

There are also studies that focus on people with Alzheimer's disease, chronic disease or mental illness. Wallen and Docherty-Hughes (2022) emphasize the critical role of museum education in enhancing the self-esteem and social well-being of individuals with psychological problems through "caring spaces." They established the Self-Reflection Project's community-based museum art therapy program, highlighting the role of museum art therapy in lifelong learning and leveraging heritage values, including overall well-being and individual identity. During the pandemic, one museum learned about the impact of trauma by exploring the framework developed by the Trauma Responsive Educational Practices (TRE) program. The authors conclude that additional support is needed to adapt the program to the museum's unique environment. At the Rubin Museum of Art, workers began to care about the same issues, and in their Nepalese art collection, there are some content that is very suitable for self-reflection. Now, the museum is planning to restart their meditation podcasts and arrange some of the learning sessions to people affected by the new corona, which will include some meditative works of art, such as a gilded statue of the 13th-century Indian goddess Durga, and a 16th-century Buddha painting in which the Buddha is meditating while the demonic army is attacking from below. The Queens Museum in New York, the United States, offers an online art therapy program every Thursday, allowing community participants to share their creations through Zoom and use paintings and poetry to discuss life before and after the pandemic. The Metropolitan Museum of Art of the United States is also launching a free art therapy program. The museum has designed the exhibition space as a safe space with trauma awareness, using the same practices used in the aftermath of the 9 / 11 terrorist attack that year. The artwork on display tries to alleviate the anxiety or sadness of visitors in the face of the epidemic. Walter Enriquez, a 75-year-old New York resident, has lost many friends and neighbors due to the epidemic. He spends 30 min sitting in front of the computer every Thursday, drawing on paper with colored pencils and pens. Enriquez said: 'Before taking part in the programme I felt very lonely, but now, I can study artistic creation. We can 't enjoy life as before, but art can help us capture the past, regain positive experiences, and get through pain and sadness. 'Bouvayer also said that in the past, doctors rarely did not have to worry about any side effects when prescribing, and now there is such a development is very touching. In her opinion, the doctor 's establishment of 'museum prescription notes 'is a way to connect with patients on an emotional level. 'We always ask ourselves: What else can I do? From now on, we can at least provide 'happy moments ', '.

In addition, the role of different art therapy methods in museum education was also investigated. Armstrong et al. (2021) investigated the dynamics of trauma-informed approaches to interacting with art, specifically approaches that create new cognitive, emotional, and sensory experiences. Outlining key visitor-related trauma-informed art museum education (T-AAME) principles, they report that museum educators can play a therapeutic role in helping visitors reintegrate into their lives. The mind, brain, and education (MBE) pedagogy, constructed by Zarrabi et al. (2020) around the themes of pain, healing, dignity, complexity, and legacy, identifies four themes that reflect the value of the educational experience: (1) using art in a neutral setting as a "proxy" to safely access emotions and work through difficult situations, (2) appreciating the value of experiential immersion in clinical development, (3) discovering the power of the multidisciplinary palliative care team, and (4) shaping work-life balance. Colbert et al. (2013) assessed participants' mental health and explored recovery-oriented approaches to mental health care through an art gallery intervention, finding that art galleries can provide a safe haven that promotes recovery, well-being, and a sense of social inclusion.

Bennington et al. (2016) examined the use of art museums as a therapeutic tool for older adults from a phenomenological perspective, demonstrating that they offer curricular explorations of emotions, thoughts, and memories, increasing well-being and social connectedness. Another study on how institutional meanings emerge at the local level, revealed how educators and participants constructed the benefits of art museum programs for people with Alzheimer's disease, providing an opportunity for more dialogue between the sociological studies of culture and health (Mangione, 2013).

In summary, the review highlights the therapeutic potential of museum education and art therapy to improve mental health and promote recovery, well-being, and a sense of social inclusion among different populations. However, no existing research has focused on how museum-based art therapy can ameliorate psychological anxiety issues in adolescents or the challenges of working with clinical diagnostic categories of adolescents in art therapy research and clinical practice from a museum education perspective.

4. Discussion

With the increasing attention paid to Art Therapy in recent years, the Montreal Art Gallery, Canada 's oldest art museum, has received a large donation funding. In 2016, the museum 's education and art therapy functions were expanded; in 2017, it became the first museum in North America to employ full-time art therapists. In 2018, it became the first art museum to accept local doctors to open 'museum prescription notes ', allowing patients to visit for free and even book art therapists in the museum. In the United States, some museums preparing to reopen are seeing art healing as their new direction. The Queens Museum of Art offers a weekly online art therapy program that encourages people to pick up a paintbrush to express their lives and feelings. The Metropolitan Museum of Art in New York has prepared a list of works of art to help spectators ease anxiety about the new corona after the museum reopens. The Cincinnati Museum of Art in Ohio trained a group of volunteers to teach art healing techniques. These measures were inspired by the Montreal Museum of Art in Canada, which is the first art institution in North America to hire an art therapist.

By reviewing peer-reviewed literature, this paper discusses how museum practitioners can develop a program of activities to promote the potential therapeutic function of museums and integrate art therapy approaches into practice. The literature suggests that museum therapy practices are strongly associated with participants' sense of self-identity, well-being, and social well-being, all of which can help alleviate anxiety. This review provides a preliminary understanding of the issues involved in museum education practices that require further examination, including the propensity of different museum learning programs to improve psychological problems among different groups.

4.1. New directions for museum education

VR is widely used in museums to augment or simulate artwork and artifacts to create more vivid and immersive learning environments. In the last decade, the boom in digital technology has driven many museums to publish collections online, and much related research has been undertaken by ARCO, SCULPTEUR in Europe, VMC in Canada, Sci Center and Bio Learn in the US (Corbit and De Varco, 2000), and similar programs around the world. Several museums offer online exhibitions, such as the Smithsonian Museum in the US, the State Hermitage Museum in Russia, and the Louvre Museum in France.

VR technology improves learner motivation and mood (Dieck et al., 2018; Puig et al., 2020), enhancing participant satisfaction and enjoyment, especially with wearable devices. It helps enhance learning experiences and personalize the learning process. Nechita and Rezeanu (2019) report that multisensory-enhanced museum spaces can enhance empathy by allowing learners to experience a variety of historical settings from a first-hand perspective. Teaching in interactive VR environments provides equal or better learning outcomes compared to traditional teaching (Newman and McLean, 2004; Stull et al., 2013; Nolin et al., 2016; Frydenberg and Andone, 2018; Felnhofer et al., 2018; Dube and Ince, 2019). However, the transformative effect of immersive VR in education has mainly been reported in the medical field (Thompson, 2009; Kim et al., 2015; Kim et al., 2017; Brusamento et al., 2019; Kyaw et al., 2019; Blumstein et al., 2020). As a new technology for museum educational activities, VR can create more engaging and immersive learning experiences (Crowley et al., 2014).

During the COVID-19 pandemic, psychotherapy conducted face-to-face increased the risk of infection, creating the need for remote therapy. The role of VR in museum education became increasingly important. As VR technology provides digitally enhanced visual complementarity to artwork details (Chang et al., 2014), administrators can pull 3D digital objects from a database and place them into a virtual exhibit room where participants can zoom into areas of interest. This method enables teaching and learning in a highly interactive environment that stimulates curiosity and creative thinking, allowing museums to develop unique, meaningful educational experiences (Smith and Blunkett, 2000). It also provides an atmosphere of freedom that can help participants with psychological disorders. Some studies have explored the application of VR to enhance visitor-exhibit interactions or allow visitors to generate virtual content in an immersive environment (e.g., Hsiao et al., 2016; Koutsabasis and Vosinakis, 2018). Bettelli et al. (2020) found that the novelty of VR may appeal to adolescents, capturing their attention and encouraging them to persist in their studies, resulting in more positive perceptions. However, little research has examined the integration of VR museum education and art therapy or the use of VR to provide telepsychotherapy through online museum-education activities.

4.2. Suggestions for future research

This review highlights the importance of incorporating museum education practices to enhance mental health and well-being. However, it finds a lack of research on the involvement of museum education in therapy, particularly on museum education engaged in therapeutic practice that demonstrates multifaceted possibilities of combining art therapy approaches with museum education. To better mitigate the effects of COVID-19 on the mental health of diverse groups (e.g., isolation and distress), the caring role of museums is exemplified by the construction of museum VR spaces that support social interaction, engagement, stimulation, and care, providing a broader range of distance art therapy opportunities. The portability of VR technology and therapies create opportunities for museums to explore partnerships with the education and healthcare sectors to expand their collections and programs, especially for beneficiaries embarrassed about their illnesses or anxious about the treatment process. Thus, VR museum education is a new type of education, an emerging therapy, and an increasingly important research topic.

Museum education through VR teletherapy can improve quality of life and maintain or promote health. It also hints at museums' potential role in

the mental health field: even those with hearing impairments can enjoy the virtual museum experience at home. However, access to technology remains a concern, and those who may not have easy access (e.g., people from low-income communities and with disabilities) need to be considered. Therefore, interdisciplinary collaboration with art therapists and educators is an area for further exploration to understand the needs and challenges of different groups in future planning and design of museum education and ensure inclusive strategies and practices.

5. Conclusion

This paper studies the practice of art therapy in museum education. We summarize its activities, main functions and practical approaches. Finally, through critical reading, we propose new directions and research trends for future development in this field. Our research results fill the gap in the practice of art therapy in museum education. Readers can obtain exciting information from the data analysis of this study, which provides valuable reference and help for future researchers.

Author contributions

CZ contributed to the overall framework for the manuscripts as well as discussion sections. ZW contributed to the literature review and the writing of the manuscript. YG contributed to the paper revision. All authors reviewed the manuscript, contributed to the article, and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Impact of creative workshops in an institutionalized patient with moderate/severe cognitive impairment with behavioral disorders: A case report

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The Hospital Care Unit for individuals with intellectual disabilities and behavioral disorders provides comprehensive care in a controlled and video-surveyed facility that minimizes access to potentially manipulative materials during aggression or pica episodes. The patient was admitted to the unit due to issues including ingestion of non-edible fluids, aggression toward staff and other patients, and self-injury. All patients participated in occupational activities led by an occupational therapist from Monday to Friday from 10 a.m. to 11:30 a.m. In addition, creative workshops such as cinema forums and cooking workshops were held on some afternoons. During the analyzed period from January to June 2022, the patient experienced three episodes of pica, 14 assaults toward staff, and eight toward peers. All of these incidents occurred after dinner and were triggered either by the inability to eat dessert or by refusal to brush teeth afterward. In our case study, the implementation of creative workshops such as cooking had a positive effect on decreasing instances of pica and aggression. These workshops slightly improved participation in other occupational therapy activities and stabilized the patient's behavior, increasing the likelihood of her being able to return to her habitual residence.

KEYWORDS

intellectual disability, cognitive dysfunction, conduct disorder, creativity, pica, cooking, case report

1. Introduction

Pica is defined as the ingestion of non-edible substances including paper, small items of clothing, liquid detergent and grass. This behavior is common in persons with intellectual disabilities and can become life-threatening resulting in surgery, gastrointestinal obstructions, perforations, and death (1, 2).

Although there are some literature reviews about interventions to treat and cease pica, the success of the interventions and treatments are not definitive, mainly due to

a lack of outcome studies (3–6). Furthermore, the majority of the literature refers to children or adults with autism or ADHD (7–10). Among the studied interventions, several emerge including self-protective devices, overcorrection, water mist and aromatic ammonia, behavioral interventions, brief restraint, differential reinforcement, discrimination training, patient self-report, and ecological modifications (5–7). Regarding brief restraint, they should be limited to extreme situations in which staff, other patients and the patient himself/herself need protection (11).

Along with pica, patients with intellectual disabilities often present other behavioral disorders that include aggressions. On this matter, patients might exhibit self-injury, physical or vocal aggression or destruction. Patients with moderate or severe intellectual disability and admitted to hospitals or living in community groups exhibit more aggressions (12, 13).

Aggressions carry burden and psychological distress for both aggressor and victim. For the aggressor, these events can alter their rehabilitation. For the victim and organization, the decrease in the efficacy and effectiveness of rehabilitative efforts, psychological distress including anxiety, anger and burnout, and physical injury (14, 15).

However, people with intellectual disabilities and behavioral disorders can be secured on a long-term basis from serious injury if appropriate management and interventions are both engaged (7). We present the case of a patient with moderate/severe intellectual disability whose pica and aggressions events decreased after introducing a cooking workshop.

2. Methods

A case study was analyzed and described.

2.1. Settings and subject

Created in 2013, the Hospital Care Unit for people with intellectual disabilities and behavioral disorders (UHDAC in Spanish) provides therapy to adults in a closed residence for a temporal period. This regional-referenced center offers integral care to a maximum of 14 people in a controlled and video-surveillance facility that minimizes access to susceptible material of being manipulated in either aggression or pica episodes.

The patient's evolution and response to their intervention program determine the permanence in the unit, being the behavioral disorder treatment and progression determinant to the patient's discharge.

We selected an admitted patient who, at the time of the analyzing period, had already spent 6 months in the unit being thus fully adapted. Furthermore, during the first 6 months and the following six (analyzed period) the patient never left the unit with the exception of medical appointments, being returned to it in the afternoon. The analyzed period comprised from January to June 2022. In this period, the care staff (nurses and nursing assistants) and admitted patients were constant, reducing any behavioral episode caused by changes in the staff, jealousy from the discharge of a peer or changing of settings (16).

2.2. Interventions

All patients participate in occupational activities led by an occupational therapist and created by her every Monday to Friday from 10 a.m. to 11:30 a.m. In these sessions patients perform activities that aim to develop and maintain social, emotional, cognitive and manipulative skills. Nonetheless, Friday activities tend to be more ludic and centered on self-care, rewarding attendance throughout the week at the other occupational activities. The occupational therapist counts with the support of monitors and nursing assistants supervising the patients uninterruptedly in a 2:1 ratio. These activities, while maintaining the same topic for everybody are individually adapted.

In addition, patients attended creative workshops on some afternoons. Specifically, they attended sessions of cinema-forum from January to March and cooking workshops from April to June. In order to participate in the creative workshops, it was necessary to comply with the rules of conduct established in the unit.

Cinema-forum took place in the Assembly Hall, which comprises 50 seats, and a large projection screen where personnel switch off the lights simulating being in a movie theater. Afterward, the users recreated the characters from their perspective by doing very low-demand role-playing. In addition, they discussed their feelings toward the characters, how they would label them and whether the movie brought any changes in their life. In this activity, they can develop their imagination, express feelings, and manage emotions.

The cooking workshops comprised easy-to-prepare dishes, mostly desserts, that were set by consensus among patients. They selected and prepared the ingredients with the help and guidelines from the therapist. The workshop concluded with a tasting as a reward and positive behavioral support for the task performed. The cooking workshop took place in a room equipped with all the utensils someone would find in a home kitchen: ceramic stove, oven, microwave, blender, utensils such as plates, cutlery, bowls, etc. Creativity was explicit through the ingredient modification to try new flavors, aromas, and textures. In addition, each one personalized the creation of their dish, showing it to the rest afterward.

We had access to all records from nurses, psychologists, occupational therapist and her medical history.

This study has been approved by the territorial management of the Service for the Promotion of Autonomy and Attention to Dependency (SEPAD in Spanish) in Cáceres (Extremadura) and informed consent has been given by the legal guardian of the patient.

2.3. Case description

The selected patient was a 48 years old female with congenital syphilis, moderate/severe intellectual disability and an IQ of 45 in the Wechsler scale. She was orphan without any family support.

The admission was due to severe behavioral alterations that made her management extremely difficult in her habitual residence despite pharmacological adjustment. The main alterations included non-eatable fluids ingestion, aggression toward staff and other residents, and self-injure facing frustration whenever her demands

were not met. Pharmacological treatment was as follows: Risperidone depot one injection every 15 days, Carbamazepine (1-1-1), Trazodone (0-0-1), Fluoxetine (1-0-0), Valproic acid (1-0-2), Risperidone (3-2-3), Lormetazepam (0-0-1), and Clonazepam (1-1-1). At any patient admission, the psychiatrist revises the pharmacological treatment and modifies it when necessary. In this case, there was no treatment modification except for the introduction of rescue medication (Risperidone) when the patient showed behavioral crisis or disorders.

Table 1 shows the patient's behavioral disorder events and consequences and interventions during the analyzed period. Behavioral records at the creative workshops are summarized in Table 2.

During the analyzed period, the patient experienced three isolated episodes of pica in March, April, and May. Of these three episodes, the one in April was notable as it occurred on a weekday and was the only day of the week that the patient attended the occupational therapy program. The patient's persistent refusal to brush her teeth after consuming sugary desserts was the trigger of all pica events. Furthermore, for the episode in April, the patient's refusal to celebrate her birthday was another trigger. As for the aggressions that resulted in mechanical restraint, 14 assaults on the staff were recorded, with June being the only month without any recorded aggression. Additionally, all aggressions concentrated from February to April, totaling 12 assaults, all of which occurred in the evening.

Upon reviewing the assaults individually, the one in January took place in the evening. On that day, the patient's physician had encouraged her to eat fewer sugary desserts and substitute them with healthier options implementing a reinforcement therapy in which the care staff would withdraw sugary desserts at lunch/dinner in the event of behavioral disturbance or non-compliance with unit rules. In February, the three cases of aggression occurred over the weekend, with the first and the last being preceded by days of agitation requiring pharmacological intervention. The manipulation of plugs and the intervention of the care staff to prevent ingestion mediated all five instances of aggression that occurred in March. These incidents all took place after dinner and the triggers were either the inability to eat dessert or the refusal to brush teeth after eating dessert. The nursing record shows that the patient becomes agitated around the approach of her birthday in April and the potential for purchasing desserts to celebrate it.

The four instances of aggression recorded in April occurred on the weekends of April 8th and 12th. All of these incidents occurred after dinner and the triggers were the same, either a lack of ability to eat dessert or a refusal to brush teeth after eating it. The aggression toward the new occupational therapist in May

TABLE 1 Frequency of behavioral events, triggers, consequences, and interventions.

Month	No. of events	Probable cause/Trigger	Consequence/Interventions
January	One staff assault	Unable to eat dessert.	Mechanical restraint. Explanation of unit rules. Phase 0: no OT; stays in her bedroom.
February	Three staff assault	Agitation in the prior days needing chemical restraints.	Mechanical restraint. Explanation of unit rules. Phase 0: no OT; stays in her bedroom.
	One peer assault	Refusal to brush her teeth after consuming sugary desserts. Patient's own birthday	Mechanical restraint. No desserts. Explanation of unit rules.
March	Five staff assault	Unable to eat dessert or the refusal to brush her teeth after eating it.	Mechanical restraint. Explanation of unit rules. Phase 0: no OT; stays in her bedroom.
	Four peer assault	Refusal to brush her teeth after consuming sugary desserts. Patient's own birthday	Mechanical/chemical restraint. No desserts. Explanation of unit rules.
	One ingestion	Refusal to brush her teeth after consuming sugary desserts.	Mechanical restraint.
April	Four staff assault	Unable to eat dessert or the refusal to brush her teeth after eating it.	Mechanical restraint. Explanation of unit rules. Phase 0: no OT; stays in her bedroom.
	One peer assault	Refusal to brush her teeth after consuming sugary desserts. Patient's own birthday	Mechanical restraint. No desserts. Explanation of unit rules.
	One ingestion	Refusal to brush her teeth after consuming sugary desserts and refusal to celebrate her birthday.	Mechanical restraint. Phase 0: no OT; stays in her bedroom.
May	One staff assault	Agitation and insomnia the night before.	Mechanical restraint. Explanation of unit rules. Phase 0: no OT; stays in her bedroom.
	One peer assault	Refusal to brush her teeth after consuming sugary desserts.	Mechanical restraint. No desserts. Explanation of unit rules.
	One ingestion	Refusal to brush her teeth after consuming sugary desserts.	Mechanical restraint. Phase 0: no OT; stays in her bedroom.
June	One peer assault	Refusal to brush her teeth after consuming sugary desserts.	Mechanical restraint. No desserts. Explanation of unit rules.

10.3389/fpsyt.2023.1132659

was preceded by insomnia at night and agitation due to the desire to host a party.

Regarding the incidents of peer assault, eight resulted in the use of mechanical or chemical restraints. Four of these incidents occurred in the week of March 21st to 28th. These assaults on peers were characterized by hair-pulling and self-harm in the form of head-butting, typically occurring in the evening and triggered by the anticipation and excitement of celebrating their birthday and being able to go out and purchase desserts. The other incidents of aggression, which occurred in February, April, May, and June, displayed a similar pattern: hair-pulling triggered by the individual's birthday or refusal to brush her teeth after consuming dessert. The calendar with these events is depicted in Figure 1.

3. Discussion

Since the implementation of cooking workshops, there have been no reported events of behavioral changes related to ingestion, except for one when the patient was unable to eat the food prepared

TABLE 2 Behavioral records at the creative workshops.

Cinema forum 1/12	Cinema forum 1/17	Cinema forum 2/14	Cinema forum 2/21	Cinema forum 28/2
Very participative, expressing interest in the film.	Aggression episode toward the audio visual material. She had to leave the session.	Due to misbehavior, she did not attend the session.	Cheerful and participative.	Due to misbehavior, she did not attend the session.
Cinema forum 3/7	**Cinema forum 3/30**	**Cooking workshop 4/28**	**Cooking workshop 5/5**	**Cooking workshop 5/23**
Nothing to report.	She fell asleep during the session.	She completed the activity (making a smoothie) and shared with peers when explained to do so. She was very happy to be able to choose the fruit she ate.	She completed the activity (making a chocolate-cookie pie). She enjoyed tasting the ingredients and being able to overstaffing the pie with chocolate. She wanted to eat the pie before it was finished.	Since she could not attend the cooking workshop (pastry making), she let the psychologist know that she wanted to leave the unit immediately. The occupational therapist invited her to a treat in the cafeteria and sorted it out.

FIGURE 1
Calendar showing the registered alterations. Red, assault on staff; Green, assault on peers; Orange, ingestion.

in the workshop. Aggressive episodes requiring mechanical or chemical restraints have also decreased from nineteen events of staff or peer assault prior to the beginning of the cooking workshops to three isolated events in the subsequent period.

Upon reviewing the literature, we discovered several interventions for reducing and eliminating pica (5–7), including replacing a potential item for consumption with a preferred food choice of the patient. Carter (17) reports the disappearance of pica in a 72 years-old woman after 2 years of using chocolate, biscuits, coffee, and soft drinks as substitutes. In another case study involving two children with developmental disabilities (18), they were taught to replace a particular pica item with a preferred snack food, starting with a 1:1 ratio and gradually decreasing to a 3:1 ratio. While this intervention may be effective for the patient in question, the fact that access to sugary food and refusal to follow rules concerning such food (e.g., brushing teeth after dessert) was a trigger for behavioral changes may lead to the patient purposely inducing pica episodes in order to obtain access to sugary treats.

The fact that a reinforcement therapy withdrawing sugary foods when either behavioral events were present or the patient did not comply with the unit rules should be noted as a factor in the behavioral disorders. We hypothesize that participation in cooking workshops where desserts are available can provide the patient with a sense of peace and the assurance of double access if she adheres to the rules.

According to Ashworth et al. (1), episodes of pica in individuals with intellectual disabilities are often correlated with a lack of family support, social contact, lack of participation in activities of interest or a daily schedule, and lack of involvement in recreational activities. In our case, the patient does not engage in Occupational Therapy activities due to a lack of compliance with rules of coexistence or lack of interest, resulting in missed activities for up to 7 days in a row. When comparing the patient's attitudes toward cinema-forum workshops with those toward cooking workshops, there is a noticeable change in attitudes and how the patient expresses a desire to attend the cooking workshops and therefore, the regular occupational therapy activities (mandatory in order to attend the afternoon creative workshops).

Regarding aggressions, there is a significant association between behavior disorders and the severity of the intellectual disability, living in restrictive settings and coercive measures (restraints) (12, 15). In our case, this fact poses a dilemma. The reason for admitting her to the unit was the presence of behavioral disorders and the impossibility of maintaining cohabitation in her habitual home.

A known trigger for aggression among intellectual disability people is feelings of frustration (10, 16). In our case, it was clear that the main trigger was feelings of frustration whenever her demands related to food were unmet. On this matter, the literature suggests that meeting a person's needs better would likely result in fewer events of behavioral disruptions (13), thus, her cooking workshop attendance might reveal another path to meet her needs. However, more research regarding aggression and its prevention is needed.

AThis study has some limitations, including the settings, pharmacological treatment, care staff supervision and health staff records which sometimes were scarce. Furthermore, the potential influence of the patient's birthday occurring during the analyzed period and the limited sessions of the cooking workshops constrained the possibility of demonstrating long-term efficacy. Implementing a longer-planned intervention controlling confounding variables could offer more reliable data. Notwithstanding, our patient experienced a decrease in episodes of pica and aggression, making progress on their path to recovery and potentially returning to their habitual residence in the future.

4. Conclusion

In our case study, the incorporation of cooking workshops, had a positive impact on reducing occurrences of pica and aggression toward staff in the analyzed intellectually disabled patient who was institutionalized. These workshops also slightly improved participation in other occupational therapy activities and stabilized the patient's behavior, increasing the likelihood of her being able to return to her usual residence.

Data availability statement

The original contributions presented in this study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Territorial Management of the Service for the Promotion of Autonomy and Attention to Dependency. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

NB-G and MR-D conceived and carried out the study, collected and analyzed the data, and draft the manuscript. JM-C and VC-V helped draft the manuscript. All authors read and approved the final manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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An in-depth introduction to arts-based spiritual healthcare: Creatively seeking and expressing purpose and meaning

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Introduction

Art therapy entails a therapeutic relationship that allows the expression and exploration of mental and spiritual needs through art (Bell, 2011). It integrates artistic creation, making use of different artistic mediators (Martins, 2013). Through various forms of artistic expression, a person communicates and explores their feelings and intimacy (Lev, 2020). Creative development allows the individual to break forms of resistance, recognize their own capabilities, and feel greater self-esteem and wellbeing (Hu et al., 2021; Ryff, 2021). Exercising creativity enables a differentiated view of oneself and favors the encounter of alternative points of view regarding psychological and spiritual issues (Alvarenga et al., 2018). The aim is personal growth and contact with our sensitive world and emotional development. In the art-therapeutic process, the artistic experience through creation enriches the imaginary and contributes to self-knowledge, driving the elaboration of internal contents and personal transformation (Martins, 2013; Ettun et al., 2014). In the art-therapeutic setting, different artistic mediators facilitate creation, expression and communication, including plastic, musical, dramatic, body, literary, and playful expression. These constitute the technical and material basis for creation. Considering the particular symbolic, expressive, and creative characteristics of different resources and understanding the therapeutic potential of each resource and how they can meet individual needs is fundamental to effective Art Therapy.

Art therapy can contribute to the knowledge, recognition and appropriation of one's own spirituality. This is a necessary part of the discovery process for those on the path of transcendence, leading the individual to (re)discover a broader meaning for existence (Sánchez García and Pinna-Perez, 2021). Understanding the meaning of life is the essential and personal quest of every individual; it is a required search that leads to the path of self-knowledge.

This opinion article presents an in-depth discussion of the potential of arts-based spiritual care, realizing in advance that there is a lack of conceptual clarity. Knowing how we might embrace a conception of spirituality anchored in art therapy may allow for more holistic practices, and thereby integrate them into a larger approach to spiritual care provision.

The creative art therapies

Art therapy is a therapeutic treatment for personal development, which uses and integrates different artistic mediators, such as paint, clay, stone, cloth and yarn, poetry or writing, music, dance and movement, storytelling, and drama [Ettun et al., 2014; British Association of Art Therapists (BAAT), 2015; Chiang et al., 2019]. All these means of artistic creation can reach the human spirit during their psycho-spiritual search for wholeness (Niemiec et al., 2020). An overview of spiritually-oriented art therapy interventions can help understand how they make transformation and healing possible by integrating the spiritual aspect into therapy (Kirca, 2019).

The therapeutic relationship is established through interaction between the client—the "creator" of the art object, which is the "creation" performed in the setting—and the observer (art therapist), using resources such as imagination, symbolism, and metaphors. This context facilitates communication, reorganization of internal contents, meaningful emotional expression, and deepening of internal knowledge, freeing the ability to think and creativity (de Witte et al., 2021). Therefore, Art Therapy presupposes a "relationship," whose dynamic is triangular: between the patient, the creation, and the therapist. The act of creation does not happen by itself, but through the establishment of a bond of trust provided by the therapeutic alliance, in a dialogic relationship (Gazit et al., 2021).

Despite focusing on communication through artistic forms of expression, art therapy is sometimes incorrectly labeled as a "non-verbal" therapy. This misunderstanding occurs because verbal communication is not essential to the elaboration of artistically expressed content or fundamental in art therapy. Music, body movement, or playful games can become the main form of communication in therapy, transmitting deep feelings without words. Art Therapy can be enjoyed solely as non-verbal expression, for instance, by children and adolescents with psychosocial problems (Bosgraaf et al., 2020); by the elderly person who has lost the ability to speak because of a stroke or dementia (Deshmukh et al., 2018); or even a victim of trauma (Kaimal et al., 2021), who may be unable to put her ideas verbally. However, according to Malchiodi (2020), art therapy includes both non-verbal and verbal communication. In most situations, the process involves verbal expression of thoughts and feelings to help individuals make sense of their experiences, feelings, and perceptions.

Art therapy thus results in a creative process, which can also be a therapeutic process, i.e., "art as therapy." The experience of making art offers an opportunity for imaginative expression, in an authentic and spontaneous way. A process that, over time, leads to personal fulfillment, emotional repair, and transformation at a psychic level. A holistic and extensive view of the human being is employed in Art Therapy, a therapeutic practice that aims to rescue not only the integral dimension of the subject but also their processes of self-knowledge, transcendence, and personal transformation (Gerber et al., 2018). The aim is also to promote image production, creative autonomy, the development of communication, the appreciation of subjectivity, freedom of expression, the reconciliation of emotional problems and their cathartic function (Gabriel, 2021). Notably, art therapy may be a cost-effective form of psychological therapy when compared to more traditional talking therapies (Uttley et al., 2015; Braito et al., 2022).

Art therapy is applied to people of all ages, with different psychological and medical problems. Interventions are carried out in groups or individually, in a private setting or in different institutions, such as schools, hospitals, shelters, nursing homes, day centers, etc. Art therapy stands out for its transdisciplinarity and its wide application, with little or no contraindications and, therefore, the intervention must be planned in order to specifically meet the needs of the population in question. Indeed, art therapy should not be considered as an alternative to the conventional care and treatment provided by healthcare care teams, but rather as a complementary part of a treatment plan, given its potential to improve holistic care.

Art, healing, and care for the spirit

Theoretical perspectives emphasize spirituality and transcendence as vital components of human personality, self-awareness, developmental tasks, and wellbeing (Kruse and Schmitt, 2019). Spirituality is widely characterized as how people seek and express meaning and purpose, how they feel connected to the present, to themselves, to others, to nature, and to the meaningful or sacred (Puchalski et al., 2014). Spiritual Care should be an intrinsic element of healthcare, since spirituality is often a basic human dimension, especially during distress (Roze des Ordons et al., 2018; Fitch and Bartlett, 2019). However, implementing Spiritual Care is difficult, for it depends on the individual spirituality of the healthcare professionals and patient (or relative), and there are no quick fixes for spiritual needs, but require personal connectedness and investment (Hvidt et al., 2020).

Transcending one's boundaries is a dynamic process, which can occur in many motions, directions, and dimensions. Self-boundaries can be crossed temporally (by integrating one's past and future in a way that makes sense in the present), intrapersonally (toward self-acceptance and meaning), interpersonally (by connecting with others and one's environment), and transpersonally (by linking with dimensions beyond the typically discernible world; Reed, 2009; Post et al., 2020).

Meaning-making is encouraged when spirituality is completely accepted. Spiritual care enables the possibility and capacity to transcend the physical and psychological (Bell, 2011; Lalani, 2020), connecting people in suffering to areas of their life, frequently through imaginative artistic expression, where spirituality and religion contribute new views to human affairs.

The intersubjective and interpersonal dynamics of care offer numerous and diverse opportunities to think about and deal with spirituality. Compassionate attention to the inner world, which is endowed with transcendent and transforming aspects, is vital (Bell, 2011). This humanizing process invites thought and conversation on the intangible, abstract components of suffering. The subtleties of meaning-making, purposefulness, and affirmation of a desirable and meaningful existence all lead to and imply spirituality (Bell, 2011). The healthcare practitioner must be prepared to interpret

and communicate these requirements, as well as seek appropriate aid and support to offer spiritual care (López-Tarrida et al., 2021).

Spirituality can be acknowledged, understood, and faced through art therapy, in the context of palliative, end-of-life care (Lefèvre et al., 2016; Warth et al., 2016), and other domains of mental health care (Deshmukh et al., 2018; Haeyen, 2019). The use of art materials to make drawings and paintings is a concrete, material record of the search for meaning and spiritual reflection and insight (Bell, 2011). Through the use of art materials and imagery, art therapy fosters meaning-making and so creates an intra-psychic space in which spirituality may be acknowledged, explored, and understood.

Art does not just have an accessory role but is a way of healing, which underlies the stimulation of creativity to achieve higher levels of wellbeing and the resolution of internal conflicts. Artistic creation calls upon mental functions fundamental for personal balance. The creative process' divergent thinking integrates symbolization, abstraction and a specific learning cognition that includes the sensorial and emotional system. It is a counterpoint to logical thinking. But experiences, when integrated, favor an expanded development that is fundamentally more adapted to an individual's reality. Having a more creative attitude toward life, one can respond more precisely to one's needs.

Creativity is essential for a balanced life and contributes to human flourishing. It is fundamental for finding solutions and for a subject's constructive integration into reality. The creative process cooperates by enlightening and repairing psychic processes. Creativity is defined as an existential process affiliated with the human capacity for self-realization, affirmation, and the potential to expand, develop and mature (Gosetti-Ferencei, 2020). There is no difference between creative processes related to arts and inventions and processes that develop an individual's personality, such as psychotherapy. Thus, to make the most of the capacity for creation and transformation, this capability is understood as inherent to the human being. In Art Therapy, there is an analogy between creating artistically and creating perspectives for personal change. Therefore, when creating new forms, configuring elements, and finding meanings for creation, a new ordering of life strategies is symbolically established.

The creative act imprints the mark of the creator, their originality and individuality, restoring their sense of identity, dignity, and community. Cultural and social influences are also part of this process. However, depression, fear (caused by more rigid personality traits), inner emptiness and anxiety are some of the constraints that prevent individuals, children and adults of all ages from expressing themselves creatively (Cocco, 2017; Xu et al., 2021). Creative unlocking and facilitation strategies must be provided for the development of creative activity, by connecting on an emotional level (through an empathetic relationship) or an environmental level (by finding a welcoming, comfortable space, which provides a moment of disconnection from outside influences).

Spirituality provides meaning to our lives by enhancing our consciousness of the most personal elements of our existence, material body, environment, and the divine (Bell, 2011). Creating art is a spiritual activity, or at least implies a spiritual component to existence that deserves attention and contemplation (Kirca, 2019). Creativity, imagination, and the creation of artifacts are indicators of spirituality and transcendent potential (Fotaki et al., 2020). Any psychotherapy intervention is about reinforcing elements that repair and heal the human body, mind, and spirit. Therefore, meaning-making and spirituality are essential to the realm of Art Therapy theory and practice (Bell, 2011).

Final remarks

The meaning-making process and the self-affirmation of personal and societal values and ideas can help us understand spirituality. This domain of human experience can be explored through artistic representation, enabling people to direct their interest to the spiritual side of the creative experience. An integrative person-centered approach is a foundation for giving spirituality the same care and attention as other physical and psychological realities. It is acknowledged to have a large and decisive influence on recovery, healing, growth, and positive therapeutic outcomes. Art-based spiritual care, therefore, lends legitimacy to the care of the most vulnerable people and contributes to a caring culture focused on spiritual development. Additional research in a broader set of cultures and populations is needed to better understand the effectiveness of art therapy interventions in spiritual growth. Furthermore, conceptual clarity and consensus on terminology will be important in art-based spiritual care both in clinical and community settings.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Reducing anxiety and improving self-acceptance in children and adolescents with osteosarcoma through group drawing art therapy

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Purpose: This study explored the effect of group drawing art therapy (GDAT) on anxiety and self-acceptance in children and adolescents with osteosarcoma.

Methods: Using a randomized experimental study design, 40 children and adolescents with osteosarcoma who were treated in our hospital from December 2021 to December 2022 were selected as the research objects, including 20 in the intervention group and 20 in the control group. The control group received routine care for osteosarcoma, while the intervention group participated in eight sessions of GDAT, twice a week, 90–100 min each, in addition to routine care for osteosarcoma. A screening for children's anxiety disorders (SCARED) and a self-acceptance questionnaire (SAQ) were used to evaluate the patients before and after the intervention.

Results: After 8 weeks of GDAT, the SCARED total score in the intervention group was 11.30 ± 8.603, and that in the control group was 22.10 ± 11.534. The difference between the two groups was statistically significant (t = -3.357, $P < 0.05$). In the intervention group, the SAQ total score was 48.25 ± 4.204, with self-acceptance and self-evaluation factor scores of 24.40 ± 2.521 and 23.85 ± 2.434, respectively. In the control group, the SAQ total score was 42.20 ± 4.047; the self-acceptance factor score was 21.20 ± 3.350 and that of the self-evaluation factor was 21.00 ± 2.224. The differences between the two groups were statistically significant (t = 4.637, $P < 0.001$; t = 3.413, $P < 0.05$; t = 3.866, $P < 0.001$, respectively).

Conclusion: Group drawing art therapy can reduce anxiety and improve the levels of self-acceptance and self-evaluation in children and adolescents with osteosarcoma.

KEYWORDS

drawing, art therapy, osteosarcoma, anxiety, self-acceptance

1. Introduction

Childhood and adolescence are important stages of physical and mental development and are prone to psychological and behavioral problems such as anxiety, low self-acceptance, low self-esteem, and social withdrawal (Lazor et al., 2021; Forrest et al., 2022). Anxiety disorders are characterized by symptoms of anxiety, fear, nervousness, and worry, as well as physical symptoms such as palpitations, shortness of breath, dizziness, and muscle tension (Birmaher et al., 1997; Lewandowska et al., 2021). Self-acceptance means that an individual can objectively accept and view himself, establish self-value based on self-recognition, respect and appreciate himself (Huang et al., 2021; Kelemen and Shamri-Zeevi, 2022). People with low self-acceptance develop psychological and behavioral problems such as low self-esteem and social withdrawal. Studies have shown that children and adolescents with cancer more likely to experience these psychological problems than those without cancer (Lewandowska et al., 2021; Raybin et al., 2022). Osteosarcoma is a severe teratogenic and fatal disease that occurs mainly in children and adolescents (Tian et al., 2020). Compared to patients with other non-teratogenic cancers, children and adolescents with osteosarcoma are bound to suffer greater psychological stress and may be more prone to psychological abnormalities (Lewandowska et al., 2021; Wu et al., 2022).

By providing information, support, and encouragement, healthcare providers and psychotherapists can help these children and adolescents cope with the rapidly changing psychological issues and challenges, thereby improving the effectiveness of cancer treatment and quality of life (Bar-Sela et al., 2007; Raybin et al., 2023). Interventions for this special type of patients should be professional, diverse, and in line with the developmental characteristics of children's psychology (de Witte et al., 2021; Bekar et al., 2022; Cheng et al., 2022). Drawing art therapy refers to a non-linguistic psychotherapy technique that reflects an individual's ability, personality, interests, concerns, and conflicts through painting, creative artistic activities, and their feedback on painting works. It can be used to improve the person's cognitive level, cultivate self-esteem and self-awareness, augment emotional resilience, promote insight, enhance social skills, and reduce emotional conflict and psychological pain (Jiang et al., 2020; Zhang et al., 2022). Compared with traditional psychotherapy, drawing art therapy is not limited by language, age, place environment, cognitive ability, and disease. Furthermore, it is easily accepted by patients, with minimal resistance and simple treatment implementation, and is gradually being used in clinical treatment (Gürcan and Atay Turan, 2021; Raybin et al., 2022). Research has established that interventions using drawing art therapy have obvious effects in some individuals (Bar-Sela et al., 2007; Zhang et al., 2022).

Currently, there are no intervention studies on drawing psychotherapy for children and adolescents with osteosarcoma, which may be related to the low incidence of the disease. Consequently, this study aimed to intervene and guide children and adolescents with osteosarcoma by using group drawing art therapy (GDAT) for their low self-esteem, anxiety, and other emotions, to help them relieve their emotional and psychological problems during treatment.

2. Materials and methods

2.1. Participants

This is a randomized, controlled, non-blind clinical study. The consort diagram of this study is shown as **Figure 1**. In this study, child and adolescent patients with osteosarcoma who met the inclusion criteria were recruited from December 2021 to December 2022. Consequently, patients (1) aged 7–18, (2) diagnosed with osteosarcoma through pathological classification, and (3) who had undergone chemotherapy and surgery were included in the study. The exclusion criteria were as follows: (1) severe intellectual disability; (2) critical stage, myelosuppression stage, or with serious complications; and (3) past psychotherapy experience.

After being fully informed of the contents and procedures of GDAT and routine care, patients and their respective guardians signed an informed consent form. This study was approved by the Ethics Committee of Henan Cancer Hospital (approval number: 2021-KY-0176-003).

2.2. Procedure

The patients were randomly divided into control and intervention groups. Random assignment was carried out by an investigator who was blinded to the patient's information. The study was conducted in a non-blinded condition, since the used instruments were self-report and children could not be blinded due to the nature of the painting therapy. The control group received routine nursing of osteosarcoma, while the intervention group received GDAT (**Figure 1**).

This study conducted GDAT on groups of 4–7 patients twice a week for 60–90 min. Each therapy session was divided into three stages: (1) a warm-up activity stage, which took approximately 20 min. In this stage, the psychotherapist led the patient to relax by playing ice-breaking games. (2) The theme drawing stage, of about 30–40 min, in which the drawing therapist introduced the scheduled drawing theme to the patients, and the patients drew freely. The content of the drawing was decided by the patient, without the therapist guiding it; the latter merely accompanied the patient to observe the order and content of the drawing. The intervention group received eight GDAT sessions; the themes are detailed in **Table 1**. The purpose was to guide patients to release various complex emotions generated during hospitalization through a creative process. (3) The ending stage took approximately 20 min. In this stage, the patients were guided to share their work, experience, feelings, and outcome of the drawing therapy, to relieve anxiety and reshape hope.

2.3. Evaluation

The patients' age, age at diagnosis, weight, sex, family status, disease, and other basic information were recorded.

Patient anxiety was assessed using the Screen for Child Anxiety Related Emotional Disorders (SCARED) scale (Birmaher et al., 1997). The scale's 41 items were divided into five factors: somatic panic, generalized anxiety, dissociative anxiety, social phobia, and

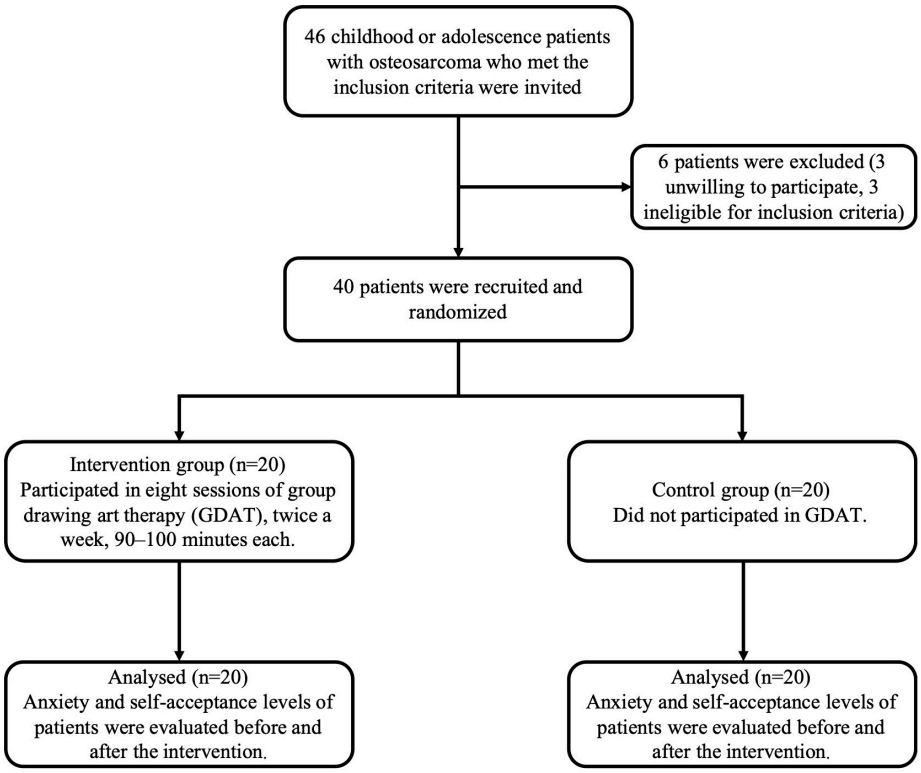

FIGURE 1
The consort diagram of the participants of this study.

school phobia. Each factor is scored at Level 3, with the options "do not have this problem," "sometimes," and "often" receiving 0, 1, and 2 points, respectively. The score for each item was added to obtain the total score of the scale. The higher the total score of the scale, the higher is the level of individual anxiety.

Patient self-acceptance was assessed using a self-acceptance questionnaire (SAQ; Cong and Gao, 1999; Chen et al., 2017). The SAQ was used to evaluate an individual's acceptance level of their current state. The scale consists of 16 items, which can be divided into two factors: self-acceptance and self-evaluation. The scale adopts a Likert 4-level scoring method, with each item receiving from 1 (*very same*) to 4 (*very opposite*) points. The total score of the scale ranged from 16 to 64 points; the higher the score, the higher the level of self-acceptance.

The SCARED and SAQ scale scores were collected by two specially trained researchers before the first GDAT session and on the day after the end of the eighth GDAT session.

2.4. Statistical methods

This study employed the data collation software EXCEL (Microsoft, Redmond, WA, United States), which ensured the accuracy of the data through double entry. SPSS 21.0 (IBM, Amenk, NY, United States) was used for data analysis. The measurement data conformed to the normal distribution; the mean ± standard deviation was used for statistical description, while the frequency and constituent ratio of the counting data were used for statistical description. The measurement data were consistent with a normal distribution and homogeneity of variance. A paired *t*-test was used to compare intra-group differences, and a *t*-test of two independent samples was used to compare inter-group differences. The chi-square test was used to compare differences between the groups. The inspection level was considered $\alpha = 0.05$.

3. Results

3.1. The basic characteristics of the groups

Forty patients aged 7–18 were included in this study. There were 20 boys and 20 girls, with an average age of 12.10 years. All the enrolled patients underwent chemotherapy or surgery combined with chemotherapy. There was no significant difference in the general data between the control group (20 patients) and the intervention group (20 patients; $P > 0.05$; Table 2).

3.2. SCARED scale scores comparison between the two groups before and after intervention

3.2.1. Intra-group comparison

The total scores of the SCARED ($P < 0.001$), somatization/panic factor ($P < 0.001$), generalized anxiety factor

($P < 0.05$), dissociative anxiety factor ($P < 0.05$), and social terror factor ($P < 0.001$) in the intervention group were significantly lower than those before the intervention (Table 3). The total scores of the SCARED, somatization/panic, generalized anxiety, dissociative anxiety, social phobia, and school phobia factors in the control group after the intervention were not significantly different from those before the intervention ($P > 0.05$).

3.2.2. Comparison between groups

Before intervention, there was no significant difference in the total scores of the SCARED, the somatization/panic, generalized anxiety, dissociative anxiety, and school terror factors between the two groups ($P > 0.05$). Before the intervention, the social phobia score in the intervention group was significantly higher than that in the control group ($P < 0.05$). After the intervention, the total scores on the SCARED ($P < 0.05$), somatization/panic ($P < 0.05$), generalized anxiety ($P < 0.05$), and social phobia ($P < 0.05$) factors in the intervention group were significantly lower than those in the control group. Although the scores of the dissociative anxiety and school terror factors in the intervention group were lower than those in the control group, the difference was not statistically significant ($P > 0.05$; Table 3).

3.3. SAQ score comparison between the two groups before and after intervention

3.3.1. Intra-group comparison

After the intervention, the SAQ total score ($P < 0.001$) and self-acceptance factor score ($P < 0.001$) in the intervention group were significantly higher than those before the intervention. Although the self-evaluation factor score in the intervention group after the intervention was higher than that before, the difference was not statistically significant ($P > 0.005$). The SAQ total score, and the self-acceptance and self-evaluation factor scores in the control group after the intervention were not significantly different from those before the intervention ($P > 0.05$; Table 4).

3.3.2. Comparison between groups

Before the intervention, there were no significant differences between the two groups in the total SAQ, self-acceptance, and self-evaluation scores ($P > 0.05$). After the intervention, the total scores of the SAQ scale ($P < 0.001$), self-acceptance factor ($P < 0.05$), and self-evaluation factor ($P < 0.001$) in the intervention group were significantly higher than those in the control group.

4. Discussion

This study found that after eight GDAT sessions, the total scores of the anxiety scale, and the scores for somatization/panic, generalized anxiety, and social phobia factors of children and adolescents with osteosarcoma in the intervention group were significantly lower than those in the control group. The total scores of the self-acceptance scale, and those on the self-acceptance and self-evaluation factors of children and adolescents with osteosarcoma in the intervention group were significantly higher than those in the control group.

TABLE 1 List of themes for group drawing art therapy.

Sequence	Themes	Purpose
1	Who am I?	Guide patients to recognize and accept themselves, so that they can share their drawings and gain understanding and support from others.
2	The emotion hidden in my heart	Guide the patients to make friends with emotion, help them transform the squeezed emotion, learn to accept it, and alleviate the pain caused by the current disease.
3	If I were a tree	Guide patients to improve their endurance and energy by imagining themselves as a tree.
4	Superhero	Guide patients to imagine their own god of protection and enhance their sense of security and belonging.
5	The one who loves me most	Encourage family members to participate, guide patients to transform their inner expectations into realistic images, to feel and transmit love.
6	What I want to do most	Guide patients to accept the imperfections in life and cherish the present through sharing life regrets and expectations.
7	Making friends with disease	Guide patients to face and understand the disease, overcome their fear and resistance to it, and enhance their confidence in overcoming the disease.
8	Future me	Give support and encouragement to make children full of hope for the future.

Children and adolescent patients with osteosarcoma are more prone to anxiety due to their high degree of disease malignancy, rapid growth, early metastasis, poor prognosis, limb deformity, and pain (Lewandowska et al., 2021; Wu et al., 2022). Drawing therapy can use non-verbal visual arts to deeply explore individual emotions, touch patients' inner subconscious, and correct unpleasant emotional experiences. It allows patients to develop symbolic language and learn new ways of expressing emotions (Bar-Sela et al., 2007; Bozcuk et al., 2017). GDAT enables patients to express various negative emotions that arise from being hospitalized and treated for illness—fear of illness, pain from illness and treatment, and anxiety about the uncertainty of physical recovery—through colors, lines, images, and stories. Consequently, the visible and invisible anxiety become a tangible and telling picture, and finally, the emotion itself weakens or disappears (Raybin et al., 2022; Zhang et al., 2022). Several studies have shown that different forms of drawing interventions can effectively reduce anxiety and depressive symptoms in adolescent cancer patients (Bozcuk et al., 2017; Forouzandeh et al., 2020; Gürcan and Atay Turan, 2021). The results of this study are consistent with those of previous research; that is, after eight sessions of group drawing therapy, the anxiety scale score of the treated patient was significantly reduced. In

TABLE 2 The basic characteristics of the intervention and control groups.

Characteristics	Intervention group (n = 20)	Control group (n = 20)	P
Gender (%)			
Male	9 (45.0)	11 (55.0)	0.527
Female	11 (55.0)	9 (45.0)	
Age (years, mean ± standard deviation)	11.40 ± 3.331	12.95 ± 2.762	0.117
Age at diagnosis (years, mean ± standard deviation)	10.70 ± 3.404	12.40 ± 2.542	0.082
Weight (kg)	45.750 ± 16.708	48.300 ± 12.791	0.591
Family monthly earning (¥, %)			
≤5,000	6 (30.0)	12 (60.0)	0.162
5,000–10,000	7 (35.0)	4 (20.0)	
>10,000	7 (35.0)	4 (20.0)	
Medical payment methods (%)			
Self-paying	1 (5.0)	3 (15.0)	0.139
Medical insurance	19 (95.0)	17 (85.0)	
Other family members with cancer (%)			
Yes	0 (0.0)	1 (5.0)	0.311
No	20 (100.0)	19 (95.0)	
Site of the osteosarcoma (%)			
Femur	10 (50.0)	7 (35.0)	0.277
Tibia	7 (35.0)	5 (25.0)	
Humerus	0 (0.0)	2 (10.0)	
Other bone	3 (15.0)	6 (30.0)	
Treatment (%)			
Surgery plus chemotherapy (%)	16 (80.0)	15 (75.0)	0.972
Chemotherapy	2 (10.0)	3 (15.0)	
Surgery	1 (5.0)	1 (5.0)	
Other	1 (5.0)	1 (5.0)	
Presence of metastasis (%)			
Yes	9 (45.0)	10 (50.0)	0.752
No	11 (55.0)	10 (50.0)	

TABLE 3 Screening for children's anxiety disorders (SCARED) scale score comparison between the intervention and control groups.

	Total score of SCARED		P	Somatization/Panic factor		P
	Before intervention	After intervention		Before intervention	After intervention	
Intervention group	24.75 ± 17.103	11.30 ± 8.603	< 0.001	6.05 ± 5.871	2.35 ± 2.889	< 0.001
Control group	20.05 ± 9.833	22.10 ± 11.534	0.432	5.15 ± 4.804	5.25 ± 3.683	0.907
P	0.293	<0.05		0.599	<0.05	
	Generalized anxiety factor		P	Dissociative anxiety factor		P
	Before intervention	After intervention		Before intervention	After intervention	
Intervention group	4.85 ± 3.815	2.25 ± 2.314	<0.05	5.15 ± 3.774	2.70 ± 2.250	<0.05
Control group	4.35 ± 3.014	4.25 ± 2.552	0.871	3.90 ± 2.426	4.30 ± 2.975	0.504
P	0.648	<0.05		0.220	0.063	
	Social phobia factor		P	School terror factor		P
	Before intervention	After intervention		Before intervention	After intervention	
Intervention group	7.30 ± 3.246	3.45 ± 2.762	<0.001	1.40 ± 1.930	0.55 ± 0.887	0.063
Control group	5.15 ± 2.390	7.00 ± 5.858	0.129	1.50 ± 1.539	1.30 ± 1.418	0.507
P	<0.05	<0.05		0.857	0.052	

Mean ± standard deviation was used for the statistical analysis. SCARED, screen for child anxiety-related emotional disorders.

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TABLE 4 Self-acceptance questionnaire (SAQ) score comparison between the intervention and control groups.

	SAQ total score		*P*	Self-acceptance factor		*P*	Self-evaluation factor		*P*
	Before intervention	After intervention		Before intervention	After intervention		Before intervention	After intervention	
Intervention group	42.95 ± 6.203	48.25 ± 4.204	<0.001	20.15 ± 3.438	24.40 ± 2.521	<0.001	22.80 ± 3.806	23.85 ± 2.434	0.153
Control group	42.65 ± 4.870	42.20 ± 4.047	0.579	20.90 ± 3.851	21.20 ± 3.350	0.734	21.75 ± 3.919	21.00 ± 2.224	0.279
P	0.866	<0.001		0.520	<0.05		0.395	<0.001	

Mean ± standard deviation was used for the statistical analysis. SAQ, self-acceptance questionnaire.

this study, the themed activities of "Who am I?" and "The emotion hidden in my heart" were used to guide patients to understand themselves and their emotions, release various complex emotions during hospitalization, dissolve pain and confrontation, and help them weaken or eliminate negative repressed emotions.

Studies have shown that cancer patients generally have a low level of self-acceptance (Li et al., 2010). Self-acceptance means that an individual can objectively accept and view himself, establish self-value based on self-recognition, respect and appreciate himself (Huang et al., 2021; Kelemen and Shamri-Zeevi, 2022). Adolescent cancer patients are more likely to doubt their own worth and lower their level of self-acceptance (Lewandowska et al., 2021). The results of this study are consistent with previous findings; that is, providing psychological intervention support to cancer patients can significantly improve their level of self-acceptance (Bozcuk et al., 2017; Zhang et al., 2022). The process of drawing can correct discordant cognition through abstract image thinking and imagination to promote and improve the painter's cognitive function and the degree of self-acceptance (Huang et al., 2021). This study guides patients to think about how to get along with the disease, stabilize their inner state, explore their personality traits, accept life imperfections, improve self-esteem, and realize self-appreciation and self-acceptance through drawing themed activities such as "What I want to do most," "Make friends with the disease," and "Future me."

In addition to anxiety and self-acceptance, previous studies have shown that drawing therapy can also help reshape the hope of cancer patients, promote energy conversion, and guide patients to love life (Collette et al., 2021; Zhang et al., 2022; Raybin et al., 2023). This study uncovered similar findings, thus demonstrating increased levels of hope remodeling in patients who received GDAT. For example, a 9 years-old patient drew a closed road for the first time, thus indicating the rejection of himself and despair for the future. After four group drawing therapy sessions, the patient drew a scene of the school raising the national flag, thereby suggesting that the person had high hopes of returning to school.

The major limitations of this study are the limited sample size and the fact that it was conducted at a single institution. In future multi-center, large-sample randomized controlled trials, children can be classified more carefully, and more individualized themes can be designed according to the actual situation to better adjust for children's inner anxiety. In addition, this study did not use objective research tools to assess the level of hope remodeling in patients. Future studies should further evaluate the impact of GDAT on hope remodeling and the sense of happiness in patients with sarcoma through objective and evaluable indicators.

5. Conclusion

Eight sessions of GDAT can significantly reduce the anxiety level of children and adolescents with osteosarcoma, while significantly improving their self-acceptance. It demonstrates that it is an effective intervention that can be widely used in the treatment and nursing of children and adolescents with osteosarcoma.

Data availability statement

The original contributions presented in this study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee of Henan Cancer Hospital (approval number: 2021-KY-0176-003). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

XL and XX conceived and designed the study. XL, LS, CZ, and YZ collected, analyzed the data, and wrote the manuscript. XD and XX prepared the tables and revised the manuscript. All authors read and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Online group music therapy: proactive management of undergraduate students' stress and anxiety

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Introduction: In alignment with the World Health Organization's (WHO) goal to provide comprehensive and integrated mental health services in community-based settings, this randomized control trial explored the efficacy of online group music therapy as a proactive intervention for reducing stress and anxiety in university students who do not necessarily have a diagnosis.

Methods: The study took place during COVID-19 restrictions. Students who volunteered were randomly assigned to 6 weeks of weekly (1) online active group music therapy, (2) online receptive group music therapy, (3) online group verbal therapy (standard of care), or (4) no-intervention (control group). Students rated their stress (Likert scale) and anxiety [State-Trait Anxiety Inventory, State version (STAI-S)], and provided heart rate variability (HRV) using a phone app, pre and post each therapy session.

Results: STAI-S and Likert stress scores significantly reduced from pre to post 45-min online music therapy sessions, with moderate evidence that these changes did not differ from the standard of care (verbal therapy). HRV results were not analyzed statistically as HRV collection was likely compromised due to challenges of remote collection. Students completed the Perceived Stress Scale (PSS) and provided a hair sample for cortisol analysis before and after the 6-week intervention. Changes in stress from week 1 to week 6 were not observed in the PSS measure; however, cortisol increased significantly in the control group as the term progressed, while it remained relatively stable in the therapy groups, suggesting therapy may lead to greater control of stress. Of participants' demographic characteristics, music sophistication, personality, and changes in quality of life, only the personality trait of conscientiousness correlated significantly with PSS, suggesting online group therapy may be beneficial for a wide range of university students.

Discussion: The results suggest group music therapy can be as effective as group verbal therapy. Further, the study indicates that online delivery can be achieved effectively, supporting the idea that remote therapy may be a viable option for other populations. While the study should be replicated with a larger multi-site

sample, it provides one example toward achieving a health-promoting culture on university campuses, consistent with the mental health goals of the Okanagan Charter.

KEYWORDS

mental health, music therapy, stress, anxiety, proactive therapy, cortisol, university students, online group therapy

1. Introduction

Despite research demonstrating the role of high stress in adverse health outcomes, including decreased mental and physical health (1–4), and despite anxiety remaining the main concern among students in counseling (5), proactive stress and anxiety reduction are not at the forefront of health care interventions. Research in relation to stress and anxiety predominantly focuses on interventions for individuals in crisis, as opposed to proactive measures to prevent acute and chronic experiences of stress and anxiety. Preventative strategies for undergraduate students are paramount considering that the highest levels of anxiety (33.5%) and depression (27.7%) are observed among younger Canadians (15–39 years of age) in comparison to other age groups (6), with suicide ranking the second leading cause of death among young Canadians (7), and the fourth leading cause of death among youth (15–29 years of age) globally (8). A longitudinal study of over 10,000 students from 15 different universities across Canada reported high student stress over the course of the 2020–2021 academic year which aligned with the COVID-19 pandemic (9). Student support services switched to online platforms as a result of the COVID-19 restrictions, which has led to a more permanent shift in thinking about methods of health care provision; the demand for online interventions is expected to continue (10). The present research explored the efficacy of online group music therapy in comparison to the standard of care (online verbal group therapy) and to a no-intervention control group. We predicted that online group music therapy would provide students with a positively stigmatized alternative for support, as engaging in music was reported as a common activity for self-support by university students during the COVID-19 pandemic (11).

Recognizing that elevated stress among university students has been associated with anxiety and depression (12, 13) shifting the focus to stress prevention could lead to a reduction in anxiety and depression. A meta-analysis reviewing proactive measures of cognitive, behavioral, and mindfulness-based interventions supports this idea (14). Arts-based interventions were explored in this meta-analysis, but there were not enough data on these interventions to be included in the analysis. Without meaningful data, arts-based therapies (e.g., music therapy) cannot be proposed with confidence, further highlighting the need for research in this area. An advantage of music therapy is that it is likely to be less negatively stigmatized because engaging in music is typically considered to be a healthy activity and is not associated with being mentally ill (15–17). This is important as more than 75% of students experiencing significant psychological distress do not seek support as a result of negative stigma (18).

Music therapy initially developed as a health care profession in the 1950s in the USA in response to soldiers experiencing post-traumatic stress disorder (19). The Canadian Association of Music Therapy was established in 1974 as the national professional body that sets the standards and qualifications for music therapists in Canada. Music therapists use music purposely within a therapeutic relationship to support health care goals for all age groups and diagnoses including dementia care, neonatal intensive care, autism, mental illness, and perioperative care. Systematic reviews report positive findings as a result of engaging in music therapy, such as improved verbal fluency, reduced anxiety, reduced depression, reduced pain perception, improved psychosocial measures, and improved motivation for treatment, while also recognizing the need for clinical trials with larger sample sizes, appropriate experimental methodology, and objective measurements of treatment effectiveness in order to substantiate these claims (20–25).

Despite music therapists working with diverse age groups and diagnoses, only three studies have been published to date on the effects of music therapy with university or college students (26–28). Each of these studies reported on the benefits of engaging in music therapy to treat a clinical symptom or developmental difficulty; however, only one of the studies implemented a randomized controlled trial (RCT) design (27) and none included a physiological measure. To our knowledge, no music therapy studies have been conducted with a non-clinical population such as university students, who are likely to experience stress and anxiety. The present study was directed at all undergraduate students, as opposed to only those in crisis or with a diagnosis, thereby investigating the effects of proactive rather than reactive support for stress and anxiety.

Proactive or preventive interventions may be helpful in curbing the increasing numbers of students experiencing a crisis. A meta-analysis of clinical control trials and random control trials exploring the effects of music therapy on both physiological and psychological stress-related outcomes observed a medium to large effect of music therapy on stress related outcomes (29), and highlighted a larger effect for group compared to individual music therapy. Prior to the COVID-19 pandemic, research reporting on the online delivery of music therapy was limited to military veterans (30–32) and adolescents (33, 34). Although the COVID-19 pandemic forced music therapists to shift to online platforms (35), research on the efficacy of this delivery mode since the start of the COVID-19 pandemic remains limited to children and adolescents with visual impairments (36), dementia care (37), and student refugees (27).

In the present online music therapy study, a community music therapy approach was used that takes into account

the larger cultural, institutional, and social context of the participants (38). Specifically, this approach aims to reframe participants' preconceived notions about engaging in mental health supports within campus culture. Recruitment posters advocated for proactive wellness and engaging in online group therapy; and students participating in the therapy groups were presented with the opportunity to recognize that it is normal to experience stress or anxiety, and that it is *ok* to engage in support. The community music therapy approach does not require an intake form, an assessment, or a treatment plan.

The present RCT reports on the first application of online music therapy for proactive wellness with undergraduate university students. The study took place during COVID-19 lockdowns when university classes had transitioned to online. It aimed to explore the efficacy of online group music therapy as a proactive intervention for undergraduate students' stress and anxiety in comparison to the standard of care (online verbal group therapy) and no intervention. More specifically, this research asked two main questions.

> Question 1: *Does participating in a 45-min online group music therapy session reduce stress and anxiety from pre- to post-session in comparison to the corresponding standard of care (online verbal therapy)?*

We hypothesized that significant reductions in stress and anxiety measures would be observed pre- to post-sessions for all therapy groups and that the reductions would not differ significantly between therapy groups. To test our hypotheses, we asked participants in both music therapy groups and the verbal therapy group to complete the State-Trait-Anxiety Inventory, State version (STAI-S), to rate their stress on a five-point Likert scale (Likert Stress), and to record their heart rate variability (HRV) from an app on their phone before and after each online group therapy session. Collecting measures before and after each therapy session provides information about the immediate effects of the intervention on stress and anxiety. This is important as experiencing low levels of stress, even for a short period of time, can have benefits (39). HRV was collected as a physiological measure of autonomic nervous system (ANS) function (40). Greater HRV is associated with increased ability to rapidly cope with uncertain and changing environments (41). However, a comprehensive review of the effects of psychotherapeutic interventions on the hypothalamic pituitary adrenal axis (HPA) and ANS regulation in adult samples with mental disorders reported inconclusive results (42). Here we examined whether HRV was sensitive to potential effects of online group music therapy.

> Question 2: *Does participating in 6 weeks of weekly online group music therapy sessions reduce stress in comparison to the corresponding standard of care (online verbal therapy) and a no-intervention control group?*

We hypothesized that reductions in stress measures would be observed from week 1 to week 6 for all three therapy groups with no difference in outcomes between the music therapy groups and the standard of care, and that music therapy would result in a reduction in stress in comparison to the control group. To test our hypotheses, we asked participants in both music therapy groups, the verbal therapy group, and the control group to complete the Perceived Stress Scale (PSS), and to mail in a hair sample for cortisol analysis, in both week 1 and week 6. A previous systematic review of RCTs exploring the effects of music interventions on cortisol revealed that only one music therapy study has measured cortisol before and after an intervention, and it was done via saliva (43). However, the results specific to the music therapy group were not reported due to the small sample size (44). Because cortisol from hair samples reflects total HPA activity in the preceding months and is more stable than saliva or blood samples that are affected by circadian rhythms and day-to-day fluctuations (45), in the present study, hair samples were collected in weeks 1 and 6 to provide retrospective information about participant HPA activity. Collecting cortisol and the PSS measure in weeks 1 and 6 provided information about the longer-term effects of engaging in 6 weeks of weekly online group therapy interventions.

In addition to the main outcome measures, we examined several variables that might potentially moderate the results. In addition to demographic data, these variables included personality traits, musical sophistication, and changes in quality of life over the 6-week period of the study. It is important to examine personality traits, as a meta-analysis showed that personality traits can moderate therapy outcomes (46). Regarding musical sophistication, while there is ample evidence that music can positively affect mental health (47), it is unclear if music sophistication moderates the degree of benefit, or a person's response to music therapy in comparison to verbal therapy. Changes in quality of life cannot be controlled in a naturalistic setting, but it is important to try to account for any adverse or positive experiences of a physical, psychological, social, or environmental nature that might impact the effects of the therapy. This was particularly important for the present study as many students experienced turmoil as pandemic restrictions were continually changing.

As the objectives of the therapy groups were to proactively manage stress and anxiety, we predicted that a significant reduction in stress and anxiety would be observed across outcome measures in all of the online therapy groups pre- and post- each online therapy session (measured by STAI-S, Likert stress, and HRV), as well as an overall reduction in stress between week 1 and week 6 (measured by PSS and cortisol). We also expected that online group music therapy would be as effective as the standard of care (online verbal therapy) and that all therapies would be more effective than the no-intervention control.

2. Materials and methods

2.1. Overall study design

A randomized control trial, pretest–posttest study design with four groups was approved by the Hamilton Integrated Research Ethics Board (project #11376). The groups were: (1) online active music therapy group, (2) online receptive music therapy group, (3) online verbal based therapy group (standard of care), and (4) no-intervention control. The study included five blocks and all blocks were completed between September 2020 and February 2022. Each block included all four groups. Within each block, each of the three therapy groups participated in a 45-min therapy session every week for 6 weeks (with the exception of Block 1, which ran for 5 weeks

due to a conflict with the exam schedule). Measures of stress and anxiety were taken pre and post each therapy session for each individual in each of the three therapy groups. Measures of stress and cortisol hair samples were taken pre and post the 6 weeks of the study protocol for each individual in all four groups in all five blocks (see details below).

2.2. Participants

Participants were full-time undergraduate students, aged 18–24 (M = 20 years old), at a Canadian university who agreed to adhere to the therapy group guidelines (**Supplementary material 1**). The study was originally designed with five different groups: (1) online active music therapy group, (2) online receptive music therapy group, (3) online verbal therapy group, (4) wait-listed group, and (5) no-intervention control group. Due to challenges recruiting participants during the COVID-19 pandemic, the waitlist group was removed from the study. Groups were to be run with weekly sessions for 6 weeks, with 10 participants per group. Thus, a block of the four concurrent group types was designed to consist of 40 participants. Four blocks were run in an attempt to achieve the desired sample size.

Power analyses were conducted using G*Power version 3.1 (48). To test whether stress and anxiety reduced from pre- to post-session, 80% power for detecting a medium effect (d = 0.5), at a significance criterion of α = 0.05, was reached at N = 41 for a one-tailed paired t-test. To test whether state anxiety and stress reductions differed across the therapy and control groups, 80% power for detecting a medium effect (f = 0.25), at a significance criterion of α = 0.05, was reached at N = 159 for a one-way ANOVA.

To achieve the desired sample of n = 160 (40 per block), four blocks were required. To capture student experiences across the school year, the study blocks were run in each of the four semesters. A total of 150 students provided consent to participate in the study, but only 110 students responded to the follow-up emails with questionnaires. The 110 students were randomly assigned to a therapy group or the control group. Students were evenly assigned to the different groups, but as a result of attrition, 84 students (15 males) completed the study: Receptive Music Therapy (n = 28), Active Music Therapy (n = 18), Verbal Therapy (n = 18), Control (n = 20). On average, students in the Music Therapy groups attended 77.5% of the online therapy sessions and students in the Verbal Therapy groups attended 71.0% of the online therapy sessions.

Demographically, students from all university Faculties were represented, but most students were in the Faculty of Science (56%). A total of 72/84 students self-described their ethnicity, broadly reporting: 32 Asian, 14 White, 6 African, 6 European, 6 cross-continent, 6 North American, 1 Caribbean, and 1 Jewish (more specific self-descriptions are presented in **Supplementary material 2**). Ethnicity was not used in the analysis and is presented to characterize the sample.

2.3 Procedure

A recruitment poster and recruitment email were circulated via social media platforms and email prior to each 6-week block. Students who responded to the recruitment messages were provided with the consent form as a Google form via email to review. Students choosing to sign and submit the consent form received a link to complete a demographic survey, the Goldsmith Music Sophistication Index (GOLD-MSI), the Ten Item Personality Inventory (TIPI), PSS, and WHO-QOL-BREF (see below for details of these measures). The PSS and WHO-QOL were completed again in week 6 of the study. Prior to the 6-week block commencing, participants received two hair sample collection kits, and were asked to provide a hair sample in week 1 and week 6 of the study. Participants were provided with an ID number to use for data collection to de-identify participants. The kits included instructions and an envelope to mail their hair sample to the lab. Finally, a 6-week recurring zoom link was sent to all participants in the three online therapy groups.

All three online therapy groups were facilitated by a registered psychotherapist, meaning the facilitators were members in good standing with the College of Registered Psychotherapists of Ontario. The therapists facilitating the online music therapy groups were also registered music therapists in good standing with the Canadian Association for Music Therapists. To minimize facilitator effects, different therapists facilitated different blocks throughout the research study, with a total of four music therapists and three verbal therapists participating. In addition, there were three undergraduate student co-researchers per block, who were either completing a research project course for credit or volunteering. Prior to data collection, online practice sessions with student co-researchers and therapists were conducted to review the data collection process.

Each online therapy group session was conducted on Zoom and began and finished with the student co-researcher being present on zoom to help participants as needed to fill out their Google form, which included completing the STAI-S, the Likert stress scale, and measuring their HRV (via the Welltory App on their phone) and recording it. The de-identified data from each participant was automatically input into a spreadsheet for later analysis. During this data collection, participants connected privately if needed with the student co-researcher using the private chat function in Zoom. Each week, after initial data collection, the therapist facilitated a 45 min online group session. The student co-researcher remained in a break-out zoom room during the therapy session and was not present for any of the therapy sessions. At the end of the therapy session, the student co-researcher was again available to help participants fill out their forms.

The instructions for the collection of the hair sample in week 1 and week 6 included the following steps: (1) cutting a small sample of hair and placing it on the paper provided in the kit, (2) folding the paper, and placing the paper with the hair in the pre-addressed, stamped envelope provided, and (3) posting the hair sample to the Drug Safety Laboratory at Western University, Ontario (**Supplementary material 3**).

Interventions implemented in the online active music therapy group included song writing, singing, lyric analysis, and verbal processing. Interventions implemented in the online receptive music therapy group included participant-directed music listening and verbal processing. Interventions implemented in the online verbal therapy group included verbal processing. Both the online music therapy and verbal therapy groups were informed by the model offered at the McMaster Student Wellness Centre, *Stress Less* (**Supplementary material 4**).

2.4. Measures

Three stress and anxiety measures were collected pre and post each online therapy session for each of the three therapy groups in each block: (1) STAI-S, (2) Likert stress, and (3) HRV. Two stress measures were collected in week 1 and week 6 from the three therapy groups and the control group: (1) PSS and (2) Cortisol. Three standardized questionnaires were given to capture participant variables that could moderate stress and anxiety outcomes: (1) Ten Item Personality Inventory (TIPI), (2) GOLD-MSI, and (3) World Health Organization Quality of Life (WHO-QOL) (49). The first two were collected prior to the onset of the therapy groups. The WHO-QOL was collected in week 1 and week 6 of the study. Participant variables collected from the demographic questionnaire included: self-described gender, self-described ethnicity, year of birth, University Faculty, previous or present use of psychotropic medication, and previous engagement in therapy. The following contains details about each of the measures.

2.4.1. Pre- and post-therapy session measures: all three therapy groups (no control group)

2.4.1.1. State-Trait Anxiety Inventory, State version

The STAI-S includes twenty questions assessing the intensity of participant anxiety at the moment of testing (50). The STAI-S was administered in the present study to measure how students' anxiety changes as a result of external factors in the moment. When completing the STAI-S, participants rate the intensity of their feelings on a Likert scale from (1) *not at all* to (4) *very much so*. The STAI-S has shown good reliability and validity across different normative groups; Cronbach's alpha = 0.86–0.95 (50). Construct validity was established in two studies by comparing the mean STAI-S scores of college students in anxiety-inducing conditions (50).

2.4.1.2. Likert stress (1–5)

The Likert scale is an example of a psychometric scale that is flexible and need-based, and whose validity is driven by the applicability of the topic in the context of participant understanding (51). In the present case, participants rated their stress from 1 to 5 (1 = None, 2 = Mild, 3 = Moderate, 4 = High, 5 = Extreme).

2.4.1.3. Heart rate variability

Heart rate variability is a non-invasive measure of the ANS as a reliable assessment of stress (40). Greater variability in heart rate can result in a greater ability to rapidly cope with uncertain and changing environments (41). In this study, HRV was collected using the Welltory smart phone application using the camera of the smart phone. Participants place their finger over the phone camera and flash for 2 min. A previous study compared HRV measurements using the Welltory App and the Polar chest strap (which are ECG accurate-site) and determined the technical error of estimate (TEE) was acceptable for all conditions (average TEE CV% [90% CI] = 6.35 [5.13; 8.5]) and both the PPG- and heart-rate-sensor-derived measures had almost perfect correlations with ECG (r = 1.00 [0.99; 1.00]) (52).

2.4.2. Pre-post 6-week intervention measures: all groups

2.4.2.1. Perceived Stress Scale (PSS-10)

The PSS is a 10-item self-report questionnaire designed to evaluate the extent to which an individual perceives life to be "unpredictable, uncontrollable, and overloading" (53). The scale is designed to assess feelings about life events and situations over the previous month using a five-point scale ranging from (0) *Never* to (4) *Very Often*. PSS scores have demonstrated adequate reliability (α = 0.78) and moderate concurrent criterion validity with the amount of stress experienced during an average week ($r = 0.39$, $p < 0.001$) and the frequency of stressful life events within the past year ($r = 0.32$, $p < 0.001$) (54). Additional studies reporting the PSS-10 to have good internal consistency and reliability include Barbosa-Leiker et al. (55), Golden-Kreutz et al. (56), and Reis et al. (57).

2.4.2.2. Cortisol

Cortisol is a glucocorticoid secreted from the adrenal glands that is often used as a biomarker for stress (58). Hair cortisol is not an acute marker of hypothalamic pituitary adrenal axis (HPA-axis) activity. Rather, it acts as a proxy for total HPA activity in the preceding months (45). Cortisol from hair samples thus provides information about participant HPA activity retrospectively. Several studies have shown that hair cortisol levels can serve as a reliable approximation of average blood cortisol levels, pointing to the validity of this method relative to established standards (45, 59).

2.4.3. Standardized questionnaires for participant variables: all groups

2.4.3.1. Ten Item Personality Inventory

The TIPI is a self-report questionnaire consisting of ten pairs of words to measure a person's Big Five personality dimensions: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to experiences (60). Participants are asked to rate the extent that each pair of words applies to themselves on a Likert scale from (1) *disagree strongly* to (7) *agree strongly*. The TIPI has been shown to have good validity: mean convergent validity with the Big-Five Inventory was r = 0.77 (60).

2.4.3.2. The Goldsmith Music Sophistication Index

The GOLD-MSI is a psychometric tool for the measurement of musical attitudes, behaviors, and skills. It is comprised of a self-report questionnaire measuring musical sophistication, defined as musical skills, expertise, achievements, and related behaviors (61). There are five subscales within the GOLD-MSI: (1) Active Engagement, (2) Perceptual Abilities, (3) Musical Training, (4) Singing Abilities, and (5) Emotions. A study by Müllensiefen et al. (61), reported that the GOLD-MSI possesses good reliability on each subscale (all α and $\omega > 0.79$).

2.4.3.3. World Health Organization Quality of Life

The WHO-QOL-BREF is a questionnaire containing 26 questions to assess four domains: (1) Physical Health, (2) Psychological Health, (3) Social Relationships, and (4) Environmental Quality of Life. The WHO-QOL-BREF provides a valid and reliable alternative to the assessment of domain profiles using the WHO-QOL-100 (WHO/HIS/HSI Rev.2012.03) (49).

2.5. Analysis plan

Analyses were conducted using both JASP 0.14.1 and RStudio 2022.07.02.

2.5.1. Question 1: Does participating in a 45-min online group music therapy session reduce stress (Likert stress) and anxiety (STAI-S) from pre- to post-session in comparison to the corresponding standard of care (online verbal therapy)?

One-tailed paired *t*-tests (corrected for multiple comparisons) were conducted between the average pre-session scores to the average post-session scores for each of the three therapy groups to determine if stress (Likert stress) and anxiety (STAI-S) reduced from pre- to post-session for each of the therapy groups.

Separate one-way ANOVAs were conducted to determine if the average change (pre-session scores were subtracted from post-session scores) in stress (Likert stress) and anxiety (STAI-S) scores differed amongst the three therapy groups (Active Music Therapy, Receptive Music Therapy, and Verbal Therapy). Following this, Bayesian ANOVAs were conducted to determine the degree of evidence for the null hypothesis (i.e., no difference among the three therapy groups in stress and anxiety reduction).

2.5.2. Question 2: Does participating in 6 weeks of weekly online group music therapy session reduce stress in comparison to the corresponding standard of care (online verbal therapy) and to the no-intervention control group?

Separate one-tailed paired *t*-tests (corrected for multiple comparisons) were conducted to determine whether there was a reduction in PSS and in cortisol scores between week 1 and week 6 scores for each of the therapy groups and the control group.

Separate one-way ANOVAs were planned to determine if the difference in PSS and cortisol scores across the 6 weeks (week 1 scores were subtracted from week 6 scores for each group) differed among the two music therapy groups and the control group. Following this, Bayesian ANOVAs were conducted to determine the degree of evidence for the *a priori* null hypothesis that there was no difference among the two music therapy groups in comparison to the standard of care (verbal therapy group) in stress reduction based on PSS and cortisol scores.

3. Results

3.1. Outcome variables: stress and anxiety

3.1.1. Question 1: Does participating in a 45-min online group music therapy session reduce stress (Likert stress) and anxiety (STAI-S) from pre- to post-session in comparison to the corresponding standard of care (online verbal therapy)?

A total of 64 students participated in the therapy groups and provided STAI-S and Likert stress scores pre and post each group therapy session. The pre- vs. post-session scores for STAI-S and Likert stress met assumptions for equal variance [$F(2,61) = 0.85$, $p = 0.43$; $F(2,61) = 1.47$, $p = 0.24$, respectively].

One-tailed paired *t*-tests comparing the average pre- and the average post-session STAI-S and Likert stress scores for each online group therapy session revealed a significant average reduction in both STAI-S and Likert stress scores separately for each of the three therapy groups (all *p*'s < 0.0008 after Bonferroni Correction for multiple comparisons). Detailed results are presented in **Table 1**.

ANOVAs using the average change scores (pre-session scores subtracted from post-session scores) for each therapy group found no significant differences among therapy groups for either change in STAI-S scores [$F(2,61) = 0.55$, $p = 0.58$, $\eta^2 = 0.02$] or Likert stress scores [$F(2,61) = 0.09$, $p = 0.91$, $\eta^2 = 0.003$]. To provide stronger evidence for the null hypothesis (no difference between the music therapy groups and the verbal therapy standard of care), a Bayesian ANOVA revealed moderate evidence that the therapy groups did not differ from the standard of care on either changes in STAI-S ($BF_{10} = 0.195$) or Likert stress ($BF_{10} = 0.198$) scores.

Due to the HRV scores being highly variable, only descriptive statistics are reported (see **Supplementary material 4**). According to the app used, HRV should range from 65 to 105 ms (62). Our participants reported measurements from 3.3 to 298 ms. This variability was likely due to several factors, including a lack of control of participants' activities at home immediately preceding the measurements, perhaps not using the app correctly, and potential issues in participants' reporting of the HRV values from the Welltory phone application.

3.1.2. Question 2: Does participating in 6 weeks of weekly online group music therapy sessions reduce stress in comparison to the corresponding standard of care (online verbal therapy) and to a no-intervention control group?

A total of 68 students completed the PSS in both week 1 and week 6, and a total of 39 students provided hair samples in both week 1 and week 6. The cortisol data were heavily skewed; therefore, we log-transformed the cortisol data (63, 64). One-tailed paired *t*-tests comparing week 1 scores to week 6 scores for PSS revealed only a significant average reduction in PSS scores in the Receptive Music Therapy group ($p = 0.02$), but the finding did not survive Benjamini–Hochberg correction for multiple comparisons ($p = 0.08$). One-tailed paired *t*-tests comparing week 1 cortisol to week 6 cortisol for each group revealed only a significant increase in cortisol in the control group ($p = 0.04$ after Benjamini–Hochberg corrections for multiple comparisons). Detailed results are presented in **Table 2**.

To test our hypothesis that reductions in PSS scores would differ among the music therapy groups (active music therapy group, receptive music therapy) and the control group, we conducted a one-way ANOVA comparing difference scores (week 1 scores were subtracted from week 6 scores). We found a non-significant effect of group [$F(2,50) = 0.661$, $p = 0.521$, $\eta^2 = 0.026$], indicating that we found no evidence that the music therapy groups differed significantly from the control group for changes in PSS scores from week 1 to week 6.

To determine whether the two music therapy groups (active music therapy group, receptive music therapy) were equivalent on PSS change scores to the standard of care (verbal therapy), a

TABLE 1 Change in stress and anxiety scores pre to post sessions (for each participant, their pre-score minus post-score was averaged across sessions).

		STAI-S						Likert stress					
Group*	*N* (males)	Pre (SD)	Post (SD)	Change (SD)	*t*	df	*d*	Pre (SD)	Post (SD)	Change (SD)	*t*	df	*d*
AMT	18 (2)	43.20 (8.94)	32.92 (6.90)	−10.28 (5.28)	7.4	17	1.77	3.03 (0.81)	2.26 (0.64)	−0.77 (0.63)	5.18	17	1.22
RMT	28 (5)	44.59 (9.09)	34.89 (6.72)	−9.70 (5.5)	9.3	27	1.77	3.09 (0.93)	2.23 (0.81)	−0.86 (0.69)	6.55	27	1.24
VT	18 (3)	45.29 (10.85)	37.08 (8.07)	−8.21 (7.48)	4.6	17	1.10	3.29 (0.68)	2.63 (0.68)	−0.65 (0.64)	4.43	17	1.04
All	64 (10)	44.40 (9.46)	34.95 (7.23)	−9.45 (6.15)	12.3	63	0.54	3.15 (1.43)	2.37 (0.94)	−0.78 (0.66)	8.58	63	1.07

All p's < 0.001; Bonferroni alpha = 0.0083 (0.05/6 comparisons). *AMT, Active music therapy; RMT, receptive music therapy; VT, verbal therapy.

TABLE 2 Change in perceived stress and cortisol week 1 to week 6.

	PSS						Cortisol						
Group*	*N* (males)	Change (SD)	*p*	*t*	*df*	Effect	*N* (males)	Change (SD)	*p*	*t* (W)	*df*	Effect	Shapiro–Wilk
AMT	16 (1)	−1.94 (6.63)	0.13	1.2	15	0.29	8 (1)	−0.05 (0.25)	0.31	0.54	7	0.19	0.53
RMT	19 (3)	−2.90 (5.48)	0.02	2.3	18	0.53	11 (2)	−0.11 (0.23)	0.06	1.67	10	0.5	0.40
VT	15 (3)	−1.80 (5.81)	0.13	1.2	14	0.31	9 (1)	−0.00 (0.71)	0.33	(27)	8	0.2	0.016**
C	18 (4)	−0.78 (4.67)	0.76	0.71	17	0.17	11 (3)	0.31 (0.49)	0.01	(8)	10	−0.76	0.005**

For the Student's t-test, effect size (Cohen's *d*). For the Wilcoxon test, effect size (matched rank biserial correlation). *AMT, Active music therapy; RMT, receptive music therapy; VT, verbal therapy. **Wilcoxon signed-rank used for Shapiro–Wilk $p < 0.005$.

Bayesian ANOVA revealed moderate evidence that the two music therapy and the verbal groups did not differ ($BF_{10} = 0.126$).

With respect to our hypothesis that reductions in cortisol scores would differ among the music therapy groups (active music therapy group, receptive music therapy) and the control group, difference scores (week 1 scores were subtracted from week 6 scores) failed to meet the Shapiro-Wilk criteria for normality ($W_{Pre} = 0.89$, $p < 0.01$; $W_{Post} = 0.91$, $p < 0.01$; $W_{Cortisoldifference} = 0.83$, $p < 0.01$). Therefore, the non-parametric Kruskal–Wallis test was used to compare the cortisol difference scores from among the two music therapy groups and the control group. This revealed a significant effect of group (receptive music therapy, active music therapy, and control group) on change in cortisol [Kruskal–Wallis $\chi^2(2) = 7.73$, $p = 0.02$, $\eta^2 = 0.25$]. A pairwise *post-hoc* Dunn test with Bonferroni adjustments revealed significant differences between the receptive music therapy group and the control group ($p = 0.01$).

To determine whether the two music therapy groups (active music therapy group, receptive music therapy) and the standard of care (verbal therapy group) were equivalent on cortisol difference scores, a Bayesian ANOVA revealed anecdotal evidence that therapy group had no effect on the changes in cortisol ($BF_{10} = 0.655$).

3.2. Correlates of stress and anxiety outcomes

Pearson correlations across all possible participants (i.e., collapsing across the three therapy groups for the pre-post session scores, and all four groups for the pre-post intervention period scores) were conducted between each participant variable and the four stress and anxiety difference scores (Table 3). After corrections for multiple comparisons, the only significant correlation was between changes in PSS and the personality trait of conscientiousness ($r = 0.39$, $p = 0.02$). The direction of the relationships was such that higher conscientiousness was related to an average increase in PSS scores across the 6-week intervention period.

4. Discussion

In alignment with the World Health Organization's (WHO) goal to provide comprehensive and integrated mental health services in community-based settings, this research explored the efficacy of online group music therapy as a proactive intervention for reducing university students' stress and anxiety. The term proactive refers to engaging students in therapy as a means to manage the stressors and anxiety of student life. Stress can be a healthy emotion when an individual has the tools to manage it, whereas persistent exposure to stressors and continual activation of the stress response can be detrimental to health and wellbeing (65). To our knowledge, this RCT reports on the first application of online group music therapy for proactive wellness with undergraduate university students.

Regarding our first question, *whether participating in a 45-min online group music therapy session reduces stress and anxiety in comparison to the corresponding standard of care (online verbal therapy)*, we found that both STAI-S and Likert stress self-report scores decreased significantly from pre to post therapy session, for each therapy group (active music therapy, receptive music therapy, and verbal therapy). Furthermore, there were no significant differences among the groups and a Bayesian analysis found moderate evidence for no difference among the groups. Thus, by these self-report measures, group music therapy was effective and no different from the standard of care (online verbal therapy). As far as a direct measure of ANS function, this was more challenging to collect remotely. Unfortunately, the HRV scores

TABLE 3 Correlates of stress and anxiety difference scores.

	Participant variables	*r*	*p**
Stress anxiety change			
State anxiety	Block of study	0.11	0.40
Likert	Block of study	0.29	0.21
PSS	Block of study	−0.10	0.37
Cortisol	Block of study	−0.10	0.55
State anxiety	Gender	0.11	0.38
Likert	Gender	−0.18	0.16
PSS	Gender	−0.15	0.23
Cortisol	Gender	−0.03	0.84
State anxiety	Attendance	−0.16	0.22
Likert	Attendance	−0.37	0.08
PSS	Attendance	−0.07	0.63
Cortisol	Attendance	−0.45	0.21
State anxiety	Year of birth	0.07	0.58
Likert	Year of birth	0.17	0.21
PSS	Year of birth	−0.26	0.21
Cortisol	Year of birth	0.18	0.30
State anxiety	University faculty	−0.12	0.36
Likert	University faculty	−0.27	0.21
PSS	University faculty	0.17	0.18
Cortisol	University faculty	−0.19	0.25
State anxiety	Medication	0.05	0.70
Likert	Medication	0.22	0.09
PSS	Medication	0.04	0.73
Cortisol	Medication	0.03	0.87
State anxiety	Therapy	−0.09	0.52
Likert	Therapy	0.22	0.09
PSS	Therapy	0.19	0.13
Cortisol	Therapy	−0.12	0.48
TIPI			
State anxiety	Extroversion	−0.06	0.67
Likert	Extroversion	−0.13	0.35
PSS	Extroversion	−0.04	0.74
Cortisol	Extroversion	0.18	0.30
State anxiety	Agreeableness	0.04	0.76
Likert	Agreeableness	−0.03	0.84
PSS	Agreeableness	0.16	0.20
Cortisol	Agreeableness	−0.03	0.87
State anxiety	Conscientiousness	−0.03	0.84
Likert	Conscientiousness	−0.02	0.91
PSS	Conscientiousness	0.39	0.02*
Cortisol	Conscientiousness	0.13	0.44
State anxiety	Emotional stability	0.00	0.99
Likert	Emotional stability	−0.16	0.23
PSS	Emotional stability	0.04	0.78
Cortisol	Emotional stability	−1.70	0.32
State anxiety	Openness	−0.28	0.29
Likert	Openness	−0.27	0.29
PSS	Openness	−0.03	0.82
Cortisol	Openness	0.10	0.60
QOL			
State anxiety	Physical	−0.17	0.27
Likert	Physical	−0.01	0.38
PSS	Physical	−0.07	0.62
Cortisol	Physical	0.06	0.73
State anxiety	Psychological	−0.17	0.30
Likert	Psychological	−0.01	0.94
PSS	Psychological	−0.36	0.06
Cortisol	Psychological	0.04	0.82
State anxiety	Social	−0.34	0.21
Likert	Social	−0.27	0.08
PSS	Social	−0.17	0.18
Cortisol	Social	0.16	0.35
State anxiety	Environmental	−0.14	0.37
Likert	Environmental	−0.13	0.41
PSS	Environmental	−0.01	0.92
Cortisol	Environmental	−0.15	0.39
GOLD-MSI			
State anxiety	Active engagement	0.11	0.45
Likert	Active engagement	−0.08	0.57
PSS	Active engagement	−0.25	0.06
Cortisol	Active engagement	0.24	0.15
State anxiety	Perceptual abilities	0.04	0.80
Likert	Perceptual abilities	−0.04	0.78
PSS	Perceptual abilities	−0.25	0.06
Cortisol	Perceptual abilities	−0.08	0.67
State anxiety	Musical training	−0.11	0.43
Likert	Musical training	−0.25	0.07
PSS	Musical training	−0.02	0.85
Cortisol	Musical training	0.09	0.60
State anxiety	Singing abilities	0.05	0.73
Likert	Singing abilities	−0.12	0.38
PSS	Singing abilities	−0.07	0.58
Cortisol	Singing abilities	0.07	0.67
State anxiety	Emotions	0.11	0.42
Likert	Emotions	0.15	0.29
PSS	Emotions	−0.16	0.22
Cortisol	Emotions	0.03	0.90

TABLE 3 (Continued)

	Participant variables	*r*	*p**
State anxiety	General music sophistication	0.01	0.93
Likert	General music sophistication	−0.15	0.29
PSS	General music sophistication	−0.12	0.36
Cortisol	General music sophistication	0.10	0.54

The variable *Medication* refers to the participants' past or present use of psychotropic medication, and the variable *Therapy* refers to past or present experience with therapy. *$p < 0.05$ with Benjamini–Hochberg corrections for multiple comparisons.

reported by participants using a phone app at home appeared to be unreliable, so it is difficult to make any conclusions regarding this measure. However, the evidence from the STAI-S and Likert stress tools clearly points to short-term benefits of online group music therapy that are similar to the verbal therapy standard of care.

Regarding our second question, *whether participating in 6 weeks of weekly online group music therapy sessions reduces stress in comparison to the corresponding standard of care (online verbal therapy) and a no-intervention control group,* there were no significant differences among the four groups (active music therapy, passive music therapy, verbal therapy, and control) on the self-report PSS stress scale, and a Bayesian analysis found moderate evidence that the groups did not differ. Furthermore, changes in PSS from week 1 to week 6 were not significantly different from chance for any group when corrected for multiple tests. The research comparing self-reported stress scores to a biomarker is mixed; several studies have reported non-significant changes in self-reported measures of stress, despite reporting significant changes in cortisol (44, 66), although several also report significant correlations between self-reported stress and cortisol (67, 68). Regarding cortisol, despite only about half of participants sending in both hair samples, there was a significant difference among the music therapy groups and the control group on the change in cortisol across the intervention. *Post-hoc* tests revealed that the receptive music therapy and control groups differed significantly on cortisol changes. Specifically, this was driven by a significant increase in cortisol in the control group and a marginal decrease in cortisol in the receptive music therapy group, as revealed via paired *t*-tests. Without intervention, it is plausible that stress levels would increase over the university term, as they did in the control group. In this light, it is interesting that the intervention groups did not show this trend. Future studies should attempt to replicate these findings with a larger sample size.

Individual differences have been reported as an important factor in the experience of stress (2). We therefore examined several variables that might moderate stress and anxiety outcomes. None of the demographic variables collected, including gender, and area of study at university, correlated significantly with any of the measures of change in stress or anxiety after correcting for multiple comparisons. Although there is literature relating personality traits to stress responses, the role of personality in response to engaging in therapy has been less studied. A meta-analysis on the associations between the Big Five personality traits and stress reported neuroticism was positively related to stress, while extraversion, agreeableness, conscientiousness, and openness were negatively related to stress (69). In the present research study, only conscientiousness was significantly correlated with changes in PSS after correction for multiple comparisons. We found that conscientiousness scores were significantly correlated with an increase in PSS scores from week 1 to week 6, suggesting that people with this personality trait may be less responsive to therapy. However, the present study differed from previous studies that explored correlations between PSS scores and personality as it explored *changes* in PSS scores over the study period, as opposed to PSS scores in the final week of the study, which appears to be a more common study design. Given that these analyses were exploratory, further research is needed to understand the complex relations between various individual differences and responsiveness to music therapy.

Participants also completed the QOL questionnaire as stress and anxiety levels can be affected by particular events in an individual's life that affect their quality of life. We found no significant associations between any of the QOL subscales and any of the measures of stress and anxiety after correcting for multiple comparisons. However, as the study was conducted during the COVID-19 pandemic restrictions, it is possible that all or most students were experiencing negative quality of life changes, making it difficult to see effects of individual differences. Given that previous studies have linked lower quality of life scores to higher stress (70–72), it would be useful for future research to examine how quality of life measures might relate to music therapy outcomes with a larger sample size and outside of a pandemic period.

Engaging in music therapy does not require participants to have a background in music, or to be able to play an instrument or to sing. However, whether musical sophistication affects music therapy outcomes remains understudied. We did not observe any significant correlations between music sophistication scores and any of the stress or anxiety measures, nor did we find any significant differences between the active and receptive music interventions. While these null findings need to be replicated with a larger sample, they suggest that musical sophistication may not be necessary for positive music therapy outcomes and that participants with varied musical backgrounds may benefit even from music therapy that involves active music making.

Despite several challenges and limitations (see section "4.1. Limitations"), the present study was innovative in showing that music therapy can be effectively delivered to university students online and in a group setting. The COVID-19 pandemic has likely forever changed aspects of health care delivery. Beyond the scope of university students, access to proactive online group mental health therapies provides a relatively inexpensive option that can drastically increase accessibility for many populations, including those from poorer economic backgrounds, those who have mobility challenges (such as seniors in care), and those living in remote areas (32).

Although on-campus treatment options are being expanded in Canada, few universities have attempted a whole campus approach to create a health-promoting culture, as is described in the Okanagan Charter (73), and we are not aware of any campuses that are offering music therapy. One important aspect of a health-promoting cultures is a *proactive approach* that provides services aimed at improving mental health before crisis situations are reached. This is of course beneficial for students, but at the same time it could lead to reductions in treatment costs. A second important aspect of a health-promoting culture is to *include a variety of options*. Creative arts therapies are not recognized as a standard of care for mental health goals, yet the findings of

the present research suggest that music therapy could be a viable option to offer to students on a university campus. Considering that 75% of students who experience significant psychological distress do not seek support as a result of negative stigma (18), offering music therapy could help to lower this number as a non-negatively stigmatized option for support. This idea is further supported by a survey completed by 786 university students who indicated the most interest in engaging in music therapy for mental health support, followed by art therapy, and lastly verbal therapy (11). In sum, the present results support that the option of online group music therapy on campus for students without a clinical diagnosis can effectively reach some students who would not otherwise engage in proactive therapy for stress and anxiety.

4.1. Limitations

Conducting this online study presented some challenges. First, because the university campus was closed as a result of COVID-19 restrictions, students had to be recruited remotely, and we experienced a considerable attrition rate from the time students completed the consent form and pre-questionnaires, to the time the time the therapy sessions began. Thus, our sample size was smaller than desired, affecting statistical power, particularly for between-group analyses. Collecting the important physiological data was also a challenge remotely. Although participants were instructed on how to collect HRV data using an app on their phone, we were not able to control how well they did this, the accuracy of their reporting, or what activity they were engaged in immediately prior to the therapy session. In the end, the HRV data was highly variable and not analyzable. Future online studies will need to find a more reliable method to collect this data. Finally, although the cortisol analyses yielded significant results, only about half of the participants sent in both samples, so these analyses were underpowered.

5. Conclusion

The present randomized control trial conducted during COVID-19 restrictions highlights the benefits of offering online group music therapy to university students as a proactive intervention for stress and anxiety in the absence of a clinical diagnosis. Significant reductions in anxiety, as measured by the STAI-S, and stress, as measured on a Likert scale, were observed from pre- to post-45 min of both active and receptive online group music therapy. Further, there was moderate evidence that these reductions in stress and anxiety did not differ from the standard of care (online verbal therapy), suggesting that group music therapy provides a viable option for stress and anxiety reduction. Significant reductions in stress from week 1 to week 6 were not observed by the PSS report measure. However, cortisol levels measured from hair samples taken at the beginning and at the end of the therapy period significantly increased in the control group from week 1 to week 6 as the university term progressed but remained stable in the therapy groups from week 1 to week 6. This study is unique in targeting university students without a clinical diagnosis and exploring the efficacy of online music therapy relative to the standard of care. Further, it is the first music therapy study to measure cortisol from hair samples collected remotely, pushing the boundaries of remote physiological measurement in therapy assessment. The results suggest a choice in therapy type could benefit many students and that music therapy can provide an alternative for students reluctant to engage in, or unable to access, verbal therapy options. This study provides an example of how a health-promoting culture on university campuses can be achieved, consistent with the mental health goals of the Okanagan Charter.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Hamilton Integrated Research Ethics Board (HiREB#11376). The patients/participants provided their written informed consent to participate in this study.

Author contributions

RF and LT designed the study. RF supervised the implementation of the protocol and data collection. RF and SM analyzed the data with input from LT. All authors contributed to writing the manuscript, read, and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2023.1183311/full#supplementary-material

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A case study of group art therapy using digital media for adolescents with intellectual disabilities

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Introduction: In art therapy, digital art therapy is a new method in which clients use digital media to express themselves creatively. We wanted to explore what this means for adolescents with disabilities. The purpose of this qualitative case study was to explain what kind of experience they had when digital media was applied as an expressive and therapeutic medium in group art therapy in which adolescents with intellectual disabilities were participants and what kind of therapeutic meaning the experience had. We tried to know the therapeutic factors by extracting the implications of meaning.

Methods: Participants were second-year high school students with intellectual disabilities who belonged to special classes. They were selected in an intentional purposive sampling method. Five teenagers with intellectual disabilities participated in 11 group art therapy sessions. Data were collected through interviews, observation, and digital artwork collection. Collected data were case studies analyzed using an inductive approach. In this study, the use of digital media was defined and utilized as "Digital Art Therapy" by setting the scope related to the study according to client's behavioral method.

Results: As a digital generation accustomed to smartphones, the participants gained confidence by repeatedly acquiring new technologies through familiarity with the media. Interaction with the media through touch and the use of apps have promoted autonomy with interest and pleasure to disabled teenagers, allowing them to express themselves actively. In particular, digital art therapy induces a holistic sensory experience by mobilizing visual images that could represent various expressions, emotions felt in music and tactile senses that made texts for people with intellectual disabilities with difficulty in verbal communication.

Discussion: Art therapy using digital media has become an important experience that provides opportunities to arouse curiosity, enjoy creative activities, and express positive emotions vividly to adolescents with intellectual disabilities who have difficulties with expression and communication and a sense of lethargy. Therefore, it is suggested that an in-depth understanding of the characteristics and differences between traditional and digital media is necessary, and that complementary use to help create therapeutic purposes and art therapy is important.

KEYWORDS

group art therapy, digital media, intellectual disabilities, adolescents, case study

1. Introduction

We are currently living in an era of digital transformation. The emergence of the 4th Industrial Revolution has led to an acceleration of digital technology. The COVID-19 pandemic has only further accelerated the use of digital technology (1). New digital technologies including metaverse, Augmented Reality (AR), and Internet of Things (IoT) focusing on artificial intelligence (AI). Telemedicine and online education are all expected to spread, evolve, and continue to be extensively developed with increasing demands throughout the world (2, 3).

One arena in which the importance of digital technology can be highlighted is art therapy. Art therapy can promote self-exploration and understanding by using the creative process of artwork as a means of self-expression and communication (4–6). Recently, the field of art therapy is using online platforms to activate community and creativity among therapists (7), With the COVID-19 pandemic started in 2020, the field of art therapy is rapidly transitioning to remote work to cope with the pandemic (8). It also prepares for the future by improving accessibility and acceptability to treatment using new art media (9).

Digital media was first used as a communication tool in art therapy by Weinberg (10), who attempted to apply computer technology to rehabilitation for people with disabilities. The medium used in art therapy is a media of expression. Digital media has been attracting attention as a new tool to attract interest and provide opportunities for artistic expression due to the characteristics of digital media (11).

In the new media era, digital media has evolved and developed in a wide range of areas, including remote art therapy, phototherapy, animation, and virtual reality (VR) using computer and graphic programs as well as creative expressions (12, 13). Recently, numerous apps for digital art production have been released that target a wide range of users, including many young customers of the digital generation. Despite the explosive spread of art-making apps (e.g., apps for digital drawing and painting, visual journalism, storytelling, animation, and multimedia), many art therapists lack experience and skills in using digital media in treatment (14). Moreover, research on this topic has progressed relatively slowly (9). Those who were born in the digital age, i.e., "digital natives" (15), recognize the utility of technology in treatment with familiarity and convenience (16). They also prefer to express their feelings through images, text, or video in their work activities, as they consider the digital space their main space (17, 18).

Malchiodi (11) has stated that digital media accessible to people with disabilities can promote a new therapeutic relationship. Previous studies have shown that the use of digital media with hospitalized children (19, 20) or in limited medical environments in clinical art therapy can allow patients to virtually experience media that they cannot experience in real life (11). Studies have revealed the usefulness of digital media in art therapy because digital media can enable patients to experience media that they could not experience in real life through digital media (21–24).

International Classification of Health of Functioning Disability was approved by the World Health Organization (WHO) in 2001. International Classification of Functioning, Disability and Health (ICF) defines "disability" as an interaction between multidimensional factors at the individual, social, and physical levels (25). People with disabilities have more limited access to digital technology than the general public (26, 27). The National Telecommunications and Information Administration (NTIA) has reported that people with disabilities have digital information gaps in their online activities and internet use in various environments compared to people without disabilities (28). In the rapidly changing environment of the modern world, digital technology's hyperconnectivity, convenience, and subjectivity are more needed for people with disabilities who require some form of assistance or have physical constraints. To reduce such digital information gap, there is a need for digital inclusion that does not exclude or marginalize anybody (29). Moreover, using digital media for communication is essential for students with disabilities to successfully transition to society after graduation and live meaningfully (30).

According to the US National Center for Education Statistics (31), from 2020 to 2021, 7.2 million students from 3 to 21 years old received special education services under the Disabled Education Act (IDEA), thus accounting for 15% of all public school students. This number has also been showing an increasing trend. Intellectual disability is defined as a condition characterized by significant limitations in intellectual functioning and adaptive behavior before age 22 (32, 33).

According to the American Psychiatry Association (APA, 2013), intellectual disability is a condition that begins during development and is characterized by deficits in both intellectual intelligence and adaptive functioning in conceptual, social, and practical domains (34). In the Republic of Korea, intellectual disabilities account for the most significant proportion of the total number of students with disabilities at 51.8% (35). For teenagers with intellectual disabilities, attending special classes can cause various psychological stresses such as anxiety and perceived inferiority because of one's disability, the formation of low self-esteem, frustration, and atrophy due to frequent failure experiences (36). They might also face difficulties in social adaptability due to emotional expression that is either socially marginalized or limited and contraction of interpersonal relationships (32). Therefore, there is a greater need for therapeutic intervention for psychological and emotional problems of students with intellectual disabilities than among general students.

Art therapy for adolescents with intellectual disabilities can provide them opportunities for expression and communication through alternative visual media (37). Art therapy in the educational scene was, initiated by Edith Kramer (38), It has been shown that art could be a powerful communication tool based on all humans' creativity (39). In addition, for students with disabilities who are usually protected and raised, art provides them a significant opportunity to function independently. They can feel joy, pleasure, and a sense of achievement in the experience of controlling materials at will (40).

In the Republic of Korea, art therapy services are provided during creative experience classes and after-school classes in special schools and general schools for children and adolescents with disabilities. For children and adolescents with special needs, art therapy in a school environment can provide them an opportunity to overcome obstacles to educational success (41, 42). In addition, strengthening programs for students who are identified as disabled can help them realize their social and academic potential by promoting appropriate social behavior and emotional development (41, 42). In this way, the clinical work of art therapy is gradually expanding into education and special education environments (43).

Technology provides many people with pleasant experiences and new opportunities (44). The playful interaction behavior offered by digital media provides sensory enjoyment, which drives art creation (45–48). The spontaneous and action-promoting characteristics of such interaction behavior have positive functions that can be useful for adolescents with intellectual disabilities who have low expression, who are depressed, who have low self-esteem, and who lack attention and motivation (49). Studies on the use of digital media for people with intellectual disabilities in art therapy (49–51) are very lacking, especially in group art therapy for adolescents with intellectual disabilities. It was difficult to find case studies that applied it as a medium of communication. Therefore, in art therapy using digital media, there is a need for extensive research on various subjects and case studies to understand the therapeutic process.

This study proposes a new method of participation for creative expression, selection, and control by therapeutically applying digital media, a form of communication and self-expression culture, to teenagers with intellectual disabilities so that they can enjoy the universal right to human equality. Moreover, a case study has been performed to obtain specific knowledge by understanding and exploring research participants through a therapeutic process and to understand the phenomenon in the art therapy process. To this end, the following research questions are explored in this study:

1. What are experiences of adolescents with intellectual disabilities in group art therapy using digital media?
2. What are meanings that can be extracted from experiences of adolescents with intellectual disabilities with group art therapy using digital media?
3. What are therapeutic factors of group art therapy using digital media for adolescents with intellectual disabilities?

2. Materials and methods

2.1. Research design

The present work used a qualitative case study approach to explore and understand experiences of individuals who had group art therapy in 11 sessions, from surface level observations in a natural setting to in-depth analyses (52). Phenomena of specific cases were described in a deep and natural context. New meanings were discovered based on the experiences reported by participants and data obtained from the phenomena observed by the researcher (53). The goal of the case study method was to investigate how, why, what was happening and what factors were related to the phenomenon (54). The purpose of qualitative case study is to explore and understand the experiences, meanings, and therapeutic factors of research participants through various data collection and analysis steps, while considering characteristics of manners (55).

2.2. Research procedure

The participants in this study were five students (one male student and four female students) in special classes at M high school in S city. The group art therapy program was conducted once a week from September 2019 to December 2019 by connecting creative experience classes for a semester over a total of 11 sessions (120 min for each session). This study used an institutional-centered art therapy program composed for special purposes. After explaining the purpose and method of the study to the teacher in charge of the special class, this study was reviewed and approved by the school.

Participants were all second-year high school students with intellectual disabilities who belonged to special classes. They were selected with a purposive sampling method (52). Based on the selection criteria for adolescents who submitted written consent, research participants and their parents (main guardians) were explained about the purpose and procedure of this study.

Personal information and characteristics of the participants in this study were obtained based on reports of special class teachers and observations of researchers. In this paper, aliases were used to protect research subjects (Table 1).

2.3. Case conceptualization

A case conceptualization is a method and clinical strategy for organizing obtained information about clients, for understanding and explaining clients, planning treatment interventions, and for establishing a consistent treatment strategy (56, 57). Case conceptualization is essential in psychotherapy (58). It was developed for art therapist responsibility and confidence in treatment (59). It has been used to increase the likelihood of treatment goals (57). Thus, the researcher identified problems, causes, and strengths based on various information related to the main complaints of participants and planned treatment using case conceptualization to obtain further improved results (Table 2) (60, 61).

2.4. Data collection and data analysis

Data were collected through interviews, observation, and document collection using the triangulation method (62). The average interview was about 30 min, there were two semi-structured interviews after initial and mid-term sessions along with one group interview after the end of sessions. Group dynamics were observed by having participants fill out semi-structured questionnaires to obtain abundant information (63).

Before starting the interview, the researcher explained to the participant that the interview content would be recorded and transcribed by the researcher, with anonymity and confidentiality of the interview content guaranteed. Consent was then obtained from each participant before the interview. We also shared individual results with participants after the study. In this process, terms related to informed consent were converted into easy-to-understand terms according to the level of understanding of the participants. The researcher proceeded with open questions within a large framework of the research problem (63). Participants were able to understand the purpose of this study and express their opinions based on their own experiences.

The document collection process included audio recordings and transcriptions of each session of art therapy by researcher, observation notes taken on-site, structured behavioral evaluations, and texts and artworks (audio-visual materials such as images and videos). Data

TABLE 1 Personal information as well as social and emotional characteristics of research participants.

Participants	Diagnosis	Personal information, social and emotional characteristics
Pink (17 years old, female)	Mild intellectual disability	She looks sensitive to her skinny appearance with short hair and glasses. Her learning ability is at the level of sixth grade in elementary school. Her learning ability is the best among the five students in the second grade of special classes of the high school. Both of her parents work and live with their sisters, brothers, and grandmothers. However, her parents have a low degree of interest in her, making it difficult for her to manage personal hygiene. Due to a lack of counseling for her worries or a lack of an ability to express her thoughts and feelings, she tends to not easily talk about stress or problems. She just accumulates them inside. She is blunt and passive. She shows dependence on her friends.
Summer (17 years old, female)	Mild intellectual disability	She looks tall and healthy. She has tied up long hair and wears round glasses. She smiles well when she makes eye contact. She uses her left hand. Her learning ability is at the level of fourth grade in elementary school. However, her sociality is the highest among the included students. Her mother and older brother also have intellectual disabilities. Thus, she feels that there are no one at home who can consult her concerns or understand her. She has the most active personality, although she cannot express her feelings well. She tends to be obsessed with people who understand and care for her. She likes to receive attention from others. She tends to make her friends take her side. She is popular with her friends for her smile and outgoing tendencies.
Handsome man (17 years old, male)	Mild intellectual disability	His first impression was that he had a healthy-looking body and was neatly dressed. Although he has a learning ability at the level of fifth grade in an elementary school, he does not show a willingness to do everything. Until elementary school, he studied in general school. However, In middle school, he was transferred to special classes, and in high school he was diagnosed with an intellectual disability, including Asperger's Syndrome, and was registered as disabled. As an only child, he is under a lot of stress due to the clash between the differing educational views of his father and mother. He has violent emotions because he spends a lot of time at home playing games and watching TV. His parents' interest level in him is high. However, his family's guidance regarding personal hygiene management, time concepts, and regular lifestyle habits is insufficient for him. He is the only male student in the class who makes no eye contact. He typically keeps his head bowed. He makes few verbal expressions. He looks passive and lethargic.
Winter (17 years old, female)	Mild intellectual disability	She has short hair and a cute appearance. She has a learning ability at the level of third grade in an elementary school. She experiences a lot of stress about community life because she lives in a temporary shelter for youth. She tends to try to reach out to others first and wants to be loved by others. She is very stubborn about what she wants to do. She is active in forming ties with others. She has good friendships.
Sea (17 years old, female)	Mild intellectual disability	She has long hair with a tall and feminine appearance. She makes no facial expressions, as she simply answers questions. She has a learning ability at the level of fourth grade in an elementary school. She has good sociality, but she tends to only maintain relationships with people she likes. She is interested in makeup and fashion. She is an only child. She has a deep attachment to her mother. She wants to get other people's attention. However, she does not express or approach first. Therefore, she experiences difficulties in forming friendships. She is firm due to her stubbornness. She does not express her feelings well. She has severe mood swings. Currently, she has little interaction with her classmates, and has distant relationships with those around her.

TABLE 2 Case conceptualization.

Main component	Case concept explanation
Background and referral information	This case considered five intellectually disabled adolescents in the second grade of a special class at a general high school, and the therapeutic issue was commissioned by a special class teacher due to emotional difficulties and conflicts with peers.
Strengths	Willingness to participate in art therapy, supportive families and schools, the degree of intellectual disability was not severe, and accessibility allowing for the quick establishment of an alliance with the media without resistance to digital media.
Limitations	First, difficulty in expressing emotions, and second, lack of interpersonal skills.
Diagnostic impressions, Treatment guidance, prognosis	Due to the abundance of visual opportunities, digital media is essential for people with intellectual disabilities who do not understand the language well.
	Therapeutic digital media that affects emotional and emotional changes are used to express and communicate art therapy to promote various types of emotional expression.
	To improve the sociality of participants through group interactive art therapy that fosters collaboration using small social groups for treatment purposes (60).
	In the treatment process, the difficulty level was applied, specifically, step by step; considering the characteristics of adolescents with intellectual disabilities, techniques and materials were repeatedly utilized, and play elements were applied (61).
	The strategy was to have participants share symbolic images, strengthen interactions, and experience a sense of accomplishment and confidence.

analysis involved describing cases and contexts. Repeated comparative analyses using open coding, categorization, and category verification procedures were performed (64).

The researcher tried to find meaningful patterns, concepts, and topics by repeatedly reading the data (65). The interpretation summarized greater meanings of cases discovered by the researcher through analysis strategies using direct interpretation from the overall perspective according to the researcher's intuition, reflective thinking, use of imagery, and application and search of new and diverse perspectives (66).

2.5. Trustworthiness

To secure the reliability of this study, opinions were exchanged with an academic adviser during research analysis and interpretation. The appropriateness of the data collection and coding contents was supervised. The researcher focused on revealing the experience and meaning of the research participants through data analyzed with a focus on fairness and consistency to minimize preconceptions. In order to exclude the researcher's subjectivity as much as possible and to strengthen the sensitivity and reliability of the collected data, colleagues with a master's degree who participated as observers and assistant therapists checked before and after the session and received feedback. A peer debriefing session was then held (67).

2.6. Ethical considerations

This study was conducted in class hours and within the scope of the curriculum at the special class of the school. After explaining the purpose and intended use of the study to all participants and their guardians in advance, written consent was voluntarily provided by them. The written consent form promised to protect the information and ensure anonymity of the participants. Participants and their guardians were explained that research data of this study would be discarded after being stored in a safe place for 5 years.

Ethical problems related to the use of digital media were supplemented by considering ethics codes for the confidentiality of electronic information suggested by the British Columbia Art Therapy Association (5), the American Art Therapy Qualification Board (68), and the Korean Art Therapy Association (KATA) (69).

All six iPads used in this study were set and encrypted with the researcher's IDs so that information on these six iPads used in this study would not be leaked. After using the app, the tablet device used by participants was initialized to prevent data leakage. All data files stored in the form of electronic information were stored with passwords. All recorded contents and data were guaranteed to be discarded following completion of the study.

2.7. Procedure: description of group process

In the art therapy environment, students' desks were relocated to the center to face each other, and their interactions were observed. Technical education and practice on the iPad and the app are known to be important (70). Thus, a TV monitor located in front of the classroom was connected to the researcher's laptop and iPad to model the app's usage and iPad drawing process. Audio-visual materials on art therapy topics were shared by participants (Figure 1A). Moreover, five new iPad 9.7 32G units were rented for participants to have a 1:1 iPad art therapy environment (Figure 1B).

2.8. Treatment plans

This study applied Richter's (71) "Art therapy's approach to art therapy education based on education" by changing the difficulty and technique of digital media in consideration of the characteristics and learning levels of adolescents with intellectual disabilities (72).

The goal of art therapy is to improve emotional expression and strengthen sociality so that participants can complete high-quality works through the complementary usage of traditional media and digital media (73). Participants planned to freely express their

FIGURE 1
(A) Sharing of audio-visual materials. **(B)** 1:1 iPad art therapy environment.

psychological state using various functions of media as a generation familiar with digital media (74, 75). When using digital media in art activities, the therapist's competence and ethical understanding of the media are essential factors (22, 76). The researcher participated in Today at Apple (experiential group session) provided by the Apple Store to increase their literacy and acquire skills in digital media utilization. They also received training on how to use apps, devices, photos, videos, coding, art, and design. The researcher demonstrated and supplemented a direct program before each session. The therapy was based on the experience of using digital media in clinical practice.

The researcher chose an iPad and iOS app considering that they are familiar to teenagers using smartphones, easy to access, and easy to carry. Specific expression techniques used in digital art therapy include digital painting, photography, video, stop motion, and digital collage. Apps used in this study for this are summarized in Table 3.

2.9. Sessions

The digital art therapy program was conducted in three stages: initial, intermediate, and advanced (Table 4). It was structured in consideration of cognitive, social, emotional and short-term aspects of adolescents with intellectual disabilities. After the intermediate stage, it was flexibly changed and finally implemented so that participants could autonomously decide on the topic they wanted. In terms of digital media utilization, the process and changes in the session were observed in an initial session followed by ten further sessions. The first session used traditional media. Another five sessions (2, 5, 7, 9, 10) had the complementary use of traditional media and digital media. Another five sessions (3, 4, 6, 8, 11) used digital media.

2.9.1. Initial stage (sessions 1–3)

In the initial stage, the focus was on relieving tension and building a relationship of trust. To build trust with participants, guidelines for art therapy and the rules to be followed within the therapy time were set together.

2.9.1.1. Session 1: creating my own story

In the first session, traditional media (Colored pencil, felt-tip pen, and eight-section drawing paper) and picture cards were used to draw story pictures (Figures 2A,B). Participants actively and sincerely engaged in the work process, although their progress was slow. For that reason, it seemed necessary to distribute planned time.

Participants were observed to habitually say negative words created by the experience of failure, such as "I'm doomed, "and "It is driving me crazy, "in the creative process. Thus, continuous emotional support and encouragement for the participants seemed necessary. The first session was a meaningful session as an opportunity for social interaction within the group, taking the first step in experiencing and expressing empathy by telling stories about themselves, although participants were not familiar with using art images.

2.9.1.2. Session 2: safe space

In the second session, clay was used for emotional expression or sensory activation (Figure 3A). Opportunities for expression were expanded by using different types of digital media together. The researcher used the easy-to-access Storymation Studio: Disney Edition app to motivate participants and attract the interest of teenagers who like animation. Participants intuitively searched through the media (77). They showed interest in the function of the app and willingness to use it on their own from filming to editing. In the process of creating an animation, participants said "Wow, it is like a game," "It is like being a film director," "It is fun," "I like it because it is like a movie, "I like this music the most, and This is the prettiest, 'unlike their

TABLE 3 Apps and functions used in digital art therapy.

Used session	App	Functions
2	Storymation Studio: Disney Edition (2019)	An app that uses snapshots to create a stop-motion movie. It can add screen effects to a photo image and insert music.
3, 4, 6	Procreate	An app for sketching, painting, and illustration. More than 135 brush libraries, layers, and time-lapses are available.
5	Perfect Image	A photo editing app that even beginners can use easily. Collage, Add Text, Magic Brush, Filter, Frame, and Sticker Features are available.
7, 8, 11	Clips	A free app to create and share videos. It has filters, moving text, music, emoticons, Disney character stickers, and short story add-ons.
9	Stop Motion Studio	An app to make a stop-motion movie. It can perform photo capture with time difference, movie editing, image editor, and music insertion functions.
10	Line Camera	A photo editing app. It has a collage, sticker, filter function, and video shooting.
6,7,8,9, 10,11 For warm-up	Mooda	An emotion recording app. Users can easily select emotion icons, attach photos, and record in a simple diary format.
Complete sessions	Camera	Installed by default on smartphones. Photo shooting, slow motion, video, and panorama functions are available.
Complete sessions	AirDrop	A function to transfer content such as photos, videos, and documents from one device to another through Bluetooth, and that allows sharing with MacBooks, iPads, and iPhones.

Storymation Studio [Application software]. (Version 1.0.2) Disney Edition. Seattle, WA: Wonder Forge (2019); Procreate [Application software]. (Version 5.3.2) Cupertino, CA: Savage Interactive Pty Ltd.; Perfect Image [Application software]. (Version 5.0.5) TongShuo (2010–2022); Clips [Application software]. (Version 3.1.3) Cupertino, CA: Apple Distribution International (2017); Stop Motion Studio [Application software]. (Version 11.4.4) Bluffton, SC: CATEATER, LLC. (2010); Line Camera [Application software]. (Version 15.5.5) Tokyo: LINE Corporation (2013); Mooda: Seoul [Application software]. (Version 1.14.0) OLIVESTONE Corp. (2019); Camera [Application software]. (Version iOS 15) Cupertino, CA: Apple Distribution International (2021); AirDrop [Application software]. (Version iOS 7) Cupertino, CA: Apple Distribution International (2011).

TABLE 4 Step-by-step goals of the digital art therapy program.

Step	Treatment Goal
Initial stage (Sessions 1–3)	- Relieve tension and build trust
	- Arouse interest through the exploration of digital media
Intermediate stage (Sessions 4–8)	- Self-exploration and emotional expression
	- Interaction and communication
	- Enhancing agency and autonomy
	– Expansion of expression through digital media
Advanced stage (Sessions 9–11)	- Positive emotional experience
	- Increased self-confidence through a sense of accomplishment
	- Improve social skills

relaxing appearance in clay work'". They were careful in choosing backgrounds, effects, and music. Participants increased their interactions by showing their digital artwork (Figure 3B; Supplementary Video S1). While watching the completed artworks together, they were all delighted by the moving visual images and the vitality given to the animation by the music.

After the session, Sea approached the researcher and asked, "What's the name of this app?" and said, "I want to go home and try it again" while smiling brightly. Participants showed emotional changes in the process of their artwork and put metaphors into the work. Attractive aspects of digital media also helped form a trust relationship between the participants and researchers.

2.9.1.3. Session 3: creating emotions

Before starting this session, the researcher modeled the process of drawing by connecting the iPad to a TV monitor. This session involved the use of the Procreate app under the theme of making friendly emoticons that could be easily accessed due to the role-played by smartphones in daily life (Figure 4). Participants used iPad as a canvas and worked as shown in (Figure 5) using their fingers and Apple pencil or Stylus pen.

This was an opportunity for participants to understand each other by sharing emotional images. After completion, they made statements such as "It was fun and fun after expressing my feelings," "I felt relieved and comfortable," and "I was just happy without thinking about anything." All participants responded that it was much more fun than drawing on drawing paper. They were also satisfied with the convenience involved in resizing images using digital media and easily correcting mistakes.

Although it was difficult for participants to express emotions using spoken language, they could better express themselves through digital artworks. Participants were able to share information and understand each other by talking about emoticons that expressed each other's feelings.

2.9.2. Intermediate stage (sessions 4–8)

Starting from sessions in the intermediate stage, participants were given autonomy and flexibility so that they could decide on the desired topic on their own. The app was used repeatedly, so that participants would master the technical aspects.

2.9.2.1. Session 4: a self-portrait of pop art

In the 4th session, with the theme of self-portrait drawing in pop art, the Procreate app used last time was used repeatedly. Pink started by saying she was not confident, but after completing the self-portrait, Pink praised herself, saying that "I did a great job, Pink." She was delighted to write her name on her work (Figure 6A). After completing the self-portrait, Handsome man wrote "disabled fool" on his work and showed a negative self-concept (Figure 6B). Handsome man recognized his disability and revealed his thoughts about himself through self-portraits.

Participants enjoyed the process of painting the self-portrait, expressed a sense of accomplishment after completion, and showed therapeutic importance of the artwork by valuing it. Participants familiarized themselves with technical aspects by repeatedly using the same app. During the talk time, they used the AirDrop app to instantly share their artwork which helped the group communicate.

2.9.2.2. Session 5: me and our garden

In the fifth session, participants smelled the scent of flowers. The classroom was full of flowers, which awakened their senses, thus allowing them to have a moment of relaxation and healing. In this session, the Perfect Image app with a photo collage function was used. Participants all experienced unity through cooperative artwork while creating a garden together (Figure 7B). After completion, they captured their desired parts by taking pictures to recreate a photo collage (Figure 7A).

While participants were creating the mandala works (diameter 25 cm), their emotions were stabilized with positive emotions were aroused. There was a change in interaction that provided altruism, praise, and encouragement to friends. Handsome man took more than 140 pictures while producing a nice photo collage and said, "It's a nice garden." Actively created photos re-visualize images through photo collages and create new stories. Creative possibilities were also expanded to photo collage artworks that fused traditional media and digital media.

2.9.2.3. Session 6: if I were ~

In the sixth session, the Procreate app was used. The participants drew pictures on their iPads, handed them over to other participants, and created a "Digital painting rotation" in which they drew pictures in addition to the pictures they received from other participants. Participants had to add layers to the received picture and draw it to prevent other people's paintings from being erased, and the record of the picture was stored separately (Figure 8A). Therefore, it was possible to confirm the contribution of each participant to the single work.

Pink expressed her complex feelings with colors and lines, saying that she was not in good condition. When her painting (Figure 8B) was returned, she smiled, saying that she was pretty when she left, but that she was struck by lightning. Pink talked about the pleasant parts and the unpleasant parts in the additional painting. Digital painting, which can be drawn by dividing the picture into separate layers, was

FIGURE 2
(A) Summer (Happy love). **(B)** Sea (Landscape).

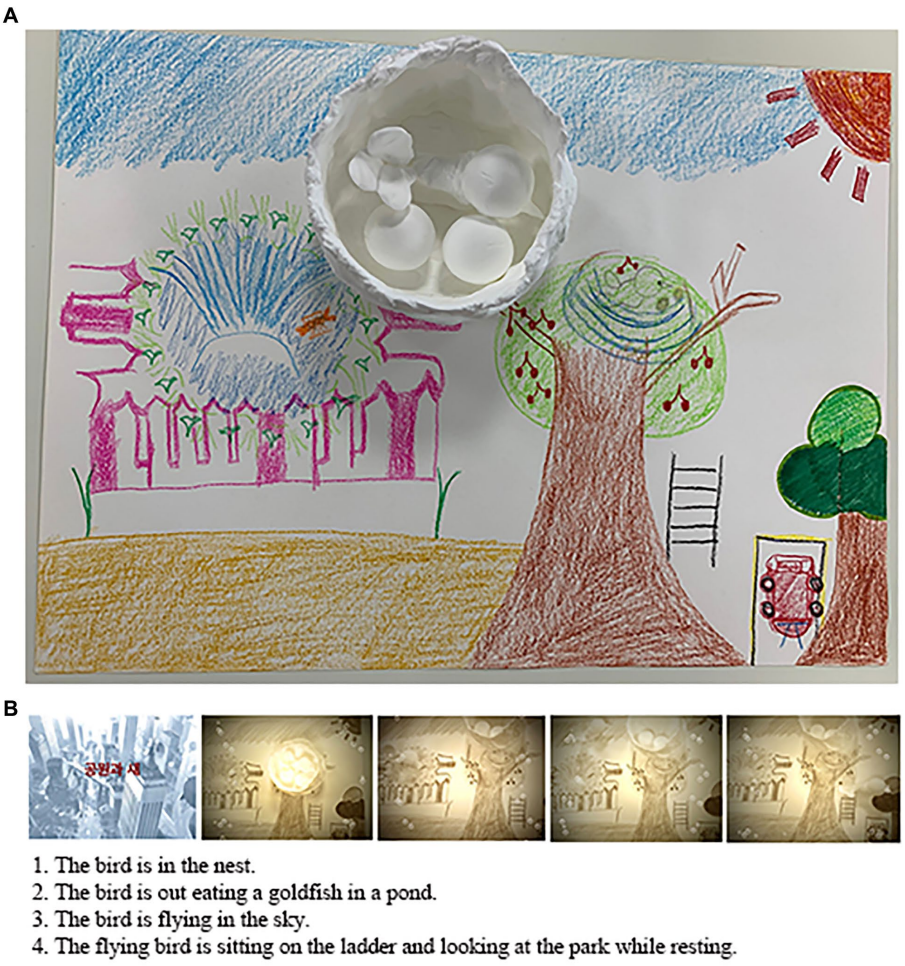

FIGURE 3
(A) Sea (Park and a Bird). **(B)** Sea's stop-motion animation (see also Supplementary Video S1).

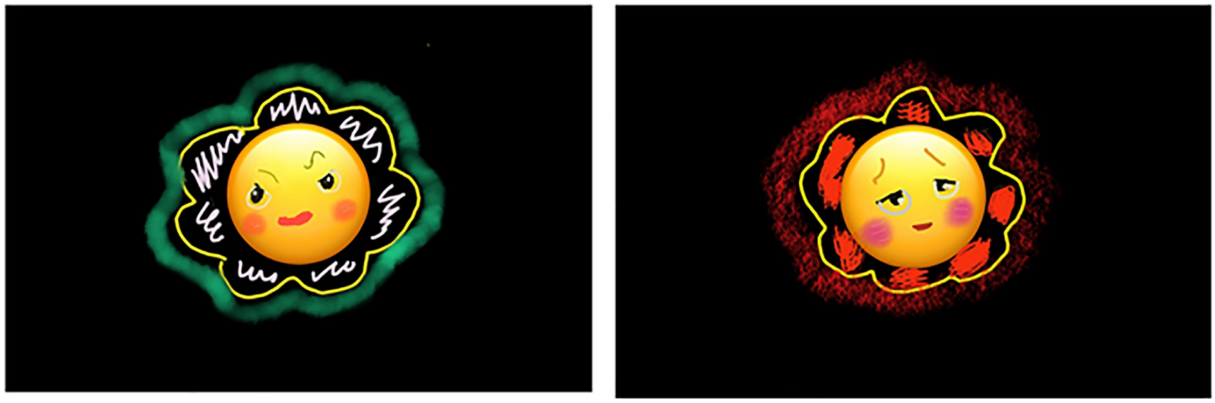

FIGURE 4
Winter's emoticons "Unpleasant, tired" (iPad 9.7 inch-Digital drawing).

FIGURE 5
Process of iPad drawing (Apple pencil drawing and finger painting).

easy to modify later, and participants were able to engage in the activity with less burden.

This session gave participants opportunities to sympathize with others through perspective-taking, interest, and imagination. It was also an opportunity to express their future dreams and communicate with images.

2.9.2.4. Session 7: making wishes

For the seventh session, Participants were motivated by the program of 'Making a wish bracelet' that they selected themselves. They worked with an immersive focus. This session involved creating a video (Figure 9) that documented the process of artistic expression as a Clips app for video production. The process of making bracelets gave them an opportunity to solve problems while being original. Participants chose colors, shapes, and materials. They edited videos together and expressed positive emotions through the experience of collaborative work.

Participants showed the importance of their digital artwork by inserting various moving stickers and text to express emotions. Sea expressed her joy and satisfaction by inserting the words. "Satisfaction with what I made today, Today is the best day, Hooray" in the video. Participants started to praise themselves by feeling a sense of accomplishment. They encouraged each other and showed positive relationship experiences and interactions in the group art therapy.

2.9.2.5. Session 8: a fantasy trip

The theme of the trip, which was the most frequently expressed theme in participants' wishes in the seventh session, was made into a video using the Clips app. Participants said they were happy just thinking about the trip plan. Photos of their travel destinations contained emotions and information through symbolic meanings. Participants were immersed in making videos of their dream trip. They expressed excitement and expectation.

Summer often expressed her expectations and excitement after deciding on New York and Hawaii as travel destinations, for which she carefully planned, saying, "There are so many places I want to go here." She made a highly complete work called "Exciting Travel" (Figure 10).

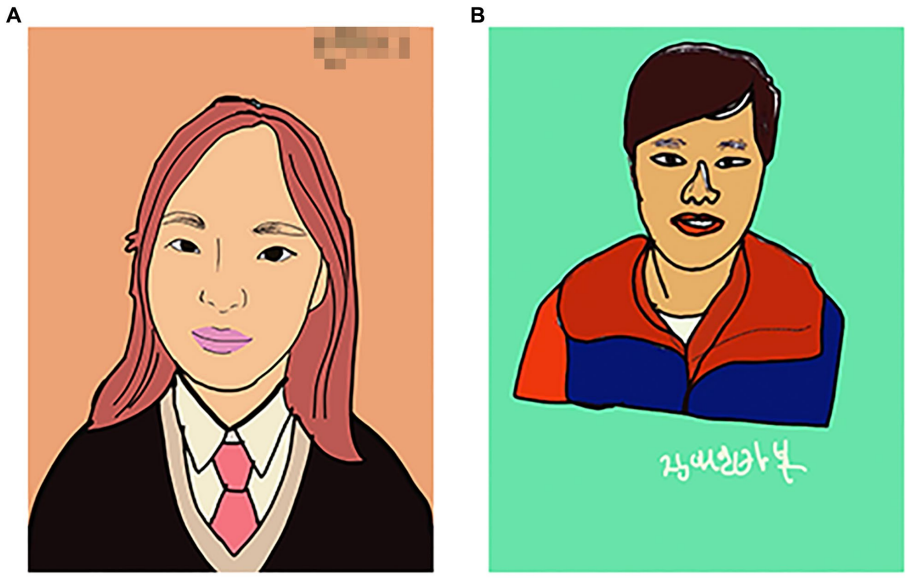

FIGURE 6
(A) Pink's "Self-portrait". **(B)** Handsome man's "Disabled fool".

FIGURE 7
(A) Pink's "Photo collage". **(B)** Our garden (collaborative work).

Participants were able to actively express themselves with audio-visual stimulation of multimedia. Emotions they felt in the music were harmonized with their visual stimuli. The liveliness of the completed video satisfied their emotions by mobilizing the touch of making text.

2.9.3. Advanced stage (sessions 9–11)

In the advanced stage, with goals of enhancing self-confidence and improving social skills through positive emotional experiences and a sense of achievement, the process of change in the past was examined, focusing on completion of collaborative works, exhibitions of works, and art journaling.

2.9.3.1. Session 9: our seasonal trees

In the ninth session, the participants drew trees together on a 50P (Paysage) canvas as a collaboration project in the advanced stage. With the Stop Motion Studio app, the work activity process was captured with a total of 417 photos, ultimately leading to the completion of a 1-min and 25-s-long stop-motion movie (Figure 11B). Participants

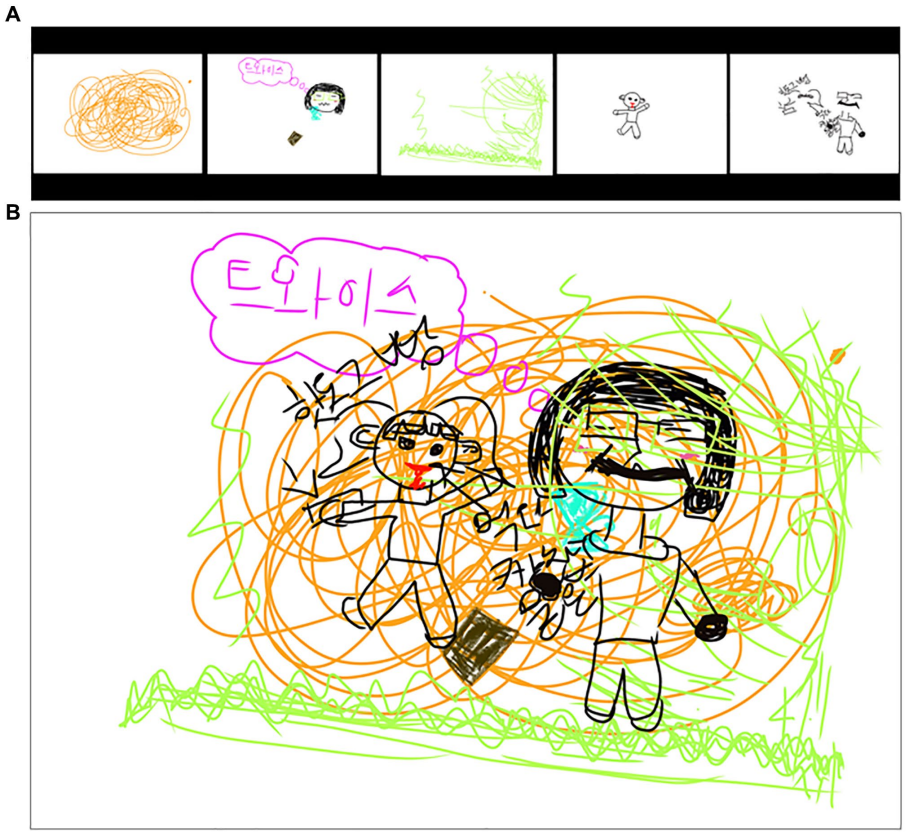

FIGURE 8
(A) Layer per participant. **(B)** Pink's "I do not think anything".

completed their respective areas, looked at the overall harmony, cared for and helped their friends, and showed a mature appearance that gave meaning to the importance of the process of completing the work together. Participants coordinated their opinions and showed teamwork in determining the title, music, background, and effect of the artwork together. They were also able to appreciate the stop-motion movie artwork and view their roles objectively. When setting the title of the work, Handsome man surprised everyone by loudly suggesting "Our Seasonal Tree" (Figure 11A).

2.9.3.2. Session 10: Christmas gift

This session began with a laugh among participants who prepared Santa hats and Rudolph headbands. The 10th session involves the creation of a digital collage (Figure 12A) and a Christmas wreath using the Line camera app. Participants had experience in magazine collage. Thus, they understood the digital collage quickly and completed the work in a short time because it was easy to edit. Parts that could be transformed without damaging the original, such as adjusting the size of the picture, aroused participants' interest. Collage is a technique with the greatest metaphorical potential (78). Participants felt grateful and happy. They expressed positive emotions as they thought about the grand prize under the theme of Christmas gifts. Afterward, they gathered their completed wreaths and made a Christmas Garland together, turned on the lights, and cheered and applauded. Participants were very proud of their work. They took pictures together in front of their works (Figure 12B) and hung them in the classroom to display them.

2.9.3.3. Session 11: say "goodbye"

As the "Media Art Exhibition" was held as a closing session that involved a group celebration, participants aimed to reflect on the process of growth throughout the therapy process and became aware of their changes. The 11th session involved using the Clips app to complete a modern media art journal in which images, narratives, music, and editing were done within a single digital media. During digital artwork activities, participants approached their friends and worked together. They showed an improved relationship wherein they were interested in. They cheered for their friends' artwork. Titles of art journals created by participants reflected main themes of their experiences.

Pink was embarrassed while looking at her works in each session and danced while choosing music during the media art journal. She showed elevated expressions in terms of behavior as well as verbal expressions. Summer said that she could get to know more about her friends by watching the exhibition. She laughed and said about her work, "It's a very well-made video, but there are so many things I want to say right now, so it's a pity that I could not put them all into the work." Images and writings had been added to each work to the end. Expressing high satisfaction after completion, the title of the artwork was called 'Precious Memories' (Figure 13).

FIGURE 9
Wish bracelet video collaborative work. Soundtrack: Itsudemo by Asuka Ito (Genre: Bright fully) (The soundtrack is music that accompanies and synchronizes with the images of the participant's video work and is edited by the participants directly selecting the music they want).

FIGURE 10
Summer's "Exciting Travel" video. Soundtrack: So Young at Heart by Judson Crane (Genre: relaxed).

3. Results

The main results of this study were an analysis of participants' experiences and meanings of participants using digital media and descriptions of therapeutic factors.

3.1. Analysis of experience and meaning of group art therapy using digital media

Experiences and associated meaning of the group art therapy were identified through coding, categorization, and subjectification by comparing and reviewing artworks, interview transcription contents, and observation journals for 11 sessions of group art therapy. Meaning was derived from a total of six themes and 13 subcategories representing experiences derived through repetitive comparison and line-by-line analysis were found (Table 5).

3.1.1. Theme 1. New and fun digital art therapy

In the interview, participants said that their first experience of creating work using an iPad was "incredible." This new experience might represent the first step toward life improvement and change.

Participants had more stories and laughter as they created artworks with digital media. Interactions with digital media can enhance the aspect of play. Their effects give pleasure (79). Fun is the core of humanity (80). Fun has important implications for human development (81).

3.1.2. Theme 2. Enjoying daily choices as the protagonist of life

Participants felt more freedom and satisfaction in the session about subject they voluntarily selected. Adolescents with intellectual disabilities have limited choices and opportunities due to family control and social exclusion, and they experience exclusion due to a lack of awareness regarding technology and digital information (82).

FIGURE 11
(A) Our seasonal tree (116.8×80.3) canvas, acrylic paint. **(B)** Stop-motion movie of our seasonal tree (Theme music: Cherry Monday) (The theme music is music that harmonizes with the image of the stop-motion movie work, and the members of the participants select and edit the music they want).

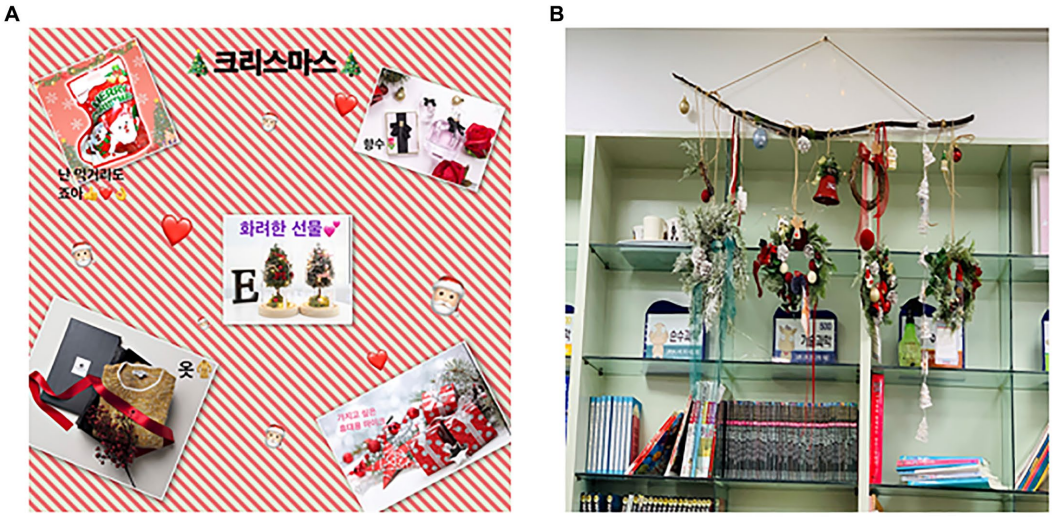

FIGURE 12
(A) Summer's "Fancy gift". **(B)** Collaborative work of Christmas garland.

Digital media works cannot be created without active participation (45, 83). Since its use itself represented a choice, it was confirmed that it was meaningful for participants to enjoy daily options as a protagonist of life.

3.1.3. Theme 3. Discovery of the positive power and possibilities

Participants said that their experiences in art therapy would be helpful in their daily lives. These responses mean that they discovered their hidden potential through digital art therapy and felt positive power such as competence and confidence. Participants were more motivated by the acquisition of skills in the use of iPads and apps.

3.1.4. Theme 4. Digital art therapy enriching experience

Rubin (38) has stated that adolescents with intellectual disabilities have a greater desire for emotional experiences and creative activities

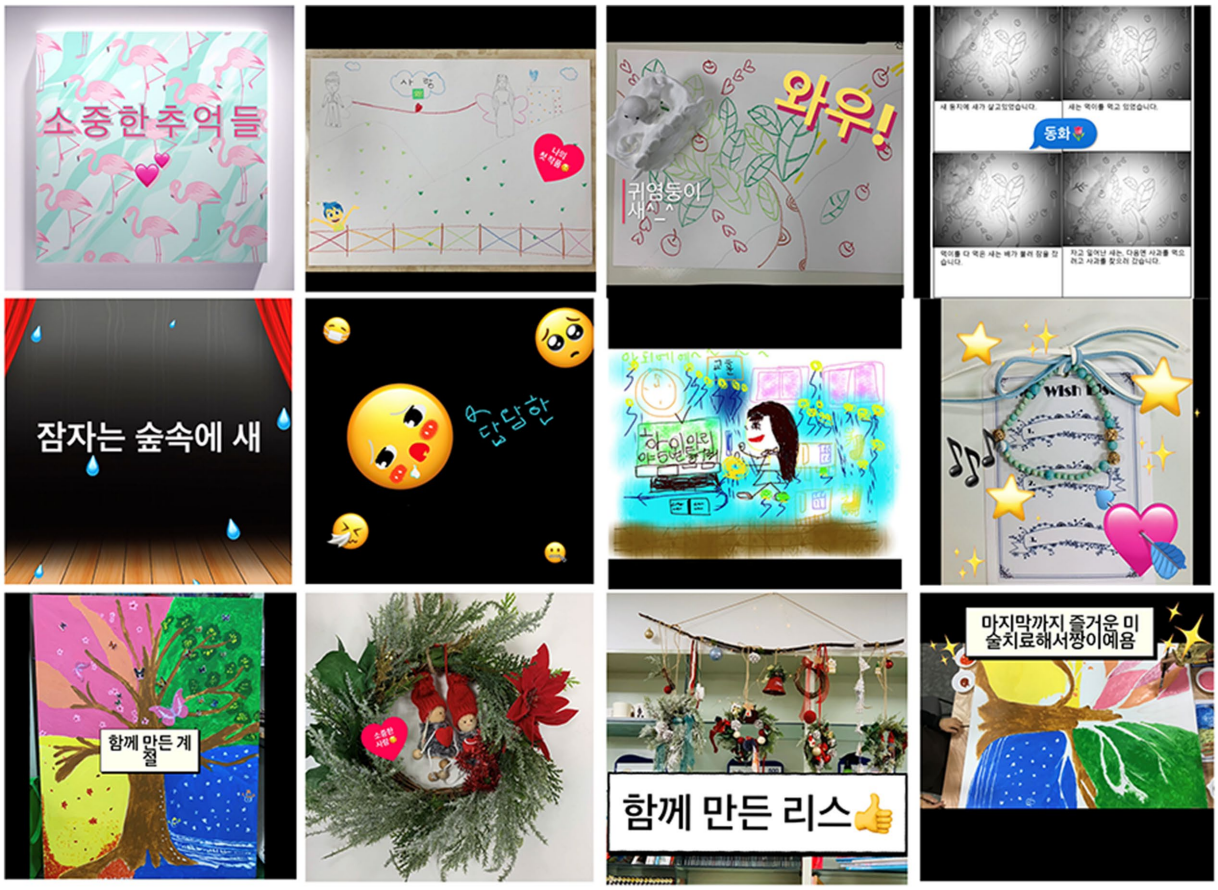

FIGURE 13
Summer's "Precious memories" (Media art journal video). Soundtrack: Itsudemo by Asuka Ito (Genre: delightfully).

due to various deficiencies. Participants experienced various new self-expressions and rich emotional experiences through convergence between media. The difference between digital art therapy and traditional art therapy is that digital media has a non-material aspect, which not only amplifies bodily sensations but also triggers heightened behaviors, bringing participants another bodily experience.

3.1.5. Theme 5. Preciousness and joyfulness of the process of "being together"

Participants said that the experience of group art therapy would represent a pleasant memory. They put the importance on cherishing times during which they complete the work with friends and collaborated happily together. Through group art therapy, participants attached meaning to the importance of collaboration. The connectivity of digital media helped communicate by allowing their work to be shared immediately and quickly. It also improved sociality by having a positive effect as a tool for communication between participants, thus improving their social skills.

3.1.6. Theme 6. Sublimation to digital art through immersion

Participants said that when making digital art works with iPads, they concentrated better, and time went by faster. This meant that digital media increased participants' immersion and motivation to participate (84–88) and sublimated them into emotional sublimation through the expression of catharsis and integrated digital art creation in the art therapy process.

3.2. Therapeutic factors of group art therapy using digital media in adolescents with intellectual disabilities

Therapeutic factors that were extracted and used to investigate the meaning of the group art therapy experience of adolescents with intellectual disabilities using digital media were playfulness, interactivity, and scalability of digital media (Table 6) (9, 48, 89–97).

4. Discussion

This study aimed to explore participants' experiences and meanings when applying using digital hardware tablets and software apps as delivery devices for expressive and therapeutic media in group art therapy for adolescents with intellectual disabilities.

Results of the present study are consistent with those of Weinberg (10), who argues that computer-based art therapy has unique advantages to grant curiosity and motivation for patients with disabilities as a new approach to a successful art experience. Malchiodi (11) has also shown that digital media can improve concentration and

TABLE 5 Results of group art therapy experience analysis using digital media.

Themes (6)	Categories (13)	Examples of quotations
New and fun digital art therapy	A new digital art therapy	"I'm excited, I am upbeat."
		"It is fun to make videos."
	Interest and fun through the act of play (art)	"Everything was new while I was in the art therapy."
	Liveliness and enjoyment of digital artworks	"It was really fun and exciting, so I want to do it again."
Enjoying daily choices as the protagonist of life	Experience choice through interaction with digital media	"It was good to be able to do it my way."
	Convenience and subjectivity of digital media	"It is more satisfying and fun to do it myself."
Discovery of the positive power and possibilities	A valuable experience improving the quality of life	"I want to do it again."
		"I will try again by remembering various things I learned during art therapy, Thank you, iPad."
	Digital art therapy that one wishes to experience again	"It is mine, a really well-made video."
Digital art therapy enriching experience	Expanded representation and total sensibility through digital media	"Thank you so much for a fun and precious experience."
		"It was difficult to express in words, but expressing it through the app made me feel very refreshed."
	Natural convergence of multimedia and various emotional experiences	"It was a good memory because I did a lot of artworks through art therapy."
Preciousness and joyfulness of the process of "being together"	Communication and connectivity through digital media	"There were parts where I thought the same and parts where I did not, but it was still fun."
		"There were times when it was hard, but it was good to contribute to a part of the collaboration."
	Expansion of relationships through collective collaboration	"It was a little uncomfortable and complicated to cooperate together, but I was proud of it after completing it."
Sublimation to digital art through immersion	Creation process and immersion of digital art	"Teacher, I'm showing the greatest concentration in my life!"
	Digital media environment, a space for appreciation and expression	"Why does time pass so quickly?"

self-esteem, consistent with the results of the present study. This study is also in line with the study of Garner (12), who argues that the use of digital art media can improve choice and autonomy among students with disabilities. Wehmeyer and Metzler (98) have emphasized the importance of autonomy for students with disabilities to have a successful transition to social life.

Participants in the present work experienced sensory expansion, various emotional experiences, and natural convergence between media in the process of engaging in the artwork activities. This supports Mcniff's belief (13) that all-in-one digital devices are promising as a fusion art production tool. The results of this study are also consistent with Hallas and Cleave's (51) claim that, for many people, technology can increase opportunities for realizable experiences such as playing, creativity, and improving quality of life, therefore contributing to primary prevention and health promotion.

Therapeutic use of digital media can enhance the emotions of adolescents with less expression and lethargy. It can also maximize the experience of participants in various expression methods to provide satisfaction and achievement. Therefore, it has the potential to become a strong therapeutic factor. Characteristics of digital media also support studies of Ehinger (99) and L'Esperance (100), who have explained that digital media can increase adaptation and increase both communication and relationship formation in art therapy. Results of this study are also consistent with a recent study by Albrecht et al. (45), which has shown that interactive digital art can be a useful therapeutic intervention, particularly for people with intellectual and developmental disabilities.

This study was meaningful in that it applied therapeutic digital media to adolescents with intellectual disabilities in special education classes who had emotional difficulties to help them understand the process, and draw conclusions through an actual case analysis depicting the phenomenon of digital art therapy with rich and detailed technology.

5. Limitations and recommendations for future studies

First, this study considered adolescents with intellectual disabilities attending special classes in a high school in the Republic of Korea. Therefore, there is a need for future studies using various media to determine the possibility of using digital art therapy for adolescents with other types of disabilities.

Second, the initial purchase price of digital media is high. There might be an economic burden when it is used in group art therapy.

TABLE 6 Therapeutic factors of group art therapy using digital media.

Therapeutic factors	Description of therapeutic factors
Playfulness	The playfulness of digital media (89, 90) is a powerful therapeutic element. Various play factors, such as realistic images, colors, sounds, and touches, stimulated the curiosity and interest of intellectually disabled adolescents who had attention problems and synchronization defects. Therefore, it is a therapeutic factor because it has aspects of motivating (90) treatment, relieving tension, and expressing itself (91).
Interactivity	Interaction is the most important characteristic of digital media (92). Media and humans are influenced by interaction (93). In particular, playful interactions with digital media are attractive to children and adolescents (46). Creativity is created through immediate interactions with digital media, and the sensory space that is the result of interaction with media exists within the expressive characteristics of digital technology (94). Digital art therapy can comprehensively present visual images, colors, sound, photo editing, and storytelling, thus inducing a holistic sensory experience different from traditional art therapy (48). It can be used as a therapeutic factor by conveying strong meanings and emotions (95).
Scalability	The scalability of digital media led to the expansion of time and space, the expansion of expression methods, the expansion of physical constraints, the expansion of senses, the expansion of media, and the expansion of experience as therapeutic factors. In McLuhan (96)'s core proposition, the term of 'media is human expansion' means that the body and senses are expanded through technology. It is much more suitable as a medium that can expand creativity and flexibility for coping in a changing world (97). It can extend physical constraints to new environments that require high levels of participation from people with disabilities or underprivileged people. The use of digital technology in art therapy means new possibilities for extending adaptation and esthetic experience to new media beyond the increase in access to expanding time and space (9).

However, in the long term, compared to high-quality traditional art materials, apps—which are software—can be transformed into cost-effective tools.

Third, to use digital media, there is a need for further research on software that can be combined with art therapy, and education in various application programs. Moreover, since few apps have been developed for use in art therapy, convergence research and development between interdisciplinary studies are necessary.

Fourth, digital art therapy and traditional art therapy are complementary to each other. Traditional and digital media have different characteristics in nature or expressive characteristics (11). Therefore, it is necessary for practitioners to have an in-depth understanding of both characteristics and differences between traditional and digital media. The author would like to suggest the importance of a complementary use of them for therapeutic purposes and for assisting in art therapy activities.

6. Conclusion

This study analyzed experiences and therapeutic meanings of adolescents with intellectual disabilities in group art therapy using digital media to derive six themes: (1) New and fun digital art therapy; (2) enjoying daily choices as the protagonist of life; (3) Discovery of the positive power and possibilities; (4) Digital art therapy enriching experience; (5) Preciousness, and joyfulness of the process of "being together"; and (6) Sublimation to digital art through immersion. Therapeutic factors that these themes imply in digital media have been identified as playfulness, interactionality, and scalability. The results of this study show that the use of digital media provides unlimited possibilities for participants to freely express their emotions in new ways and can improve various sensory experiences and creativity. This was an opportunity to develop positive relationships, improve self-esteem, and develop digital literacy skills by amplifying emotions of teenagers with intellectual disabilities and by changing their thinking, feelings, and acting in the process of communicating with the media. This qualitative case study provides implications that digital media can be a beneficial therapeutic intervention as it can provide everyone with more opportunities, including those with disabilities.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

JK and YC performed the conception and design this study. JK wrote the manuscript. YC critically reviewed the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that this research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2023.1172079/full#supplementary-material

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Online art therapy pilot in the Western Isles of Scotland: a feasibility and acceptability study of a novel service in a rural community

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Introduction: Art therapy, despite being an evidence-based, safe and acceptable intervention, is not widely available to clients in Scotland. Online delivery has the potential to expand the reach and accessibility, but special considerations need to be given to designing successful online art therapy services, due to the unique emphasis on the role of an image and artmaking alongside the therapeutic relationship.

Methods: A pilot online art therapy service was developed and delivered in the Western Isles of Scotland to individual adult clients wishing to increase their psychological wellbeing. This research aimed to assess feasibility and acceptability of the novel service, identify enablers and challenges in setting up and delivering the service, explore participants' expectations and experiences of art therapy and identify any impacts of the service. Mixed-method evaluation incorporated questionnaires, focus groups, interviews and Audio Image Recordings (AIRs). Findings were grouped into themes across several key areas: service setup, research procedures, intervention design and impacts and insights. Recommendations were developed for the first three areas and the last section presents indications of change and gives voice to client experience primarily.

Results: Online art therapy was described by clients as a judgement-free zone which allowed freedom to experiment, express, feel and immerse themselves in the creative flow. Other benefits included readiness to accept emotions, increased understanding of self and others and being able to see things from a new perspective. Clients recognised the unique nature of art therapy in relation to other psychological treatments and valued the freedom of expression it offered, including the non-verbal.

Discussion: This project demonstrated that online art therapy is not only a feasible an acceptable intervention, but potentially also a powerfully impactful one, capable of instilling a positive change in a surprisingly short period of time. Exploring ways to expand current and introduce new art therapy services is highly recommended. Refinement of an intervention design, tools and research procedures is recommended through further feasibility studies of a larger scale.

KEYWORDS

art therapy, online psychotherapy, mental health, online intervention, pilot feasibility study, rural community, audio image recordings, service evaluation

1. Introduction

Art therapy is "a form of psychotherapy that uses visual and tactile media as a means of self expression and communication" (1). Creative self-expression and therapeutic relationship are the essential therapy tools used to address a range of emotional and psychological challenges that might be difficult or distressing. Due to not relying entirely on verbal communication, art therapy is a particularly suitable form of psychotherapy for those clients who find verbal expression difficult or who may be looking to expand their ways of communicating thoughts and emotions which are hard to verbalise. Since art therapy has both curative and preventative potential (2–4), clients who do not have specific psychological difficulties might use art therapy to increase their quality of life and enhance wellbeing. Therapeutic approaches integrating elements of different psychological theories are often considered most suitable in addressing individual clients' needs (5, 6), while flexibility and person-centredness are at the core of most art therapists' practice.

Art therapy is an evidence-based intervention with well-documented positive impacts on a wide range of client groups with diverse psychological difficulties. Systematic reviews have established multiple benefits of art therapy for common mental health conditions, including depression and severe anxiety (7–13), and demonstrated its success in addressing psychological impacts of long-term or life limiting physical health conditions (14–16). Evidence is also growing of sustained benefits of art therapy (17, 18) and of it being a highly acceptable form of treatment (19–21).

There are encouraging indications from Australia (4), Canada (22), and the US (24, 25) that art therapy might offer a valuable and relevant support for clients of all ages living in rural areas. However, despite growing evidence of its benefits and acceptability, art therapy is rarely available in more remote locations in Scotland, with existing art therapy services predominantly centred around urban areas. Limited number of practitioners, geographical challenges and time and financial burdens of travel mean that individuals in rural areas experiencing psychological distress, including patients with life-limiting medical conditions, miss out on this valuable intervention (26).

Art therapy discipline has increasingly welcomed opportunities offered by digital technology for both online therapy and digital art making (26). Most recently, similarly to other mental health practitioners in Scotland (27, 28) and beyond (29–31), art therapists embraced digital technologies enabling them to connect remotely with clients during the Covid-19 pandemic and ensuring continuity of treatment (32). A survey of UK-based art therapists gathered practitioners' early experiences of their transition to online practice, with as many as 90% art therapists reporting that they intended to honour their clients' preferences for mode of delivery and would expect to be working online at least to some extent in the future (33).

Growth in remote care in mental health provision seems inevitable (34). Potential benefits for clients living in rural and more remote areas reach beyond overcoming geographical distances and increasing access to services. There are indications that some clients might engage more willingly with therapy provided at distance and might feel more empowered and in control of own recovery (26, 35, 36). Online delivery has also additional benefits of increased privacy, which might be particularly welcomed by clients in small communities.

Online psychotherapies can be as effective as those delivered face-to-face (37) and therapeutic process can develop to at least the same extent online as in face-to-face therapy (38, 39). However, offering online art therapy safely and efficiently requires certain adaptations to practice and, at the same time, presents unique opportunities for the therapeutic process (25, 26). In case of art therapy, there are indications of both limitations and affordances of it being delivered online, some shared with other psychological therapies and others specific to the nature of art therapy practice, in particular work with art materials, space for storing artwork and opportunity to share the creative process (33). Despite growing public interest in online health interventions and rapidly progressing expansion of art therapy practice into online realm, research into therapeutic mechanisms and client experiences of therapy is still limited and much needed to inform practice.

Art therapy services for adults in the Western Isles of Scotland have been offered to a modest extent via the Western Isles Council, Taigh Chearsabhagh (Museum and Arts Centre), and privately. These services have been welcomed in the community but are limited in their reach and accessibility. The current pilot service was developed in response to this need and commissioned by the NHS Western Isles (NHSWI), aligning with its European INTERREG mPower social prescribing project aims, including investigating the potential for online wellbeing-focused interventions in the remote rural community. Feasibility and acceptability of the service were the key concerns in its evaluation, with focus in particular on online mode of delivery in the rural context of the Western Isles.

In line with intention-to-treat principle, the project's primary aim was to deliver online art therapy to adults who might need it, regardless of if they wished to take part in evaluation. The sample was meant to be small and data collection deep rather than wide in order to identify any supportive and challenging mechanisms in the process of setting up, delivering and evaluating of an online art therapy service. Lessons were expected to be relevant to developing other online health and care services and psychological treatments in particular. Establishing acceptability and feasibility of research-related processes was intended to guide future study designs in art therapy and related disciplines.

This research aimed:

- to assess feasibility and acceptability of the novel online art therapy service,
- to identify enablers and challenges in setting up and delivering the service,
- to explore participants' expectations and experiences of art therapy and
- to identify any impacts of the service (on the participating individuals and the wider community).

This paper outlines the process of establishing a pilot online art therapy service within an island community, presents key findings from a feasibility study, focusing primarily on client experience and proposes recommendations for future practice and research.

2. Materials and methods

Evaluation of this project employed mixed methodologies within qualitative and quantitative paradigms, as well as arts-based elements.

Due to key interest of this project in participants' experiences and its pilot nature, more weight was given to qualitative methods. A variety of methods was used to allow for triangulation of findings across different groups of participants and within them (40). A mix of methods was considered most suitable for capturing change and the complex and unique nature of art therapy practice. Stakeholders invited to share their experiences of the service included: (a) staff assisting in setting up the service and referring clients to therapy, (b) art therapists, and (c) art therapy clients (recipients of the intervention). At least two different methods of capturing experiences were used within each group (Figure 1).

Ethical approval for the work was granted by the University of the Highlands and Islands on the 15th May 2021 (ref. ETH2021-1176).

2.1. Intervention design

The online art therapy pilot service utilised some of the procedures and infrastructure already in place in the Western Isles, primarily through the NHS Western Isles European INTERREG mPower project (41), including alignment with mPower referral processes, where appropriate, and involvement of community and digital navigators in referrals and ongoing support. Information about the project and referral criteria were distributed among third sector groups in the Western Isles, who were also invited to a dedicated online session, introducing the project and offering opportunity to raise concerns and shape the referral process. Eight community-based organisations were consulted and four expressed interest in the project, of which one reported no interest from clients and three went on to referring clients to the service.

Therapy was offered by two fully qualified and experienced art therapists, who had practised extensively with a range of client groups and in a variety of settings and were particularly familiar and experienced in working with rural communities and clients who lived more remotely. The therapists were closely involved in setting up the service, were consulted on study design to limit potential interference with the therapeutic process and facilitated specific research-related elements as part of their role. They met regularly for peer and clinical supervision specifically for the purpose of this project.

Art therapy was offered to clients on an individual basis, as a block of eight 1-h weekly online sessions. An additional ninth session was offered to each client for the purpose of making an Audio Image Recording (see *Participants and methods: Clients*). This specific session was scheduled between the seventh and the eight (last) therapy session, to allow time for processing and consolidating of any new material arising from the experience. Art therapists were free to use any art psychotherapeutic approach according to individual clients' needs and their professional expertise and judgement.

Therapists and clients connected via Attend Anywhere, a video consultations platform approved for use within the NHS and utilised by Near Me services in Scotland (42). Clients could use their own digital devices to connect for their therapy if they wished. They were also provided with iPads complete with Apple Pencils and a pre-loaded Procreate application on each device for the duration of their therapy, which were setup and provided by the NHSWI IT department. These could be used to connect with the therapist, share images and/or for digital art making. Sets of traditional (physical) art materials were also provided to clients free of charge.

2.2. Participants and methods: clients

The service was intended to be inclusive and suitable for adults of all ages, experiencing a range of emotional difficulties, regardless of formal mental or physical health diagnosis. Detailed recommendations for referral were developed by the art therapists and the researcher and shared with referring organisations. Essential criteria included, for example, willingness to work creatively in a supportive (virtual) environment, to reflect on experiences and feelings and to try using arts media to communicate and express emotions. While mental health diagnosis was neither essential nor excluding, it was recognised that online art therapy in this pilot might not be suitable for some clients with complex mental health diagnoses (e.g. psychotic illness, personality disorder, current PTSD symptoms) or current suicidal intent. Referrals could not be accepted for clients who engaged in psychotherapy at that time. Art therapists were not only guided by the referral criteria but also worked closely with the referrers, with each other and with prospective clients to establish if art therapy might be a suitable option for each individual.

Adults who were offered a place in the online art therapy service were at the same time invited to take part in the research. Participation was entirely voluntary and the clients' decision to participate (or not participate) had no consequences on their involvement in therapy. Participants were free to withdraw from

FIGURE 1
Research methods and their timeline in relation to the intervention.

either part of the project, including therapy sessions, at any point in time. Research methods were carefully chosen and adapted for the use in this project, resulting in robust but relatively non-intrusive data collection procedures.

Clients who chose to take part in the research were asked to complete online questionnaires (hosted on the JISC Online Surveys platform) at two points in time: prior to starting online art therapy and on its completion. Both online surveys included two short self-reported psychometric measures (Warwick-Edinburgh Mental Wellbeing Scale and WHO-5) and a questionnaire devised for the purpose of this project, asking about participants' expectations (pre-therapy) and the actual experience of therapy (post-therapy). In order to ensure anonymity, participants were asked to choose a memorable nick name that would allow for linking responses from both surveys. On completion of their course of therapy, participants were also invited to share their experience through artwork, which they could upload to a dedicated online Padlet space.

Clients who wished to create their Audio Image Recordings (AIRs) with their art therapists, did so in their second last therapy session and consented to their videos/images being shared for research and educational purposes. AIR is a unique art therapy-specific evaluation method, involving a client sharing an image (or a couple of images) of their artwork and responding to questions asked by their art therapist, which is captured in a simple voice-over-image video (43). This arts-based method serves multiple purposes: (a) it supports clients and therapists to have a somewhat structured reflective conversation on the therapy process, (b) it allows clients to hear themselves describing their experience, which can be therapeutic in itself, (c) with client permission it may be used for research purposes and to raise awareness of art therapy among the wider public. Recordings captured by the art therapists were subsequently edited by the researcher and uploaded to a private YouTube channel, accessible through shareable weblinks. Clients were offered an option to have their voices electronically modified and care was taken to remove any potentially identifiable information.

2.3. Participants and methods: staff

Staff involved in setting up and delivery of the pilot service, including NHSWI mPower staff and Third Sector group partners, were invited to take part in several stakeholder meetings prior to the start of the project. They also had an opportunity to communicate any observations and feedback regarding the project throughout its duration, via e-mail and a dedicated online Padlet space.

Staff were also invited to take part in an online focus group towards the end of the project, after the therapy had finished for all clients. The group discussion lasted 1.5 h, was facilitated by the researcher via MS Teams and recorded for the purpose of analysis. The focus group was conducted around the client journey through therapy—from referral to post-therapy situation. Participants were invited to share their honest feedback on various aspects of the service and particularly on what worked well, what did not and what they felt might be improved in similar projects in the future.

2.4. Participants and methods: art therapists

Having finished their art therapy sessions, both art therapists took part in a focus group-like discussion with the researcher followed by individual in-depth interviews providing a space to further explore the key themes arising from the group discussion. In addition to topics similar to those explored in the staff focus group, art therapists were invited to also reflect on issues specific to art therapy practice, including: (a) development of therapy process and therapeutic relationship in an online setting, (b) adaptations to practice required in online delivery, (c) insights into artmaking using digital media as part of therapy, and (d) suitability and therapy-related impacts of research methods, including in particular AIRs.

2.5. Data analysis: cross-group and intra-group themes

The questionnaires, focus group theme guides and interview schedules were designed to gather information and capture participants' experiences on a number of pre-defined topics, which were considered pivotal for the process of service development. All methods also provided dedicated 'open spaces' for any off-topic comments to be shared (e.g. free text items in the questionnaire, Padlet available throughout the project, invitation to share further insights following interviews and focus groups), allowing unintended effects or surprising insights to be captured.

Thematic analysis of data collected through this flexible design resulted in a set of themes shared across the different groups of participants and themes specific to a particular group experience, as well as, essentially, individual opinions and experiences. The findings pertaining to cross-group experiences are presented first, followed by findings pertinent to experiences of specific participant groups. Direct quotes are presented in *italics* and accompanied by an indication of a participant group source: C for clients, S for staff (including referrers), AT for art therapists. Any potentially identifiable information was either removed or concealed (e.g. gender indicative pronouns replaced).

3. Results

Eight individuals were accepted for online art therapy offered via this pilot service, all of whom also took part in some or all the research procedures they were invited to. Of the six clients who completed the pre-therapy survey, four went on to also complete the post-therapy survey. Two other clients who chose not to complete the pre-therapy survey decided to do so post-therapy. Six clients agreed to do their AIRs with the therapist. However, recording did not go ahead for one client due to issues with technology and timing, while one client expressed a wish to do a second recording in response to their initial AIR, resulting in six AIRs being produced, of a length between about 7 and 12 min each. Five images were contributed to the Padlet online area.

Four members of staff involved in setting up and delivery of the pilot service took part in an online focus group and one staff member

who was not available at that time agreed to take part in an interview instead. Both art therapists took part in a focus group and in individual interviews.

In total, 15 participants took part in the research: five members of staff, two art therapists and eight clients.

The eight clients were all females, of different ages (two were under 30, four between 31 and 60, and two over 61 years old). Although not necessarily confirmed by formal diagnoses, their predominant mental health presentations, as assessed by the art therapists, included: low mood (all clients—including at least three individuals with depression), anxiety (five clients), adverse childhood experiences (six clients, with likely linked trauma for some) and chronic psychosomatic pain (three clients).

3.1. Service setup

3.1.1. Preparation

Staff perceptions on the amount of time spent on preparation to the project differed with some people feeling that not enough time was allocated to the early stages and others feeling that they had spent long time waiting for things to happen before they could move on in their roles and tasks. In effect, activities leading towards the start of the project were not always adequately co-ordinated in time, requiring human effort and flexibility to mitigate potential negative consequences (e.g. sessions with clients arranged before equipment was delivered).

Due to the restricted timeline of the project, all clients started their therapy around the same time, which the art therapists felt was *a lot to suddenly do, a lot to hold emotionally (AT)*. They, however, recognised that the workload felt more feasible in the online therapy setting than it would have been in a face-to-face situation as it allowed for more flexibility in arranging sessions and removed the need to travel between spaces. Art therapists felt that the clients would have also benefitted from longer time to 'settle in' therapy. In this pilot, the referrers and digital navigators supported clients in the early stages (prior to therapy) with practical arrangements around technology, with art therapists having e-mail contact only. Art therapists felt, however, that they would have liked to meet their clients prior to starting therapy sessions and dedicate more time for laying foundations for working together so that time in the early sessions can be used more effectively:

> That holding is really important, and because you're not on the ground, you're not doing that, someone else is bringing materials, the iPad, (…) an art therapist doesn't have control over that aspect in this case. And so, we're coming in remotely, at that point, and then trying to make a beginning, which takes time. (AT)

Despite the above challenges, the service was set up in time for the intended course of therapy to take place and concerns about time and communication in the preparatory stages of the pilot *settled once the activity [art therapy] began (S)*, which was described by one person as *lots of surprises in the set-up but not the delivery (S)*. One member of staff reflected: *Practical stuff about the set up was difficult, but the benefit outweighs all that (S)*.

Recommendations: Preparation

Allocating sufficient time for setting up an online art therapy service is crucial, particularly in its early stages. Realistic timelines, roles and responsibilities clearly defined and clear guidance on tasks and procedures are important for ensuring success from the start. Extra time should be allocated to responding to any unforeseen adaptations, if required. Setting up regular opportunities to meet for all stakeholders is recommended to aid communication, to resolve issues early on and provide clarity on roles as well as awareness of individual needs and the type of support staff may require. Weighting tasks according to priority and considering chronological order in which activities need to happen would help identify those that need to be attended to early in the process (e.g. arranging tender for therapists if not already in place).

3.1.2. Referral process

Some third sector groups seemed to be cautious about referring service users to the pilot, perhaps not having enough *understanding of what art therapy really was about (S)*, despite the information and flyers provided. There were indications that some referrers were seeing art therapy as similar to art activities and concluded that their clients who had been already involved in art classes might not have further need. One potential referrer had concerns about burdening their clients with *something additional, something new, irrespective of how beneficial that might be (S)*. An art therapist felt that it was common for other professionals not to be familiar with art therapy and discussion was helpful: *Part of the work is just discussing it. People over time get an idea of what we do and do not do or what we can best achieve (AT)*. One referrer, however, shared that they had been *looking for art therapy for [their] clients for years (S)*.

There was also some confusion about the referral criteria with staff reporting uncertainty about the reasons why some referrals were not considered suitable by the art therapists, despite the inclusion criteria provided and having met with art therapists to discuss. In particular, there did not seem to be a shared understanding as to why certain individuals with dementia were not offered therapy, which in that case was primarily due to the time-limited service which the art therapists felt might not allow space and time to accommodate the unique needs of people living with dementia. Referrers also acknowledged their limited confidence in assessing client suitability for art therapy, e.g. *I was surprised about one referral as I thought that would not be [their] thing at all and [they] probably got more out of it than anybody (S)*.

Participants generally felt that it was important that *the referral form was coming through somebody they [the clients] knew and were already involved with (S)*. Referrers felt responsible to some extent for their client's experience, at times supported them to settle into their therapy and in some cases throughout the process: *I wanted to make sure that they [clients] succeeded, that they had everything they needed and were comfortable (S)*. For the art therapists, the support from the referrers was important in creating a safe environment for clients in the time-limited therapy.

Recommendations: Referral process

Involving NHS-based partners and engaging an independent clinician (e.g. clinical psychologist) in the referral process could increase referring organisations' confidence in getting involved. A risk assessment procedure shared across partners in the project may be helpful in addition to the art therapists' own. It is important to arrange a discussion

within the team about clinical governance in private practice and allocate sufficient time for stakeholders to meet with art therapists and raise any concerns they may have. Reconsidering ways of sharing information about art therapy practice may be needed to ensure a shared understanding. It is important to agree a good triage system to avoid any confusion around referral criteria and have procedures in place for communicating with individuals referred.

3.1.3. Technology

Delivery of the online art therapy via the Near Me service required initial co-ordination of several parties, including NHS IT team, mPower staff and the therapists. Once the system was in place, however, only some minor technical issues were reported and supported by the digital navigators and, at times, by the referrers, with one referrer reporting that they had given their clients *a little bit of teaching beforehand (S)*. In one case, the referrer offered to assist the client in setting up the connection and accompanied them in person for the very beginning of the first session [*It is important that this support is in place to minimise anxiety and keep people engaged in the process (S)*]. The client and the therapist made special arrangements for subsequent sessions, *where [the client] would log in at an earlier time to check all the technology (AT)*.

Both therapists had a very positive experience of the platform in this pilot and reported that it offered smooth connectivity and functionality. It also seemed to have worked well for the clients (with some exceptions, generally resolved quickly with the support of digital navigators). However, even though the platform provided good enough quality connection between the clients and the therapists, its functionality is limited for use in art therapy. Art therapy practice requires artwork to be shared and for the therapist to observe the process of artmaking alongside client's facial/body expression. To compromise for the lack of such inbuilt functionality within the platform, photographs of artwork were often shared via email and/or artwork was lifted to the camera for therapists/clients to see. One client remarked that *there was no way to show both [their] face and the art (C)*.

Arranging for the digital equipment (iPads) to be provided for clients was, again, time consuming and there were indications that some clients might have preferred to use their own devices, being more used to, for example, an Android operational system. Indeed, most clients reverted to using their own devices towards the end of their therapy. One art therapist felt that clients would appreciate some dedicated training in the use of the Procreate app: *It would be better to have someone that would actually go through Procreate with them (AT)*.

Recommendations: Technology

An online art therapy service demands reliable digital technology, including high quality Internet connection, to be in place for everyone well in advance of the actual therapy sessions starting. NHS emails need to be arranged early for art therapists, enabling contact with clients prior to the sessions. Sufficient time needs to be allocated for preparation, co-ordination and equipment setup and, essentially, for clients and art therapists to familiarise themselves with (likely) new to them systems. Training sessions should be available for therapists and clients who may need them – in using the platform and also in using app(s) and equipment for digital artmaking, should they wish to try this. Support arrangements need to acknowledge individual needs (e.g. wish to use own device) and varying confidence and familiarity with digital technology. A technology-focused check-in early in the therapy (separate from therapy sessions) can be arranged to identify any issues that may still need to be resolved. Finally, development of a bespoke digital platform better suited to art therapy practice may be considered.

3.1.4. Research design

Aiming not to interfere with the therapy process, the research was designed in a way that protected clients' anonymity as far as possible. That meant that the researcher did not have direct contact with clients and therefore the research element of the pilot relied heavily on staff and therapists. One staff member felt that clients would find it acceptable to talk with the researcher directly (either face-to-face or online), suggesting interviews as a good option for those clients who might be worried about digital records being kept safely and those struggling with questionnaires.

Six clients who completed the post-therapy survey found the questions easy to answer [*it was not a big deal. (C)*] and *perfectly fine (S)*, with one participant also saying that they were useful as a reflective tool [*made me happy to reflect (C)*]. Two clients who completed the pre-therapy survey decided not to take part post-therapy. Even though four clients completed both surveys, responses could be linked for three clients only due to one participant failing to use the same nickname in both surveys. One referrer indicated that some clients found it difficult to answer the self-report wellbeing questions (WEMBS and WHO-5 scales), which presumably might have discouraged them from doing it again post-therapy:

> One client with [MH condition] could not face completing psychometric scale, felt it was overwhelming, could not decide how [they] felt. (…) One client with [MH condition] found it a bit daunting, [they] obsessed about [their] answers: do I feel great? or do I feel a little bit great?… Because people do try to answer honestly… (S)

Six clients agreed to do their AIRs and one did not, explaining that they felt confused and hesitant about doing this and *did not feel comfortable showing [their] art (C)*. One recording did not go ahead due to technical difficulty. Three clients described a positive experience of recording their AIRs with one person saying it was *brilliant (C)* and another feeling that through doing this they were *able to explain how [they] found the whole experience [of therapy] (C)*, and one participant reflecting: *It was a safe and understanding experience and [the art therapist] guided me through it very well and thanked me for my input (C)*.

Referrers also observed the positive impact that recording their AIRs had on clients, with one person noting that the recording *made [the client] realise there was something going on and [they] needed to get to the bottom of it (S)*. One person also observed that some clients seemed to have been *quite proud of the recording that they did, it was a real boost of confidence (S)*. One staff member recognised the value of AIRs as a research method: *When people see the videos [AIRs], that is where the real feedback is, I think (S)*. Art therapists felt that doing AIRs was an important experience for their clients and they themselves found them to be a valuable reflective tool, enhancing their practice [*For me it was quite a turning point in thinking about future work really in terms of capturing things and actually being able to use that recording as a reflective tool (AT)*]. One art therapist said they were *struck with how generous everybody was, just wanting to do this knowing it will help someone else to maybe start thinking about doing art therapy (AT)*. Clients valued the opportunity to review their recordings with the therapists in their last session together, which in one case resulted in the client recording their second AIR, in response to the impression that seeing their first recording has made on them.

Both the art therapist and the client found the experience very rewarding:

> It was such a powerful thing for [the client] and such a powerful reaction to [their] artmaking and what [they] saw in [themselves] that to make that second one felt so important, because to me that really captured that whole powerfulness of the therapy, of what [they] were doing. (AT)

> As I was listening, it was a really good insight. I took a step back and I could see a distorted sight of me. It was a good experience to have to think about actually what I have deep inside me that I could bring out (C).

Recommendations: Research design

It is recommended that future research continues to utilise mixed methods for capturing the complex multilayer nature of art therapy practice. Study designs should be guided by the intention-to-treat principle, which in larger studies should not compromise recruitment if, for example, the control group is offered therapy at a later stage. Audio Image Recordings should be seen as a valid method in art therapy research, capable of capturing insights of a depth difficult if not impossible to achieve via other methods. Sufficient time and resources need to be allocated for editing and sharing of AIRs with the wider team. While questionnaires are helpful and generally acceptable tools, the use of psychometric scales may need to be reconsidered with some client groups and/or optionality in answering questions offered. Pre-testing of mental wellbeing measures is recommended in order to identify scales that are likely to work best in specific contexts. A reliable system for linking responses should also be in place. Anonymity might not be in fact as important to art therapy research participants as an opportunity to speak with the researcher directly and in person interviews should be considered, offering an additional space for reflection.

3.1.5. Intervention design

3.1.5.1. Traditional and digital artmaking materials/tools

There was a shared feeling among staff that the clients appreciated the opportunity to use the variety of (often new to them) art media, which were not necessarily readily available to buy around where they lived other than online [*Experiencing all the different [art] materials that I have not used before has been great (C)*]. Art therapists felt that for some clients there had been *a real excitement about the material packs coming (AT)*, which *set [them] off on a positive foot (AT)*. Art therapists also felt that for some clients having the art materials provided was an important part of the therapy process and particularly helpful in the early stages of therapy:

> [Some clients] felt something quite nurturing about this pack that had been given to them and it felt quite important, and I noticed there was a real sense of looking after the materials and real pride in their packs as well. (AT)

One staff participant felt that digital artmaking *was either very loved or very hated (S)* by clients. Of the six clients who completed the questionnaire following their art therapy, three tried making digital images in their art therapy and three did not. One of those who tried reported that they did not enjoy it as they *liked to be hands on and have the materials in [their] hand to touch (C)*. Two clients particularly enjoyed making digital art, particularly the variety of (digital) arts media available through the app and ease of use: *I really enjoyed the variety of tools I was able to experiment with, it was really good fun and easy to share (C)*.

One of the art therapists noticed benefits of digital artmaking for one client in particular, *who felt less confident with the art materials (AT)*, observing that it aided their readiness to be creative and experiment: *The iPad actually was easier and it was convenient. It was practical, and it tapped into something personally for [them], I think, as a tool (AT)*. That client was hoping to make arrangements to be able to continue using the Procreate app on own device beyond the duration of therapy.

Both art therapists enjoyed using iPads for digital artmaking in sessions with clients and felt that, although it offers a fundamentally different experience, it is an appropriate arts medium for use in art therapy, certainly for some clients. One of the art therapists found themselves engaging in digital artmaking for the purpose of ongoing reflection on their clients' therapy process, valuing it as a useful tool in professional practice, particularly for keeping and revisiting records of client progress:

> I made an image after every single session that I did and that was brilliant. I loved doing that. I felt it was so easy drawing on the iPad. I found that really freeing as well as being very containing. And once you turn it off, it's gone almost, but it was there, so for me there was a really good record. (…) I would be looking at them all at the sequence and it just really helped to work. (AT)

3.1.5.2. Connecting online

Art therapists appreciated that online working allowed for more flexibility in arranging times to meet with their clients and adapting more easily to their needs, which they felt the clients were valuing. This potential for adaptation extended to being able to offer options for clients to switch their camera off, if needed, and for them to have more control over sharing their artwork [*being able to offer that greater flexibility when needed is something I'm really valuing with the online working (AT)*]. Clients and participating staff generally agreed that the online mode of delivery was convenient and meant, for example, reduced costs of travel and not having to arrange child care [*invaluable, because there was no travel time required, not as much arrangements had to be made (S)*].

Staff also felt that online delivery was important for removing certain barriers to engaging, particularly for those clients who *might not be entirely comfortable being out (S)* or those who had lost *a lot of confidence over the last few years (S)* due to the Covid-19 pandemic [*it is important they are given the choice to do things online (S)*]. Three clients indeed referred to the impacts of the pandemic, noting that online delivery is a safer option and that having the choice to connect online might help those who struggle with interpersonal interactions, either as an effect of the pandemic or in general. One client imagined that connecting online might make them feel relaxed, while another appreciated that it would give them more time to prepare.

In their responses to the questionnaire, four clients indeed confirmed that online delivery was an important factor in making the decision to take part in art therapy, for three participants that was not important and one participant was not sure. One client shared with their art therapist that they *would not have come face to face* (…) *this*

opportunity to engage online was what made [them] do it. (AT) While it seems that for the majority of clients connecting with the therapist online, at least to some extent, was a preferable option, one client shared that they found it difficult *not having the therapist in the same room (C)* and that they would have preferred *to be away from the home setting and any issues you have going on (C)*.

3.1.5.3. Length and structure of therapy

The structure of the therapy and its pre-defined duration in this pilot presented both advantages and challenges for all involved. While art therapists found the clarity of the structure to be helpful in some ways, they agreed that having an option to extend therapy would have been helpful for most of the clients who took part:

> If there had been another block of time (…) no doubt that each person would have continued to use the space and wanted to use the space. And in terms of the development of what they were doing, I think that would have unravelled further. (AT)

A similar view was shared by a member of staff who felt that *if the therapy could have gone on longer that would be such a benefit to [the client] (S)*, as [they] were *really getting into it when it stopped (S)*. One client in particular also felt that *the allotted number of weeks wasn't enough (C)*, particularly as they found it difficult to commit to the set times during the week. The same client also *did not feel comfortable with the therapist only being available during the session and not at all outside of it (C)*, highlighting that the fundamental frame of art therapy practice might not be suitable for all clients.

Recommendations: Intervention design

Offering art therapy clients a choice of art materials is recommended, including digital artmaking tools for those willing to try or not comfortable with traditional art media. Ideally, length of art therapy would be agreed with clients on individual basis and with regular reviews. Time-limited art therapy, however, can still be beneficial, particularly in an online setting where the therapeutic process seems to develop more intensely for some clients. Art therapists should consider aspects of practice specific to online settings not only mirroring face to face arrangements in virtual spaces but also reflecting on unique opportunities that online work opens.

3.2. Development of the therapeutic process in an online and time-limited therapy

Connecting online from private spaces seemed to have implications for the development of the therapeutic relationship. One art therapist reflected: *There is an intimacy about seeing people in their own homes and I think it becomes a shared responsibility really to set up the frame (AT)*. The importance of a comfortable, quiet and private space to connect from was not obvious for all clients at the beginning of their therapy [*not knowing what therapy is until they start, so not knowing what they need really in the beginning in terms of the space (AT)*].

The art therapists found that some of the practical challenges specific to online practice, like issues with connectivity and digital technology, could have been used with some clients, quite unexpectedly, to aid the therapeutic process. With one particular client, the therapist felt that the technological challenges prompted the client to find solutions and *actually showed a real resourcefulness in the person (AT)*:

> [The connectivity issue] was quite a parallel in terms of the person themselves and how they manage things not working out. So actually we were able to utilize that theme of how they experience that, connecting up as part of our narrative in the session as well as in other situations, which was helpful. (AT)

One of the art therapists reflected how working in an online space, quite paradoxically, seemed to have intensified the experience of connection and strengthened the focus of their therapeutic work:

> There's something about the kind of tightness and smallness of the space that sort of intensifies everything somehow, and it doesn't feel like a flat screen. When the connection is good, it feels very three dimensional, like a capsule. (AT)

Despite recognising that a longer time for therapy would have been beneficial for most clients, the art therapists did not find the time limit to be too restrictive for the therapeutic process to unfold. On the contrary, they felt that the frame might have at times supported progress and engagement in the process. Both therapists agreed that although *at the end it was starting to feel like a very short piece of work, (…) it was still possible to do a lot in a very short space of time (AT)* and they recognised *how much and how deep [the clients] all worked. (AT)*, despite the seeming brevity of therapy. Awareness of the limited time, and hence, the need to focus, might have in fact helped clients to make progress:

> There was quite an awareness of keeping themselves [clients] safe, knowing that they had a limited time, but equally really wanting to maximize the opportunity that they had and absorb themselves in as much of that as they could (…) I don't feel it hindered the processes at all, but I think it was certainly a theme that was there. (AT)

3.3. Impacts and insights

3.3.1. Expectations and the actual experience of online art therapy

Seven participants have not experienced art therapy prior to this pilot and were not offered it before and one participant who has taken part in art therapy previously, shared their positive experience:

> My previous experience was extremely fulfilling, I was able to concretely work through a number of issues that had been really troubling me, it allowed me to improve upon relationships, take a step back and accept the feelings I'd been having in a safe environment. I felt validated and understood by my art therapist, her feedback and guidance was crucial to the therapy process. (C)

Three participants were not sure what to expect from the art therapy while others anticipated to be having a conversation with an art therapist and making art either within the sessions or in between

10.3389/fpsyt.2023.1193445

sessions [*Talking about how I feel and showing how I feel through my art. (C); a good rapport with therapist (C)*; *An interactive, welcoming and supportive collaboration between therapist and patient. A safe space to explore various issues and learn to understand oneself and how we might better interact with the world around us as a result (C)*]. One participant expected to be offered topics to explore in their art and that the work would then be reviewed with the therapist. Participants highlighted that they appreciated the opportunity to try art therapy and two people expressed slight nervousness about starting, including related to lack of confidence in using digital technology. One person hoped that art therapy would equip them with tools to use beyond its duration: *I wanted to know how it worked so that I could give myself the tools to do it myself (C)*.

On committing to art therapy, the participants were hoping to achieve a range of benefits for themselves, including:

- opportunity to express, confront and accept emotions: *to talk through all my feelings and why I have them (C), to express and figure out why I was feeling emotions that I knew were affecting my everyday life (C), acceptance of uncomfortable feelings (C).*
- a way to release tension: *A form of relaxation and possibly some soul searching (C), to be able to relax and concentrate on it and feel happy (C), calm tools to relax and not panic about new things (C).*
- personal growth: *A safe space to explore and move on from things that hold us back in life (C), a better understanding of self (C), increased confidence (C).*
- a protected time for oneself and purpose: *time for me, give me a focus to do something (C).*

Of the six participants who completed the questionnaire following their art therapy, three felt that it was as they imagined, two were not sure and one person said that it was not what they expected purely because *not having done it before [they] did not really know what to expect (C)*.

Clients who took part in the post-therapy survey agreed to varying degrees that the experience of art therapy had been enjoyable, surprising and helpful (Figure 2). The majority also indicated that it was interesting, educational and worthwhile, but also challenging. Respondents differed in their opinions on whether the therapy was important and demanding with more respondents leaning towards agreement rather than disagreement with these descriptors. Three respondents felt that the above words did not describe their experience fully and complemented them with their own, which included: *relaxing, thought provoking, enlightened, fulfilling, revealing of different perspectives* and *a safe and nurturing space*, which *made you make time for yourself (Cs)*.

3.3.2. Nature of online art therapy

Art therapists felt that their clients had a good understanding of the nature of the art therapy process and recognised that it is a very different experience to verbal psychotherapy, counselling, art classes or a conversation with a friend [*It's not like having a cup of tea with somebody, you can still have a conversation but it's pulling things out… (C)*]. Most of the clients have had previous experience of psychological therapy or counselling and were able to compare those with their experience of art therapy, noticing the unique role of artmaking, non-verbal expression and the therapeutic relationship involving the therapist, the client and, to some extent, the artwork: *Everybody was able to make that difference in terms of how that process of nonverbal plus that supportive therapeutic relationship really allowed them to use the session (AT)*.

Comparing their experience of online art therapy to seeing a doctor or a psychiatrist, participants highlighted insufficient time during doctor appointments to *talk about everything properly (C)* and that art therapy offered a more personal and dialogue-encouraging person-centred approach: *It's good to talk to somebody and you feel you get feedback. I do not feel like I get feedback from my doctor because [they are] just dealing with certain issues that you go with (C)*.

Clients who have had previous experience of other psychological therapies appreciated the opportunity for non-verbal expression and communication in art therapy, which to some felt less restrictive and relieving pressure of having to be precise in describing often difficult and complex emotions and problems: *[Other therapies] are often quite structured and they involve a lot of talking. So it's nice just to not always talk, just see what the non-verbal part of you is saying. (C); You're not having to be concerned about how it is you are explaining things whereas you do to a certain degree when you are just sitting across the table and you are chatting with that person. (C)* Some clients recognised the role of artmaking and the image in being able to progress in their therapy: *In talking with someone you need to be aware of how you word your feelings… With the artwork you are free to let your mind think what it wants (C)*.

> Without the images, you'd just be sitting there trying to put all these emotions into words and sometimes there aren't good words to really convey everything simultaneously. You're feeling so many things and you're trying to process it and you're trying to think about how to explain it to someone but with art therapy, you just put a brush on paper and you just see where it goes. You don't have to worry about articulating in any specific way. Taking that pressure away is just so beneficial. (C)

One person compared their experience of art therapy to art classes they used to attend throughout their life, recognising that they did not offer the therapeutic benefit they hoped for:

> Once you do art therapy in that supportive, nurturing environment with a professional, you realise what you've been missing trying to just do art in an academic setting, it just doesn't have anywhere near the same effect. (C)

Feeling safe in the therapy space was essential for clients and something they particularly appreciated [*With art therapy it is just such an open-minded experience and such a nurturing experience, it's very gentle, you cannot really do it wrong. (C); It's just a really safe environment to explore things that you do not even realise are inside you (C)*]. One client recognised that feeling safe was a prerequisite to therapeutic progress, while it might not seem obvious: *I think it sometimes takes a little bit for people to adjust to that, to realise that they are safe in this little space. And I think it's really interesting to see what happens as that develops (C)*.

Within the unquestionable frame of the therapeutic relationship, non-verbal expression and feeling safe, three distinctive though interconnected themes have clearly emerged from how participants described their experience in their own words (Figure 3). They seem

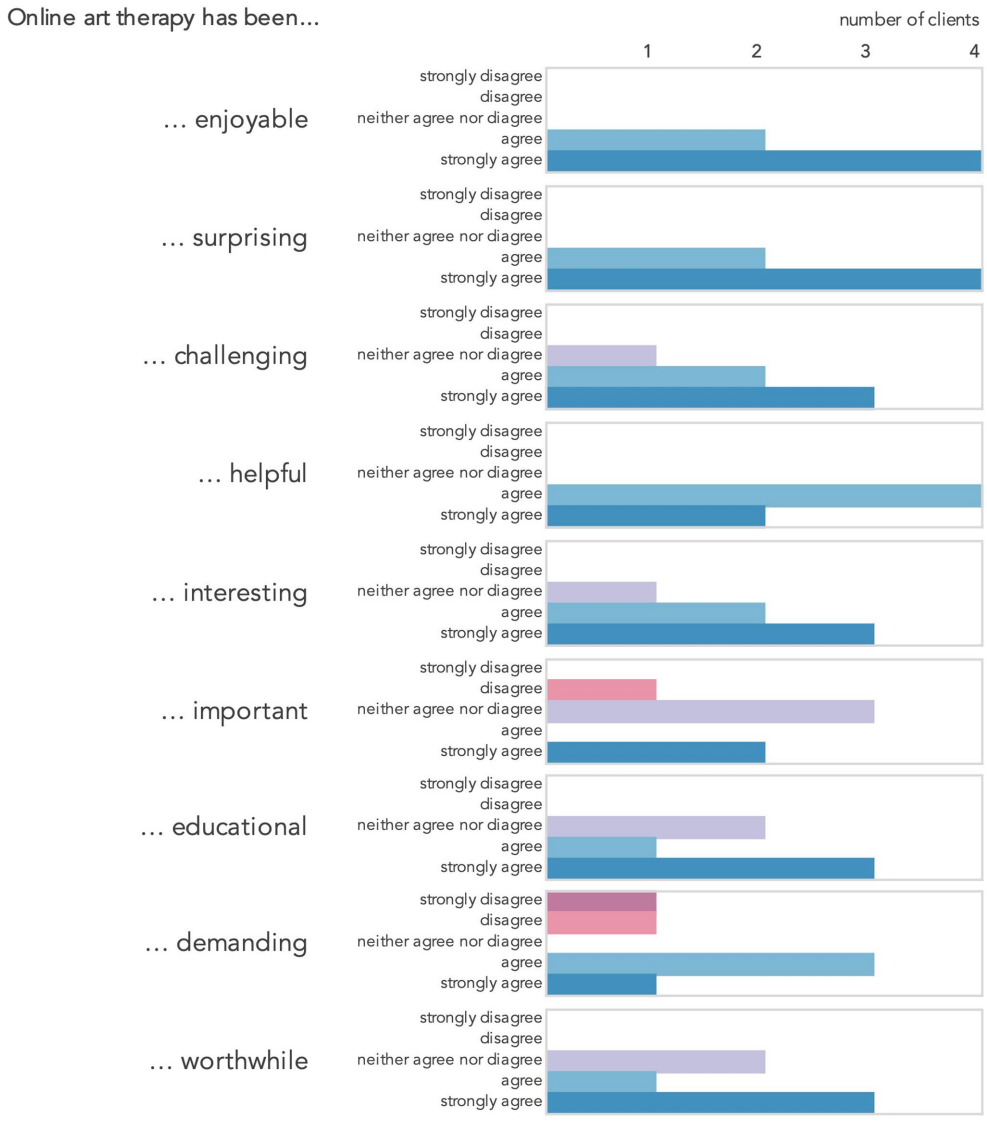

FIGURE 2
Responses to the post-therapy survey item 17: How strongly do you agree or disagree with the following descriptions of your online art therapy experience?

to encapsulate the features of online art therapy which the clients felt were important and, supposedly, differentiating online art therapy from treatments they had received previously.

One client described an online art therapy space as a *judgement free zone* (C), which seemed to have echoed across participants' experience and was also noticed by staff: *[The client] felt that [they] could express [themselves] and not be worried about being judged (S)*. One client described their relief on realising that not only would they not be judged in the therapy space, they themselves did not need to apply judgement to their artmaking: *It's made me realise that I do not have to be so hard on myself when it comes to painting or drawing. It does not have to be a perfect reflection of whatever it is that you are trying to draw (C)*.

Most clients referred to the liberating feeling of freedom that art therapy allowed [e.g. *Making the art piece left you free to let your mind wander as to where it could take you (C). Just being able to let go and be free and just try these materials out and actually just go with it (C)*]. For one client the feeling of freedom was linked with expanding mind: *The art therapy is giving you more freedom* (…) *it's making you expand more, it's making you think more (C)*. This freedom to experiment seemed to have extended to portraying and accepting a range of emotions:

> You're having to think about other things around you that you can maybe pull into the artwork, things that are going on in life, you can put them down (…) you can either be wild with it or you can be sad with it or you can be happy with it (C).

One staff participant felt that the freedom their clients felt was related not only to creative expression but equally to being able to communicate freely with the therapist: *It was the freedom around the art side but around the conversation as well, total freedom, opportunity to vent, to share (S)*.

Some clients also seemed to have referred to enjoying a state of creative flow while engaging in art making, describing a lost sense of time and feeling fully immersed in the process: *A few times when I've*

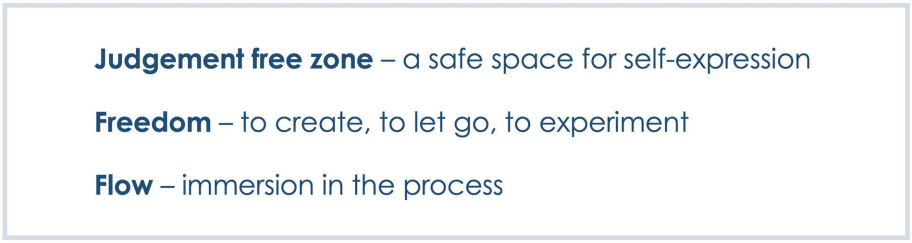

FIGURE 3
The three distinctive features of online art therapy as identified by clients.

been working on an artwork I've lost track of time because I am getting stuck with what I'm doing and I'm enjoying myself (C); I get lost in my pictures and I feel like I'm actually there (C).

3.3.3. Benefits from online art therapy

A range of benefits for psychological wellbeing were observed by all involved in the pilot, including the clients themselves. One staff participant emphasised that they *found this project to be the most beneficial for [their] clients (S)* in relation to other psychological therapies and social prescribing activities they took part in previously. One participant thought that *it was a surprise to [clients], how much they got from it (S).*

One participant felt that art therapy was particularly helpful for anxiety *because it forces you to focus on something else, you have to concentrate on what you are creating in the present moment (S).* One client confirmed that *art therapy was great for helping [them] keep focused (C).* A staff participant also recognised that *the therapist was so patient with [them], let [them] work at [their] own pace, let [them] speak when [they] felt like speaking, which had a very calming effect on [them] (S).* Another staff participant felt that the therapy offered benefits that lasted beyond its duration: *It was overwhelmingly positive reactions from people, what they got from it, at the time of the sessions and ongoing (S).*

Of the six clients who completed the post-therapy survey, four reported that they had noticed benefits for themselves and two were not sure. One person felt that they had become more acceptant and observing of own feelings. Another client felt that they had learnt about art therapy and were *able to support [themselves] better* (C). One client felt *strong and resilient (C)* and another felt *more happy (C).* One of the clients who were not sure if they had noticed benefits, explained that they found themselves in an overly busy time during their therapy due to unforeseen circumstances, but the therapy made them realise that they *needed time for just [themselves] (C).*

The clients indicated several areas of psychological wellbeing which they felt were impacted by their art therapy (Figure 4), including (a) acceptance - of emotions and things that cannot be controlled, (b) better understanding of self, (c) increased confidence, (d) improved resilience, (e) a newly gained perspective on aspects of life and (f) improved relationships.

A small sample in this study does not allow for statistical analysis of change on neither of the psychometric scales used. However, both scales have shown to be responsive to change at an individual level: for WEMWBS, a minimally important level of change in wellbeing was detected at 3 points difference (44) and for WHO-5 a 10% difference indicates a significant change (45). According to these estimates, between the two points in time, pre- and post- therapy, positive changes in wellbeing could be observed on both scales for one of the three clients for whom establishing and comparing scores was possible—with 12 points improvement in WEMWBS and 52% improvement in WHO-5 (Participant 1, Table 1). The results were mixed for the other two clients, with both negative (on WEMWBS) and positive changes (on WHO-5) detected for one client (Participant 3, Table 1), and negative change only indicated for another client on WHO-5 (Participant 2, Table 1).

3.3.4. Beyond online art therapy

Some impacts of art therapy clearly lasted beyond the time in which it was offered. One art therapist felt that their client's *realisation that she needs this for herself (AT)* was an important outcome for that client and might possibly allow them to take actions towards improved wellbeing. One staff participant shared that *when [their client is] feeling down, [they] look regularly at what [they have] already created. Through therapy [they] have found a way to do something positive (S).* One client concluded: *I still feel a little bit trapped, but from how I feel now to when I started the first session, it's just a big improvement (C).*

Of the six clients who took part in the post-therapy survey, five said that they would recommend online art therapy to others and one person was not sure. Clients felt that more people would be interested in art therapy if it was available to them and they were already recommending it to people they know: *There's so many people needing it, people I've spoken to… I want people to know about it and how good it is (C).*

Inspired by art therapy experience, some clients developed interest in group activities and art classes which they may be able to attend having regained *confidence to try out other things (S).* One client went to an art event which was not something they would have done before and which the referrer felt *was like this has opened that door for them (S).* Some clients found new (or rediscovered) interest in developing own artistic practice with one participant expecting that they would *probably continue with the art [themselves] (C),* another noticing *the urge to continue making art pieces (C)* and one person even considering creating a dedicated artmaking space in their home. One staff participant noticed that two of their clients *were still using art materials they got left (S)* and an art therapists observed that artmaking became an important part of their client's daily life, *it totally took off in [their] life (AT)*:

> There was a real sense of people continuing with the art after [art therapy] and talking about it in terms of art making as opposed to art therapy for themselves afterwards, really wanting to keep that connection with their art making process, that feeling. (AT)

Staff participants felt that not many other services in the Western Isles would be able to address the clients' needs identified through this

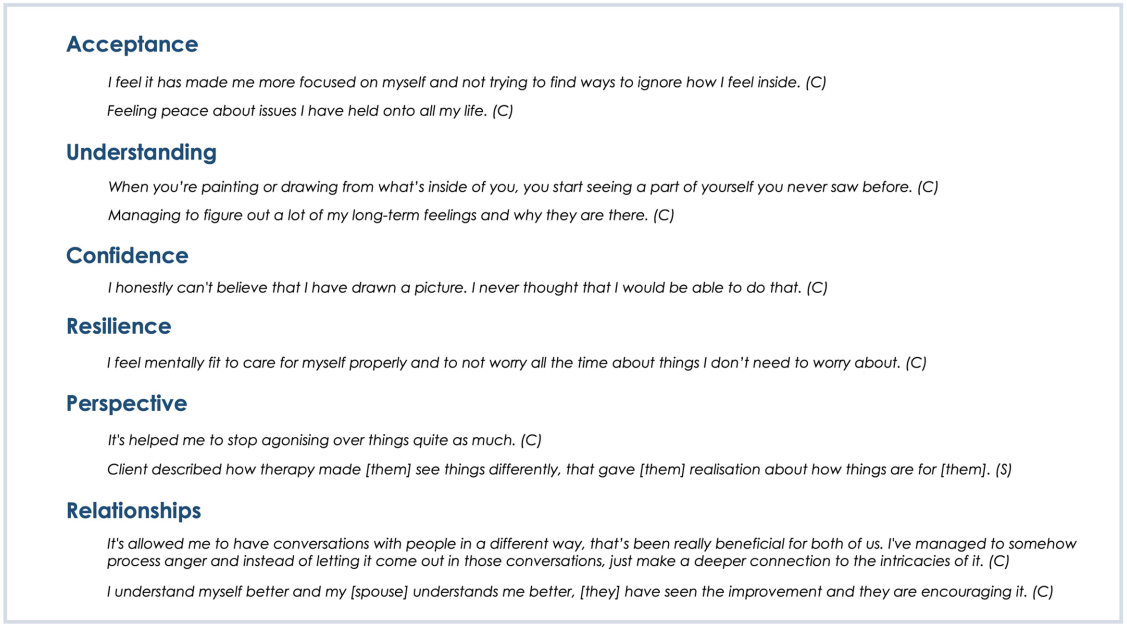

FIGURE 4
Areas of indicated benefits for wellbeing.

TABLE 1 WEMWBS and WHO-5 scores for the three participants who completed both questionnaires.

	WEMWBS		WHO-5	
	Pre-therapy	Post-therapy	Pre-therapy	Post-therapy
Participant 1	44	56	40	92
Participant 2	50	48	80	40
Participant 3	47	43	40	52

pilot. Some psychological therapies were restricted to specific age groups or specific geographical locations only. Art therapy was available face-to-face but with limited reach and demand exceeding capacity. Clients themselves found the online art therapy service valuable and felt that others would also find it beneficial:

> Just to encourage it to continue or to be on offer somehow, so that people can access it (…) because without it so many people are just left out and not managing to live a quality of life really (C). This is a service that is so important. It has turned my life around (C).

4. Discussion

This pilot feasibility study highlighted priorities and considerations for future (online) art therapy practice and its evaluation. It confirmed the notion from previous research that safe and effective online practice demands adaptations in relation to traditional face-to-face therapy (25, 33) and demonstrated that online art therapy can be an acceptable intervention, much valued by clients. It also provided one of the first documented illustrations of how online art therapy practice presents unique opportunities for the therapy process and should not be seen as simply replicating traditionally used methods in an online setting (26).

Setting up a successful online art therapy service, therefore, requires not only practical and technological considerations but, most importantly, demands a good understanding of what it can offer from multidisciplinary teams involved in referrals and ongoing client support. While art therapy practice retains much of its fundamental nature in an online setup, it is important to recognise that achievable therapeutic aims might, in some cases, differ from those expected in face-to-face therapy. This might mean reconsideration of client suitability for therapy, including increased relevance for some clients who might not otherwise use face-to-face services, but also careful reassessment of clients for whom online delivery is less likely to work well. As online services are becoming increasingly common, confidence of referrers is likely to grow with increased familiarity and knowledge. In the meantime, ongoing dialogue between art therapists, service designers and providers is essential for a shared understanding of what is achievable and safe in an online setting.

This study demonstrated, as indicated previously for other online psychotherapies (38, 39), that the therapeutic process and relationship can both develop successfully in an online art therapy, sometimes in fact faster and more successfully. In some cases, a skilful art therapist can incorporate challenges of online connectivity into the therapeutic process, revealing aspects of personal difficulties which would be difficult to identify in a face-to-face setting. Previous studies similarly indicated links between the therapeutic progress and unique

circumstances of connecting online, including in the intimacy of inevitably sharing images of a home space and glimpses of personal life (24, 25).

Therapeutic relationship is clearly possible in an online art therapy setup, as confirmed by both the clients and the therapists in this study, and it is evident that it takes the triangular form unique for the art therapy practice (or perhaps hexagonal, as proposed more recently (23), with the artwork and artmaking process just as important as the relationship between the two humans involved, and perhaps in fact intensified in an online setting (24). However, it needs to be recognised that developing a successful therapeutic relationship online demands, at times, a particularly skilful facilitation from an art therapist (33, 46), including an increased awareness, focus and effort. Creating a safe space for sharing and reflecting, which is core to art therapy practice, is made more challenging in an online setup, where the art therapist needs to support the client remotely in being creative and protecting this space for themselves. This process is not currently adequately supported by online communication platforms and art therapists often need to demonstrate creativity and resourcefulness in identifying solutions that work best for individual clients (47).

While this feasibility study aimed primarily to increase understanding of acceptability, suitability and mechanisms of online art therapy, it also provided rare insight into wellbeing-related benefits for individual clients, as perceived by clients themselves and observed by staff involved in their care. Online art therapy as offered in this study was reported to result in increased acceptance of emotions, understanding of self, a new perspective, confidence and resilience, all of which are outcomes observed routinely in art therapy practice [e.g. (8, 12, 48, 49)]. Parallels with what would be expected in a face-to-face therapy suggest the potential of online art therapy to achieve comparable outcomes, despite some differences in how the therapeutic process develops. Mechanisms that contributed to these positive impacts were identified by clients as: (a) non-judgemental approach, (b) freedom of expression, and (c) immersion in the process, which the clients felt were not necessarily achievable within other health services or, indeed, other forms of psychotherapy. In fact, the emphasis that clients put on reporting of feeling safe and free to express themselves and explore emotions and thoughts, both verbally and creatively, as opposed to in other therapy situations, suggests potential value of online mode of delivery itself in offering greater perceived intimacy and freedom of expression, at least for some clients.

Aside from a small number of participants in this study, a key limitation from the research perspective was its non-directiveness in terms of the art therapy approach. Due to variability within the intervention, it was not possible to develop an understanding of active ingredients (50) in the online art therapy process. However, the same quality ensured 'real life' testing of the online art therapy service, retaining as many elements of authentic practice as was possible, which, supposedly, allowed for insights truly aligned with local needs. Similarly, incorporating a range of methods might have arguably decreased precision of data collection and reporting. It has, however, allowed for a person-centred experience for clients and staff as research participants, resulting in depth of insights and reflection, including on acceptable and meaningful research procedures, which is expected to strengthen the research design of future studies.

Online art therapy, as demonstrated in this study, can be a relevant and welcomed intervention for adults living in rural and less populated areas. While careful consideration needs to be given to the service setup, coordination of a multidisciplinary team and ensuring safety and comfort for clients, potential benefits seem to outweigh effort. Future research could further explore the indication of the therapeutic value of online spaces within art therapy and beyond. There remains more to be discovered around the potential that connecting online offers to the therapeutic process for all psychotherapies and for art therapy in particular, given the unique role of an image within the therapeutic relationship. As this study raised a question about usefulness of common mental wellbeing measures within the island community context, more research is recommended into most culturally appropriate tools for measuring change and inter-intervention comparison (51, 52). Further studies should aim to increase our understanding of the relevance of online art therapy for rural communities and propose ways in which online interventions would best meet the local mental health needs and how they would best fit within the wider mental health provision.

Data availability statement

The datasets presented in this article are not readily available because data contains sensitive personal material of psychotherapy clients and is not suitable for public sharing due to potential for identification of participants from a small island community. Requests to access the datasets should be directed to AZ, ania.zubala@uhi.ac.uk.

Ethics statement

This study involving human participants was reviewed and approved by the Research Ethics Committee of the University of the Highlands and Islands and the NHS Western Isles R&D. The clients and staff participants provided their written informed consent to participate in this study.

Author contributions

AZ, NK, CM, MMac, and MMal contributed to conception and design of the study. AZ, NK, and CM undertook the research. MMac supported data collection. AZ wrote the first draft of the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Mixed-mode Zentangle and Pastel Nagomi artwork for improving mental well-being in university students during COVID-19 pandemic – a randomized controlled feasibility trial

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Background: University students are identified as a high-risk group for mental health problems. Artworks have been found effective in enhancing individuals' mental well-being in different populations, but none have been conducted on university students. This study was to address this research gap to determine the feasibility and estimate the preliminary effects of Zentangle and Pastel Nagomi on the mental well-being of undergraduate students during the COVID-19 pandemic.

Method: This was a 3-arm randomized controlled trial, with 33 undergraduates allocated to two 8-week artworks (Zentangle or Pastel Nagomi Art group) and a control group. Data were collected at baseline, and weeks 4, 6, 8, and 12. Focus group interviews were conducted at the 12-week follow-up.

Results: The consent and attrition rates were 80.5 and 6.06%, respectively. The attendance rate ranged from 83.3 to 100%. Compared with the control group, the Pastel Nagomi art group had a significant improvement in retaining positive affect at week 6. This retention could be further observed at week 12. Moreover, the Zentangle group had a significant increase in positive affect at week 4, with better retention at week 12. In addition, the within-group analyses showed that the Pastel Nagomi art group had significantly decreased negative affect at weeks 6 and week 12; and the Zentangle group had significantly decreased depression at week 8. The qualitative findings suggested that the intervention resulted in the participants enjoying the artwork process, and being proud of their artwork and personal growth.

Limitation: The study included an imbalance number of online vs. face-to-face sessions, and repeated measures may have affected the results.

Conclusion: The study suggests that both artworks are effective in improving undergraduates' mental well-being and that it is feasible to conduct future large-scale studies (263 words).

KEYWORDS

Pastel Nagomi art, Zentangle art, art-based intervention, mental health, undergraduates

1. Introduction

Worldwide, the COVID-19 pandemic has created a crisis for mental health. The World Health Organization (WHO) has called for mental well-being to be a global priority (World Health Organization, 2020). University students have been identified as a high-risk group, suffering from psychological symptoms even before the pandemic (Wang, 2009; Limone and Toto, 2022). The social distancing policy has escalated learning with technology, creating a "new normal" for education. However, the proliferation of online teaching and learning and the pandemic-associated restrictions have led to further deteriorations in students' mental health, because of decreasing social interaction, delayed academic activities, and reduced opportunities to seek counselling services (Cao et al., 2020; Li et al., 2020; Ando, 2021; Jojoa et al., 2021; Chen and Lucock, 2022). An artwork intervention program could be one of the alternatives to improve university students' psychological states.

1.1. Artwork interventions

In recent years, expressive arts interventions, such as artwork, music, drama, narrative and storytelling, have been found to be effective in enhancing individuals' psychological well-being (Phillips and Becker, 2019). According to a recent systematic review of expressive art interventions for health workers (Phillips and Becker, 2019), artwork and music interventions have had greater positive impacts on mental health than storytelling or narrative. Moreover, artwork intervention can work as a mindfulness-based therapy model to bring positive effects such as stress reduction, emotional regulation, self-esteem, self-awareness and resilience (Coholic, 2011). Specifically, the evidence about face-to-face artwork interventions has shown improved psychological well-being in different settings, including counsellors in the United States (Ifrach and Miller, 2016), nurses and nursing assistants in Lithuania (Karpavičiūtė and Macijauskienė, 2016; Hsu et al., 2021) and end-of-life workers in Hong Kong (Potash et al., 2014).

Among undergraduates, a few studies have examined the relationship between face-to-face art-based workshops and psychological state (Curry and Kasser, 2005; Walsh et al., 2005; Sandmire et al., 2012; Campenni and Hartman, 2020; Sonnone and Rochford, 2020). Anxiety could be reduced by creative art (Walsh et al., 2005), free-form painting (Sandmire et al., 2012), or coloring mandalas (Curry and Kasser, 2005; Walsh et al., 2005; Sandmire et al., 2012; Campenni and Hartman, 2020). Walsh et al. (2005) found that creative art reduced stress and increased positive emotion. Sonnone and Rochford (2020) found that group art therapy could improve undergraduates' ability to express and disclose themselves, enhance their social connections, and help them to develop new insights. The benefits of artwork in improving psychological status among undergraduates via face-to-face modes have been found. However, considering the "new normal' of online teaching during the COVID-19 pandemic and a post-pandemic future, the effectiveness of online artwork workshops on improving undergraduates' psychological well-being worth exploring.

1.2. Zentangle and Pastel Nagomi artworks

The popularity of the Zentangle method and Pastel Nagomi Art is growing. These two art forms share similar concepts. For example, they promote relaxation by emphasizing no comparisons, critiques, or judgments of the finished piece with others, and appreciating the opportunity to make choices [Japan Pastel Hope Art Association (JPHAA), 2003; Krahula, 2012]. Furthermore, both only require simple materials and little space.

1.2.1. Zentangle

Zentangle was developed by Rick Roberts and Maria Thomas (Krahula, 2012) in the United States. According to the official website of Zentangle, the technique was founded in 2003, with significant growth over a short period of time. There are currently over 3,000 Certified Zentangle Teachers (CZT) in 40 countries (Zentangle Inc, n.d.). It is easy to learn and aligns with mindfulness-based stress reduction interventions (Moore, 2013). Relaxation effects can be created by drawing structured patterns repeatedly; these patterns consist of dots, lines, simple curves, S-curves and orbs (Krahula, 2012). This method has been reported as having a positive association with improved mental well-being in psychosis patients in Taiwan (Chen et al., 2016), primary school students in Taiwan (Chia et al., 2020), healthcare workers in Taiwan (Hsu et al., 2021), and first-year university teacher students in Malaysia (Hui and Marof, 2019). Chen et al. (2016) reported that Zentangle significantly improved psychosis patients' ($n = 22$ in intervention and $n = 22$ in control groups) social interaction anxieties and self-esteem through eight weekly one-hour workshops. Chia et al. (2020) associated the Zentangle method with reducing stress and calming the minds of primary school students ($N = 12$) through eight weekly 75-min drawing workshops. Hsu et al. (2021) found that it helped to improve healthcare workers' psychological well-being by reducing stress, workplace stress and frustration, enhancing self-efficacy and increasing their commitment to work ($N = 40$) from just one four-hour workshop. Hui and Marof (2019) reported that the Zentangle method increased the positive affect of the university students ($N = 44$) with four three-hour workshops. A review of the literature found four mentioned relevant studies, mainly with pre-and post-single group study designs (Chen et al., 2016; Hui and Marof, 2019; Chia et al., 2020; Hsu et al., 2021). Although studies of the Zentangle's effectiveness are limited, the results are promising. More studies conducted in different countries with randomised controlled trials and adequate sample size are necessary to validate its effectiveness. An example of Zentangle art is shown in Figure 1.

1.2.2. Pastel Nagomi art

Pastel Nagomi Art was developed by Hosaya Norikatsu in Japan Pastel Hope Art Association (JPHAA) (2003) in Japan. It is also described as "Hope Art." It involves using fingers to apply powered pastels directly onto the paper. It requires no specific training or talent. Similar to the Zentangle method, Pastel Nagomi Art imposes no restrictions or rules of "correctness," which encourages individuals to self-reflect and increase their self-acceptance, hence helping to enhance self-esteem and self-efficacy [Japan Pastel Hope Art Association (JPHAA), 2003]. Because of its simplicity and colourful drawings, Pastel Nagomi Art has become popular in Asia, particularly in Hong Kong where numerous tertiary institutions and non-profit

FIGURE 1
An example of Zentangle Art work drawn by the participant.

FIGURE 2
An example of Pastel Nagomi Art work drawn by the participant.

organizations arrange Pastel Nagomi Art workshops to enhance the mental health and well-being of the general public. To our knowledge, there have not been any studies examining the effectiveness of the Pastel Nagomi Art on mental health. An example of Pastel Nagomi Art is shown in Figure 2.

To fill the research gaps, this research aimed to conduct a feasibility study to test the preliminary effects of Zentangle and Pastel Nagomi on the mental well-being of undergraduate students. The followings were the specific research questions:

1. Feasibility: (a) What are the consent rate, (b) the attrition rate, (c) the reasons for dropout, (d) the intervention compliance rate and (e) the reasons for noncompliance? (f) What suggestions do participants have for the intervention and logistic improvement?
2. Preliminary intervention effect: (a) What are the estimates of the treatment effect of a mixed mode face-to-face and online mode with eight weekly one-hour workshops for undergraduate students on the primary outcomes: improving the psychological state of depression, anxiety and stress; and on the secondary outcomes: improving self-efficacy, emotion, and mindfulness state? (b) What intervention benefits/harms do participants describe in their own words?
3. Qualitative data about feasibility and intervention benefits: (a) What are participants' explanations for potentially discrepant quantitative results?

2. Method

2.1. Design

A 3-arm randomized control trial study design was used: one arm with Zentangle workshops, the other arm with Pastel Nagomi Art, while the control group received usual care (i.e., the university provides different mental health workshops and counselling to all students). Focus group interviews followed the interventions to assess the process evaluation and explore the intervention effects.

2.2. Participants

A sample size of 10–15 in a group is recommended for a feasibility study (Hertzog, 2008). Chinese-speaking undergraduate students from a university in Hong Kong were invited to participate in the study. Students who had attended or were attending Zentangle or Pastel Nagomi classes were excluded. Recruitment was conducted through emails and promotion posters. Both convenience sampling and snowball sampling methods were used. The application period lasted for 1 week, between 18 January 2021 and 26 January 2021.

2.3. Data collection procedure

Ethical approval was obtained from the Institutional Review Board before the commencement of the study. An online questionnaire was sent to the registered students ($N = 41$) with an information sheet and consent form. Details of the university counselling service were provided in the information sheet. After receiving the completed questionnaire, the students who agreed to participate in the study were randomly assigned to three groups: (1) the control group, (2) the Zentangle method, and (3) Pastel Nagomi Art, using computer-generated numbers [0 for the control group; 1 for Zentangle group; and 2 for Pastel Nagomi Art group]. The randomization was conducted by a colleague who was not involved in the study. The participants were then informed of their groupings and intervention schedule. Eight students withdrew at this stage due to timetable clashes, or through failing to respond. Finally, there were 33 participants:

12 in the Zentangle group, 11 in Pastel Nagomi Art, and 10 in the control group. The study took place between 3 February 2021, and 31 March 2021.

2.4. Intervention group

This mixed-mode intervention consisted of two face-to-face and six online workshops. A qualified instructor with certified qualifications for teaching both Zentangle and Pastel Nagomi Art was recruited for the workshops. Eight weekly 60-min workshops of Zentangle or Pastel Nagomi Art were held with groups of 3–8 participants. The participants were invited to have face-to-face workshops for the first and last sessions. Social distancing and infection control measures were maintained, and no food and drinks were allowed during the face-to-face workshops. The second to seventh sessions were held in online mode. Zoom, which is a free technology-mediated communication application, was used as the online platform for these meetings.

2.5. Control group

The participants in the control group received care as usual at the university. Two weeks after the completion of the study, they were invited to participate in one face-to-face Zentangle or Pastel Nagomi workshop of their own choice.

2.6. Outcome measures

To determine the feasibility of the study, (a) consent rate; (b) attrition rate; (c) intervention compliance and acceptance were assessed. To determine the preliminary effect of the intervention, study questionnaire data were collected at the baseline, T0, (before the commencement of the session); T0.5, (immediately after the 4th session); T0.75, (immediately after the 6th session); immediately after the last session, T1; and 1 month after the last session, T2. The questionnaire consisted of eight parts:

1. Demographic information: Students' personal information, such as age, gender, the form of university entrance, the program of study, year of study, religious affiliations, cumulative GPA, and the number of subjects taken in the current semester, was collected.
2. Perceived psychological distress: the Depression Anxiety Stress Scale (DASS–21) developed by Lovibond and Lovibond (1995) was adopted to measure the participants' levels of depression, anxiety and stress. This consists of 21 items with three subscales of seven items each (depression, anxiety and stress). Each item was scored on a 4-point Likert scale, ranging from 0 = "Did not apply to me at all" to 3 = "Applied to me very much or most of the time"). The sum of item scores was calculated for each subscale, with a higher score indicating more severe levels of distress. The internal consistency was found acceptable for each subscale and the total scale ranged from ($\alpha = 0.80$ to 0.93) in an earlier study of undergraduates (Cheung et al., 2020a,b).
3. Self-Efficacy: The participants' ability to cope with different stressful situations was measured by the 10-item General Self-Efficacy Scale (GSES; Schwarzer and Jerusalem, 1995). A 4-point Likert scale was adopted, ranging from 1 = "Not at all true" to 4 = "Exactly true." The summation score was used, with a higher score indicating a greater sense of self-efficacy (Schwarzer and Jerusalem, 1995). The internal consistency was found previously to be high, from $\alpha = 0.76$ to $\alpha = 0.90$ (Schwarzer and Jerusalem, 1995).
4. Emotion states: The 20-item Positive and Negative Affect Scale (PANAS) was used to measure the participants' overall emotional states at a particular time (Watson et al., 1988), with 10 items each for Positive Affect (PA) and Negative Affect (NA). Each item was scored on a 5-point Likert Scale ranging from 1 = "Very slightly" or not at all to 5 = "Extremely." The summation score (10–50) was used for the analysis – for PA, higher scores indicate higher levels of positive affect; for NA, higher scores reported more negative moods. It demonstrated an excellent internal consistency ranging from $\alpha = 0.86$ to $\alpha = 0.90$ for PA and from $\alpha = 0.84$ to $\alpha = 0.87$ for NA (Watson et al., 1988).
5. Mindfulness state: 12-item revised Cognitive and Affective Mindfulness Scale, revised (CAMS-R) was used to measure participants' mindfulness states (Feldman et al., 2007). A 4-point Likert scale, ranging from 1 = "Rarely/Not at all" to 4 = "Almost always" was adopted. Items 2, 6, and 7 were reverse-scored. Score summation was used for the analysis, with a higher score indicating higher levels of mindfulness consciousness (Feldman et al., 2007). CAMS-R had shown discriminant validity in a previous study, with a concurrent measure of mindfulness, distress, well-being, emotion regulation and problem-solving approaches (Feldman et al., 2007). Its internal consistency was found acceptable, $\alpha = 0.76$ (Feldman et al., 2007).
6. Personality: The 10-item Brief Version of the Big Five Personality Inventory (BBF-10) was adopted from Rammstedt and John (2007) to investigate participants' personalities on five traits, Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience. Each subscale consisted of two items with scoring on a 5-point Likert scale, ranging from 1 = "Strongly disagree" to 5 = "Strongly agree." Items 1, 3, 4, 5, and 7 were reverse-scored. Score summation for each subscale was used to identify the most matched traits for the individuals. The BBF-10 was previously found to have an acceptable internal consistency for each subscale (ranging from $\alpha = 0.74$–0.89), validity and test–retest reliability with undergraduates (Rammstedt and John, 2007).

Please refer to Table 1 for Cronbach's alphas of the above-mentioned scales used in this study.

2.7. Focus groups

All participants from the two artwork groups were invited to participate in 45–60 min focus group interviews one month after the workshop sessions, to share their acceptance of and satisfaction with their experiences.

TABLE 1 The Cronbach's alphas of the scales used in the present study (N=31).

Scale	Baseline	Week 4	Week 6	Week 8	Week 12
	α	α	α	α	α
DASS					
Depression	0.93	0.93	0.93	0.91	0.92
Anxiety	0.78	0.73	0.84	0.78	0.90
Stress	0.88	0.87	0.86	0.85	0.91
General self-efficacy scale	0.86	0.95	0.91	0.95	0.94
Positive Affect	0.93	0.91	0.87	0.90	0.83
Negative Affect	0.94	0.92	0.92	0.91	0.86
Cognitive and affective mindfulness scale revised	0.71	0.78	0.77	0.81	0.77
Brief version of the big five personality inventory					
Extraversion	0.86	0.92	0.86	0.85	0.91
Agreeableness	0.82	0.77	0.90	0.64	0.80
Conscientiousness	0.69	0.63	0.81	0.73	0.80
Neuroticism	0.85	0.89	0.87	0.86	0.89
Openness to experience	0.82	0.78	0.77	0.75	0.74

3. Data analysis

3.1. Quantitative data analysis

The Statistical Software Package for the Social Sciences (SPSS), version 26.0 was used for data analysis. Descriptive statistics, namely frequencies, means, and standard deviations, were used to analyze the study variables. The Kruskal-Wallis and Wilcoxon signed-ranks tests were used to analyze the time-point differences between groups and within groups, respectively. The significance level was set at $p < 0.05$. The statistical power to warrant hypothesis testing was not required due to the small sample sizes for the feasibility, pilot, and exploratory studies (Lee et al., 2014).

3.2. Qualitative data analysis

The focus group interviews were audio-recorded. The audio recordings were transcribed verbatim in Chinese and then imported into NVivo Pro 12 for data management and analyzed by two coders (EM, CH) using theoretical thematic analysis procedures (Braun and Clarke, 2006). The themes were identified by deriving from "the explicit meaning of the data … [with]the analyst not looking for anything beyond what a participant said" (Braun and Clarke, 2006, p. 84). The coding was guided by research questions related to intervention benefits, harm as well as explaining and supplementing quantitative results. The two coders coded the transcripts separately and discussed the coding to ensure agreement on a basic set of codes and categories.

4. Results

4.1. Participants

Table 2 summarizes the participants' demographic and characteristics at baseline. 90.9% ($n = 30$) were females and 84.8% ($n = 28$) were transfer students, who were community college graduates admitted to the undergraduate program (Cheung et al., 2020a,b). 51.5% ($n = 17$) were Year 1 students, 30% ($n = 10$) of them were studying in Year 2, 6.06% ($n = 2$) were Year 3 students and 8.25% ($n = 4$) were Year 4 students. Significant differences for BBF10-neuroticism ($p < 0.05$) and BBF10-openness ($p < 0.05$) were found between the participants in the Pastel Nagomi Art and control groups at baseline. Otherwise, there were no significant differences in demographic or other variables found among the group.

4.2. Study feasibility

A total of 41 students registered for the study, 33 agreed to participate, and 31 completed the study. Thus, the consent rate was 80.5% while the attrition rate was 6.06%. Measurement completion rates at week 8 were 100% for the three groups. The attrition occurred only in the Zentangle group. Figure 3 shows the study consort diagram.

In the Pastel Nagomi Art group arm, 100% ($n = 12$) completed the 8-week program. Of the 12 participants in the Zentangle group arm, 83.3% ($n = 10$) attended the week-6 workshop, and 100% attended the other 7 workshops.

Twenty participants attended the focus groups, 11 from the Pastel Nagomi Art group and 9 from the Zentangle group. In the focus group, participants expressed great satisfaction with both art forms. All expressed having no strong preference for the modes of the workshops. 72.7% ($n = 8$) of the Pastel Nagomi Art group participants and 77.8% ($n = 7$) of the Zentangle group did say that the face-to-face mode provided better interaction with the instructor and classmates to build social networks and the feeling of being supported, and hence being able to receive clear instruction about the steps of the artwork. On the other hand, 27.3% ($n = 3$) of Pastel Nagomi Art group participants and 22.2% ($n = 2$) Zentangle group participants indicated that the online

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TABLE 2 The characteristics of study participants at baseline (N=33).

Students	Pastel Nagomi Art group		Zentangle group		Control group		Chi-square
	n=11		n=12		n=10		
	n	%	*n*	%	*n*	%	*p*-value
Gender							
Male	1	9.1	0	0.0	2	20	
Female	10	90.9	12	100.0	8	80	
Age							0.35
19 to 20	5	45.5	4	33.3	1	10	
21 to 22	3	27.3	6	50.00	3	30	
23 to 24	2	18.2	2	16.7	4	40	
≧25	1	9.1	0	0.00	2	20	
Form of university entrance							1.000
Non-Transfer	2	18.2	2	16.7	1	10	
Transfer	9	81.8	10	83.3	9	90	
Religious beliefs							1.000
None	9	81.8	10	83.3	9	90	
Christian	2	18.2	2	16.7	1	10	
Year of study							0.73
Year 1	6	54.5	7	58.3	4	40	
Year 2	3	27.3	4	33.3	3	30	
Year 3	0	0.0	0	0.00	2	20	
Year 4	2	18.2	1	8.3	1	10	
cGPA							0.111
Mean	3.2		2.9		3.2		
SD	0.3		0.5		0.3		
Number of subjects							0.39
Mean	5.6		6.0		5.1		
S.D	0.9		1.3		1.9		
Min.	4		4		0		
Max.	7		8		6		
Personality	Mean	S.D	Mean	S.D	Mean	S.D	Kruskal-Wallis
Extraversion	5.7	0.9	5.3	1.4	5.7	1.2	0.61
Agreeableness	6.7	0.9	7.1	1.6	7.2	0.8	0.56
Conscientiousness	6.0	1.7	5.3	1.0	5.1	1.5	0.48
Neuroticism	7.0[#]	1.1	7.0	1.9	6.0[#]	0.7	0.092
Openness to experience	6.9[#]	1.6	6.0	1.5	5.4[#]	1.1	0.090

[#]Significant differences on BBF10-neuroticism ($p < 0.05$) and BBF10-openness ($p < 0.05$) between Pastel Nagomi Art and control groups.

mode allowed them to use the art materials and tools more conveniently and in a more relaxed way at home. Most participants in the Pastel Nagomi Art group suggested that the workshop length could be extended to 75 min. The majority of participants ($n = 16$, 80%) agreed the workshop should start at the beginning of the semester but some of them ($n = 4$, 20%) suggested they could be held after the examination period.

4.3. Preliminary intervention effects

4.3.1. Quantitative results

In general, Tables 3, 4 demonstrate that, compared with the control group, both intervention groups show promising improvement trends within the eight-week intervention period and this was sustained for another 4 weeks after the intervention but for different outcome variables.

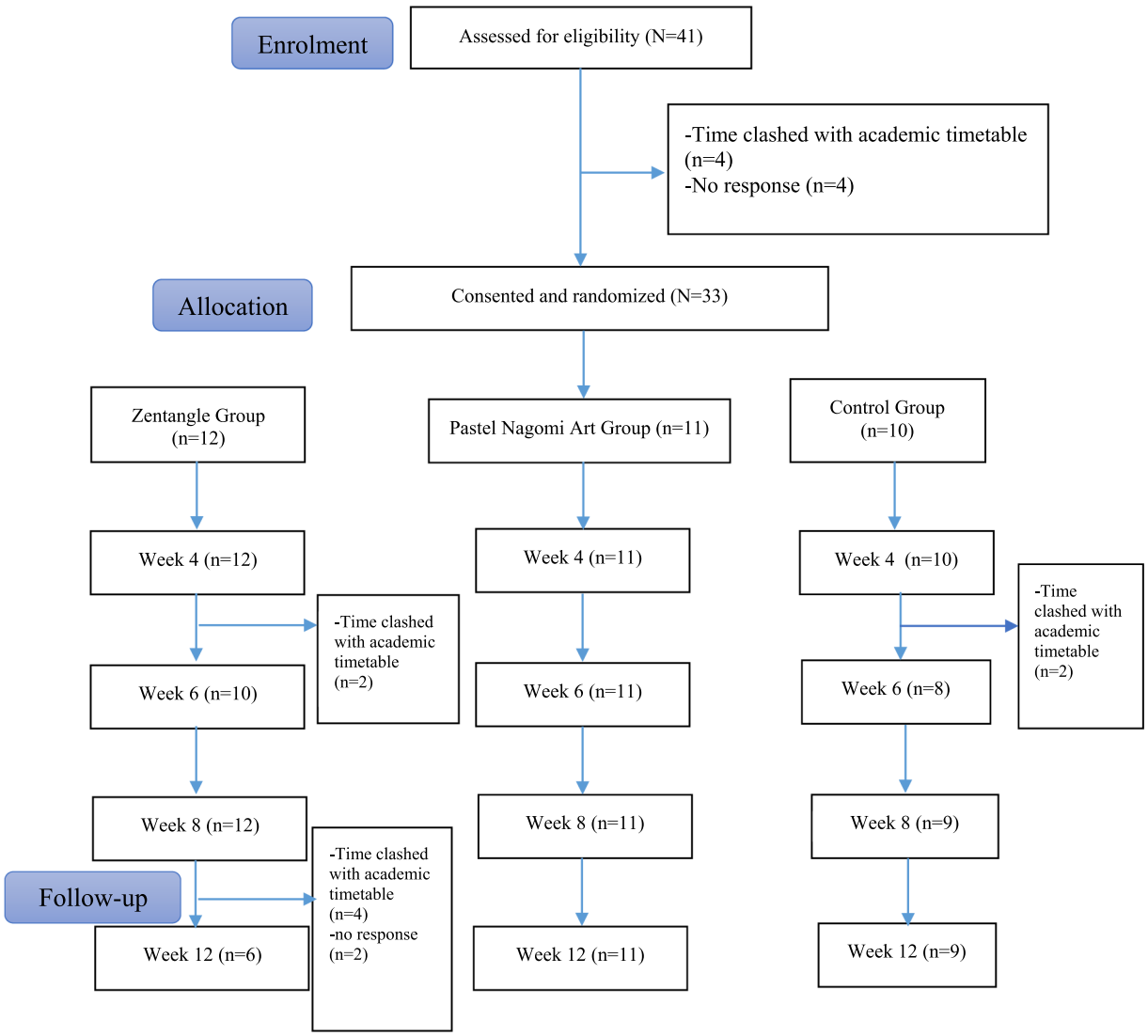

FIGURE 3
Consort diagram of the study.

4.3.1.1. Within-group results

The Pastel Nagomi art group had a significant decrease in negative affect at week 6 (mean change = −2.2; $p = 0.047$) and at week-12 follow-up (mean change = −5.5; $p = 0.006$; Table 4) as compared with baseline. Moreover, the Zentangle group showed a significant decrease in depression at week 8 (mean change = −3.2; $p = 0.034$; Table 3). For the control group, there was a significant reduction in positive affect on weeks 4 (mean change = −6.6; $p < 0.001$), 6 (mean change = −6.9; $p = 0.016$) and 8 (mean change = −5.2; $p = 0.023$; Table 4). Although improvement was shown in anxiety at week 8 (mean change = −3.3; $p = 0.003$; Table 3), this reduction not only did not sustain at the week-12 follow-up, but also was worse than the baseline (Table 3).

4.3.1.2. Between-group results: Pastel Nagomi art group vs. control group

Pastel Nagomi art group presented a significantly better result in retaining positive affect (mean change = −0.80) than the control group (mean change = −6.9) at week 6 ($p = 0.037$; Table 4). This retention could be further observed at week 12 (mean change = +1.3).

4.3.1.3. Between-group results: Zentangle group vs. control group

Similar to the Pastel Nagomi art group, the Zentangle group (mean change = +3.0) also showed a significant increase in positive affect than the control group (mean change = −6.6) at week 4 ($p = 0.002$), with better retention at week 12 (Table 4). On the other hand, the control group (mean change = −5.8) had a significantly greater decrease in negative affect than the Zentangle group (mean change = +3.7) at week 4 ($p = 0.006$; Table 4).

In summary, the within-group analyses showed that the Pastel Nagomi art group had significantly decreased negative affect at weeks 6 and week 12. Moreover, the Zentangle group showed a significant decrease in depression at week 8. From the between-group analyses, compared with the control group, the Pastel Nagomi art group had a significant improvement in retaining positive affect at week 6. This

TABLE 3 Intervention effect on perceived psychological distress for within-groups compared with baseline and between-groups compared with the control group.

		Pastel Nagomi Art group				Zentangle group				Control group				Between-group comparison	
		Mean	S.D	Within group change[@]	Within group	Mean	S.D.	Within group change[@]	Within group	Mean	S.D	Within group change[@]	Within group	Pastel Nagomi Art group vs. control group	Zentangle group vs. control group
					p				*p*				*p*	*p*	*p*
Depression															
	Baseline	10.8	12.7			12.8	8.9			9.3	6.2			0.82	0.43
	Week 4	11.8	11.1	1.0	0.73	11.0	7.5	−1.8	0.21	10.4	9.7	1.1	0.95	0.62	0.50
	Week 6	10.5	8.9	−0.3	0.91	11.4	11.3	−1.4	0.191	9.5	8.8	0.2	0.56	0.82	0.85
	Week 8	10.0	9.5	−0.8	0.76	9.7	8.1	−3.2	0.034*	8.4	9.5	−0.9	0.078	0.160	0.44
Week-12 Follow-up		8.9	8.0	−2.9	0.49	8.0	8.1	−4.8	0.31	13.0	12.5	3.7	0.88	0.62	0.47
Anxiety															
	Baseline	9.3	7.4			8.3	6.8			10.0	4.9			0.70	0.50
	Week 4	9.1	7.0	−0.2	0.87	9.7	5.6	1.4	0.45	9.8	5.7	−0.2	0.67	0.70	0.37
	Week 6	10.0	7.4	0.7	0.98	10.2	9.6	1.9	0.98	8.5	7.2	−1.5	0.20	0.32	0.56
	Week 8	7.5	6.5	−1.8	0.063	8.8	6.6	0.5	0.94	6.7	5.3	−3.3	0.031*	0.130	0.150
Week-12 Follow-up		8.2	6.2	−1.1	0.56	5.3	5.0	−3.0	0.66	15.3	11.7	5.3	0.44	0.30	0.31
Stress															
	Baseline	12.7	10.8			11.0	6.3			12.4	6.4			0.91	0.57
	Week 4	12.5	9.3	−0.2	0.84	14.0	7.5	3.0	0.21	11.6	6.1	−0.8	0.55	0.70	0.153
	Week 6	12.7	8.9	0.0	0.78	15.0	9.6	4.0	0.48	13.5	9.1	1.1	0.88	0.86	0.52
	Week 8	12.5	10.4	−0.2	0.85	13.5	6.2	2.5	0.21	11.8	6.3	−0.7	0.23	0.43	0.075
Week-12 Follow-up		10.2	7.0	−2.5	0.31	14.7	8.9	3.7	0.63	17.5	10.5	5.1	0.63	0.27	1.000

*$p < 0.05$.

[a]Kruskal-Wallis and Wilcoxon signed-ranks tests were used for between-group and within-group analysis, respectively.

[@]For the within-group change, the comparison is between that moment and the baseline.

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TABLE 4 Intervention effect on self-efficacy, emotional states and mindfulness state for within-groups compared with baseline and between-groups compared with the control group.

		Pastel Nagomi Art group				Zentangle group				Control group				Between-group comparison	
		Mean	S.D	Within group change[@]	Within group	Mean	S.D.	Within group change[@]	Within group	Mean	S.D	Within group change[@]	Within group	Pastel Nagomi Art group vs. control group	Zentangle group vs. control group
					p				*p*				*p*		*p*
Self-efficacy															
	Baseline	27.1	4.8			25.7	4.3			26.7	2.6			0.616	0.54
	Week 4	28.8	5.8	1.7	0.24	25.4	5.7	−0.3	1.000	24.8	5.5	−1.9	0.53	0.182	0.57
	Week 6	27.4	4.0	0.3	0.44	26.5	5.6	0.8	0.59	29.0	3.2	2.3	0.13	0.251	0.35
	Week 8	26.7	5.5	−0.4	0.61	24.3	6.5	−1.4	0.27	27.6	4.7	0.9	0.34	0.222	0.134
Week-12 Follow-up		29.1	5.6	2.0	0.190	27.0	3.1	1.3	1.000	25.9	6.8	−0.8	0.75	0.439	0.89
Positive Affect															
	Baseline	28.8	7.4			25.8	6.6			31.4	7.0			0.402	0.102
	Week 4	27.6	7.9	−1.2	0.47	28.8	5.8	3.0	0.25	24.8	6.2	−6.6	0.008*	0.137	0.002*
	Week 6	28.0	6.1	−0.8	0.63	25.0	5.9	−0.8	0.23	24.5	7.0	−6.9	0.016*	0.037*	0.22
	Week 8	28.5	7.5	−0.4	0.79	25.7	6.1	−0.2	0.44	26.2	6.0	−5.2	0.023*	0.050	0.103
Week-12 Follow-up		30.1	7.6	1.3	0.45	27.8	4.9	2.0	1.000	29.8	4.9	−1.7	0.56	0.173	0.56
Negative Affect															
	Baseline	27.1	7.7			22.7	8.0			26.0	9.0			0.703	0.22
	Week 4	25.7	9.0	−1.4	0.28	26.4	7.4	3.7	0.14	20.2	5.4	−5.8	0.031	0.168	0.006*
	Week 6	24.9	9.4	−2.2	0.047*	24.5	7.6	1.8	0.95	20.0	6.4	−6.0	0.094	0.361	0.12
	Week 8	24.5	7.2	−2.6	0.074	25.7	8.2	3.0	0.69	20.7	3.9	−5.3	0.063	0.803	0.069
Week-12 Follow-up		21.6	4.9	−5.5	0.006*	27.3	9.2	4.7	0.88	25.3	5.6	−0.8	0.31	0.234	0.52
Mindfulness state															
	Baseline	30.9	4.3			30.6	4.6			30.7	3.4			0.88	0.80
	Week 4	30.2	4.9	0.73	0.23	29.4	4.6	1.17	0.34	29.1	3.8	1.78	0.48	0.82	0.97
	Week 6	30.5	4.8	0.36	1.000	28.5	5.6	2.00	0.25	30.6	2.3	−0.29	1.000	0.89	0.33
	Week 8	31.3	5.3	−0.36	0.87	28.7	5.3	1.92	0.125	29.6	4.4	0.88	1.000	0.84	0.31
Week-12 Follow-up		31.5	4.9	−0.55	0.98	31.0	3.8	2.17	0.063	29.1	5.3	0.86	0.69	0.75	0.31

*$p < 0.05$.

[#]Kruskal-Wallis and Wilcoxon signed-ranks tests were used for between-group and within-group analysis, respectively.

[@]For the within-group change, the comparison is between that moment and the baseline.

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TABLE 5 Qualitative Findings: Intervention Benefits.

		Pastel Nagomi Art group	Zentangle group
Theme	Sub-themes	Examples	Examples
Enjoyment of the artwork process	Relaxation and joyfulness	I felt happy when I saw my artwork. This feeling made me feel relaxed. I also felt happy with my improvement in the artwork.	I felt relaxed! Even though I spent an hour drawing, but I did not notice it as the time passed so fast. The relaxation during the time of the drawing was invaluable and I was happy.
	Focus	Focusing on repetitive scraping and rubbing with my fingers made me feel relaxed. Focusing on the artwork process made me feel good.	I could solely focus on Zentangle when I was drawing. Probably, I was so focused on drawing that I neglected other businesses.
	Social networking	I also enjoyed the moment of drawing with others. I believe that it is the social bonding which helps relieving my stress.	I felt more relaxed during the face-to-face sessions (the first and last session) which I can interact with the instructor and others.
Proud of the artwork	Satisfaction	I felt a sense of satisfaction after finishing the piece.	I found my work was really beautiful when it was viewed from a distance. The achievement I felt was actually greater after completing the piece.
	Willing to share	I would share my artwork with friends through WhatsApp, and I got their compliments. Then, I shared them with my family hoping that they would admire my work.	I sent my finished artwork to my friends, they praised it. They even asked whether I purchased it from somewhere else. I felt that I was so great.
Personal growth	A renewed sense of self	We had to learn more about ourselves before getting changed. Drawing is a good way to get to know myself better. I believe that drawing is beneficial to personal growth.	It could help me to be aware of my stress.
	A new relaxation method	I considered drawing as an alternative way to relax. I used to relax through drawing and now I have acquired a new drawing technique to relax.	In my spare time after drawing class, I took out a piece of paper and draw some patterns that I have learnt in the class. I found a new way to relax.

retention could be further observed at week 12. Similar to the Pastel Nagomi art group, the Zentangle group had a significant increase in positive affect at week 4, with better retention at week 12.

For the control group, on the other hand, the within-group analyses showed that there was a significant reduction in positive affect on weeks 4, 6 and 8. Although improvement was shown in anxiety at week 8, this reduction not only did not sustain at the week-12 follow-up, but also was worse than the baseline. The between-group analyses found that the control group had a greater decrease in negative affect at week 4 than the Zentangle group.

4.3.2. Qualitative results

Twenty participants attended the focus groups, 11 from the Pastel Nagomi Art group and 9 from the Zentangle group. Five focus groups were conducted with 2 to 6 participants for each group. Two coders achieved 88.7% agreement in the first draft. After that, the coders discussed the diversity and coded the themes again. The codes achieved 100% agreement at the second coding. The percentage agreement by adding up the identical codes that the coders applied and dividing the results by the total number of codes which can reflect the reliability of the protocol as the protocol involves a simple coding task (Feng, 2014). No participants indicated any harmful effects. The coding for intervention benefits resulted in the identification of three themes and seven sub-themes (Table 5). For the first "*enjoyment of artwork process*," the participants from both intervention groups described that they felt a *relaxed and joyful* atmosphere during the artwork process. This suggests that the workshop provided quality time for them to relax and manage their stress. Some participants in the Pastel Nagomi Art group expressed that they felt relieved from daily stress when they used the skills of drawing Pastel Nagomi Art. Some participants from the Zentangle Art group said that they felt the time went fast during the workshop. Likewise, a few participants from the Pastel Nagomi Art group felt that the face-to-face intervention session provided them with an opportunity to *build a social network* and hence relieve stress. Moreover, some participants from both groups reflected they felt the intervention workshops enhanced their attention, through concentrating on the drawing and ignoring the stressors during the intervention workshops.

For the second theme "*pride in the artwork*," the participants from both intervention groups expressed that they *felt satisfied and confident* after the drawing. A few participants from both the Pastel Nagomi Art and Zentangle Art groups revealed that they *felt fulfilled* when seeing their art. Furthermore, the majority revealed that they were *willing to share* their artwork products with their friends and families. Both groups shared that they felt satisfied when their friends and families praised their artwork.

Through the intervention workshops, the participants felt they had experienced *personal growth*, as the third theme. A few participants from each intervention group reflected that the workshops allowed them to *renew their sense of self* through reflecting on themselves and releasing their emotions. Moreover, some participants from each group indicated that they had *learned a new relaxation skill* during the intervention to assist them to manage their stress.

5. Discussion

5.1. The feasibility of the study

To the best of our knowledge, this is the first study to investigate the feasibility and preliminary effects of a mixed-mode (face-to-face and online) intervention of Pastel Nagomi Art and Zentangle Art on improving the mental health of undergraduate students during the COVID-19 pandemic. The present study achieved an acceptable consent rate, demonstrating acceptable recruitment. In addition, high attendance rates in both intervention groups suggested excellent acceptability of the intervention. Timetable clashes were the main reasons for absence from workshops. Furthermore, the focus-group interview participants provided supporting evidence of their acceptance of both artwork interventions and the modes of the intervention. Compared with previous studies with the consent rate and attendance rate ranged from 56.3–70.2% (Coholic et al., 2018) and 50.3–95% (Lee, 2021) respectively, the present study has demonstrated its high feasibility to pursue a full-scale study.

In the current study, a mixed mode (face-to-face and online) was used which is probably the first of its kind. Most of the artwork interventions in previous studies were conducted merely face-to-face (Kim, 2013; Chen et al., 2016; Karpavičiūtė and Macijauskienė, 2016; Campenni and Hartman, 2020; Newland and Bettencourt, 2020; Hsu et al., 2021) or online modes (Sit et al., 2022). In terms of dose, frequency and duration, this present study is comparable with previous work. According to a recent systematic review of the effectiveness of mindfulness-based artwork therapy for managing symptoms of anxiety, depression, and fatigue, among 14 studies, the doses (i.e., lengths of sessions) ranged from 45 to 180 min, the frequencies (i.e., the time intervals between sessions) were weekly or bi-weekly, and the durations ranged from two to 13 weeks (Newland and Bettencourt, 2020). In this review, 11 studies (78.57%) conducted interventions weekly for eight weeks (Newland and Bettencourt, 2020), which the present study also adopted. There were some variations. Hsu et al. (2021) conducted a face-to-face Zentangle art study for healthcare workers with one four-hour session; while Sit et al. (2022) conducted Zentangle art in online mode with weekly 30-to 90-min sessions for 11 weeks. The doses of the interventions might have varied because of the types of artwork, for instance, 90 min for creative art-making (Burns and Waite, 2019) and 180 min for content-picture drawing (Monti et al., 2013). The doses of Zentangle art ranged from 60 (Chen et al., 2016) to 90 min (Chia et al., 2020). It is worth noting that in the interviews the participants suggested extending each session to 75 min. Future studies should explore the dose, frequency and duration of interventions further.

5.2. The effectiveness of artwork on mental well-being

The results of this study support positive intervention effects, as both intervention groups improved in regard to depression, and positive affect, compared with the control group. Furthermore, as compared with the control group, the Pastel Nagomi art had a more sustainable effect on stress as noted in week 12. Karpavičiūtė and Macijauskienė (2016) conducted an RCT and found that silk painting artwork could improve mental well-being, reducing stress and fatigue and increasing a sense of community at work among nurses and nursing assistants. Furthermore, previous studies also found art making with paint, markers, and collage materials on canvas material reduced stress in female counsellors (Ifrach and Miller, 2016). Thyme et al. (2007) indicated that painting and drawing helped to reduce depression symptoms in depressed women and relieved depression, perceived stress and parenting stress in Korean mothers of children with disabilities (Lee, 2021). Coloring mandalas can also help to reduce anxiety and negative affect and increase positive affect in undergraduates (Campenni and Hartman, 2020). Moreover, Zentangle art can improve self-esteem and reduce social interaction anxiety in patients with psychosis (Chen et al., 2016) and enhance psychological and family well-being (Sit et al., 2022). One previous study supported the present study's finding, reporting that a four-week creative art program, including water-coloring, collage making, beading and knitting, was effective in enhancing the mental well-being among women (Fraser and Keating, 2014).

Although improvement trends were observed, there were no significant improvements in stress, anxiety, mindfulness and self-efficacy. One reason was the small sample size in this study. The improvement trends suggested that it might take time for the effects of both artworks on mental well-being through enjoyment of the artwork process, pride in the artwork and personal growth to develop. The qualitative exploration of this study supported this suggestion. The participants in both intervention groups experienced a relaxing and joyful atmosphere, being focused and establishing social networks. They pointed out that the eight artwork sessions provided them with regular weekly one-hour sessions away from stressors and allowed them to take a break and refresh their minds during the intervention. Regular practice of relaxation techniques can help individuals to manage their stress at moderate emotional levels (Pfeiffer, 2001). Moore (2013) reported that a repetitive act of drawing patterns or lines, similar to the Zentangle art, helped individuals get into a mindfulness state and generate self-healing processes to reduce stress. Karpavičiūtė and Macijauskienė (2016) found that finger painting which was similar to the concept of Pastel Nagomi art could improve the state of mindfulness. Tactile sensation, mindfulness state and the experience of being present are related to cognitive processes (Grossman, 2011; Hinz, 2020). Developing a state of mindfulness could be effective in decreasing mood disturbance and stress (Brown and Ryan, 2003). In addition, Salzano et al. (2013) reported that group painting activities helped hospice caregivers to increase social support and hence reduce their stress, which is consistent with our findings.

Moreover, it was important that the participants were keen to share their artwork products with others or on social media, which serves as evidence they felt satisfied with their products. The participants expressed their enjoyment of receiving compliments from others on their artwork. Lin Brostrom et al. (2020) found that sharing the artwork could provide a positive new topic and an opportunity for the participants to interact with others via technologies such as text messages and social media. Choi and Choung (2021) also found that women who used social media for social connections had increased satisfaction with life during the COVID-19 pandemic. The present study supported previous findings that artworks can improve subjective well-being by providing positive self-images and hope, enhancing satisfaction with daily life, and expanding contact with the outside world (Reynolds et al., 2008). The satisfactory artwork

products and sharing behaviours could further enhance self-esteem and self-efficacy.

Furthermore, the participants in both intervention groups encountered personal growth with a renewed sense of self and learned a new relaxation skill. They reflected that they had increased their awareness of their emotions, especially the changes that occurred to their negative affect, which added support to the finding that the Zentangle art group participants' negative affect was higher than that of the control group participants at week 4. The Zentangle art group participants had increased their awareness of their emotions after the intervention, but they may still have tried to deal with the negative affect. Emotional awareness was found as an essential component of effective emotional regulation (Gratz and Roemer, 2004). The repetitive movement in both artworks could help the participants get into a state of mindfulness to increase their awareness of the present (Moore, 2013; Karpavičiūtė and Macijauskienė, 2016). This increased awareness helps individuals reconsider threatening situations and regulate emotional responses (Modinos et al., 2010; Prazak et al., 2012). Learning a new relaxation skill allowed the participants to acquire a new method to release stress for long life, not only for the short period of time of the study.

5.3. Limitation

This study had some limitations. An imbalance number of online vs. face-to-face sessions might affect the study outcomes. This study was conducted during the COVID-19 pandemic, social distancing was reinforced. Thus, to minimize face-to-face contact, only two face-to-face workshops were conducted. Although the participants did not have a strong preference for the modes of the workshops, about three-fourths of them preferred face-to-face. Further studies can consider four online and four face-to-face workshops in the post-pandemic situation. The two-time points of data collection at weeks 4 and 6 during the 8-week intervention could be another limitation. As mentioned, a recent systematic review found that the duration of interventions ranged from two to 13 weeks (Newland and Bettencourt, 2020). With this reference, the intention of collecting data at these two-time points was to test the effect of the interventions in a short duration. However, repeated measures might induce survey fatigue. In addition, according to the qualitative results of this study, participants' confidence has been improved. In this study, the Rosenberg (1965) 10-item self-esteem scale was used but low Cronbach's alpha values at different time points were registered ($0.01 < \alpha < 0.66$). These low values could be due to the small sample size. Due to the low values, the self-esteem scale was not included in the analysis. Future studies should re-assess the psychometric properties of this scale for this university student population, and other scales can also be used to verify the impact of these two studied artworks on self-esteem. This study involved students from one university which affects the generalizability of the study results.

6. Conclusion

The quantitative and qualitative findings of the present study have supported that Zentangle and Pastel Nagomi Art are effective in improving mental well-being. Both artworks might also build essential stepping stones for enhancing mindfulness, self-efficacy and self-esteem. Furthermore, the feasibility of this study also demonstrated acceptable recruitment, consent, attendance and retention rates. For future large-scale studies, the duration of each session can be extended to 75 min to allow the participants more time to enjoy the artwork. Furthermore, longer intervention periods or additional interventions may be needed to sustain the positive intervention effect.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The study involving human participants were reviewed and approved by the Institutional Review Board of the Hong Kong Polytechnic University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

KC planned the study, coordinated the study, and revised the manuscript. KYM taught the art workshops, drafted and revised the manuscript. HT conducted data analysis. NHL and KYL coordinated the art workshops. SWH coded the qualitative result. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. All authors contributed to the article and approved the submitted version.

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Are neuroaesthetic principles applied in art therapy protocols for neurorehabilitation? A systematic mini-review

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Art is an instrument created by humans as an alternative way of expression. For this reason, it has found its use in clinical contexts to improve mood, increase participation in therapy, or improve communication for patients with different pathologies. In this systematic mini-review, the Preferred Reporting Item for Systematic Reviews and Meta-Analysis (PRISMA) guidelines were adopted. Internet-based bibliographic searches were conducted via major electronic databases (Web of Science and PubMed). We analyzed the quantitative studies in which art figures as a neurorehabilitation treatment to identify whether standard art therapy protocols exist and whether these are based on the principles of neuroaesthetics. Our review identified 8 quantitative and 18 qualitative studies. Although art therapy has been used for more than 20 years as a clinical tool, there are no standard protocols to refer to when planning interventions. Although the effectiveness of using arts as therapy has been reported in many qualitative or feasibility studies, there is still a lack of quantitative studies in which the outcomes of art therapy are directly based on the principles of neuroaesthetics.

KEYWORDS

neuroaesthetics, neurorehabilitation, technology, virtual reality, art therapy

1. Introduction

Art activities can be considered complex, multimodal interventions that combine multiple components involving aesthetic engagement, imagination, sensory activation, the evocation of emotion, cognitive stimulation, and, possibly, social interaction, physical activity, and engagement with wellness promotion (Craig et al., 2008; Fancourt, 2017).

As art activities can trigger psychological, physiological, social, and behavioral responses, they could be linked with health and interactions with healthcare (Fancourt and Finn, 2019). In this framework, art therapy (AT) may be defined as the use of arts to support personal and relational treatment goals as well as community concerns, improve cognitive and sensorimotor functions, foster self-esteem and self-awareness, cultivate emotional resilience, promote insight, enhance social skills, reduce and resolve conflicts and distress, and even advance societal and ecological change (Regev and Cohen-Yatziv, 2018).

Art therapy can also be defined as a form of psychotherapy, physiotherapy, and/or speech therapy that uses art media as its primary mode of communication to enable the patients to develop their health and wellbeing by promoting their creative resources with art materials in a safe, enriched, and facilitating environment (Deshmukh et al., 2018).

However, in many cases, "art therapy" refers to specific treatments administered by a professional art therapist, despite the many different applications reported in the scientific literature for arts in health promotion. According to this latter general point of view, the use of arts for promoting health is a recognized therapeutic approach widely used at present in various clinical situations, especially related to neurological disorders, such as Alzheimer's disease (Davidson and Almeida, 2014), stroke (Gonen and Soroker, 2000; Beesley et al., 2011; Baumann et al., 2013), Parkinson's disease (Cucca et al., 2021), and psychiatric disorders (Grube, 2002; Caddy et al., 2012).

In 2019, the World Health Organization (WHO) published a scoping review titled "What is the evidence on the role of the arts in improving health and wellbeing?" (Fancourt and Finn, 2019). This review mainly divided the possible outcomes of arts into promotion/prevention and management/treatment. Furthermore, in this WHO document, art therapy was divided into contemplative protocols (such as watching visual arts or listening to music) and creative protocols (such as painting or playing an instrument, even if the result cannot exactly be defined as arts). Finally, this document of the WHO further divided the types of arts applied to health into five main broad categories. The categories are performing arts (e.g., activities in the genre of music, dance, theater, singing, and film), visual arts (e.g., crafts, design, painting, photography, sculpture, and textiles), literature (e.g., writing, reading, and attending literary festivals), culture (e.g., going to museums, galleries, art exhibitions, concerts, theater, community events, cultural festivals, and fairs), and digital arts (e.g., animations, film-making, computer graphics, and online fruition of arts) (Fancourt and Finn, 2019).

These five approaches may involve imagination, aesthetic engagement, sensory activation, cognitive stimulation, the evocation of emotion, and, in some cases, an increase in physical activity and social interaction (Fancourt and Finn, 2019). They may also encourage patients to develop a nonverbal language to help overcome emotional, cognitive, linguistic, or motor disturbances.

Given that the review of the World Health Organization covered more than 3,000 studies, it is quite surprising that the word "neuroaesthetics" is not present in this article. Neuroaesthetics is an emerging field of neuroscience, defined as the scientific study of the cognitive processes and the neural bases related to the contemplation and creation of a work of art (Zeki, 1999; Nalbantian, 2008).

Although art therapy could be a bridge between neuroaesthetics and neurorehabilitation, it appears that the protocols of arts for health do not benefit from the recent scientific findings in the field of neuroaesthetics. Among the discoveries in this neuroscientific field, the wide brain arousal including the activation of motor areas, even when an art masterpiece is simply contemplated by a static subject (Ishizu and Zeki, 2013), is an interesting one. Many different possible explanations have been provided for this elicitation of motor and premotor areas, including the possible activation of mirror neurons (Freedberg and Gallese, 2007), the possible recognition of the motor intentions of the painted people (Adolphs et al., 2000), the motor imagery related to the use of painted tools, the accessibility of the painted environments (Di Dio et al., 2016), or even the empathetic engagement with the artist that, with his/her gestures, produced (or played) the artistic masterpiece (Knoblich, 2002; Umiltà et al., 2012).

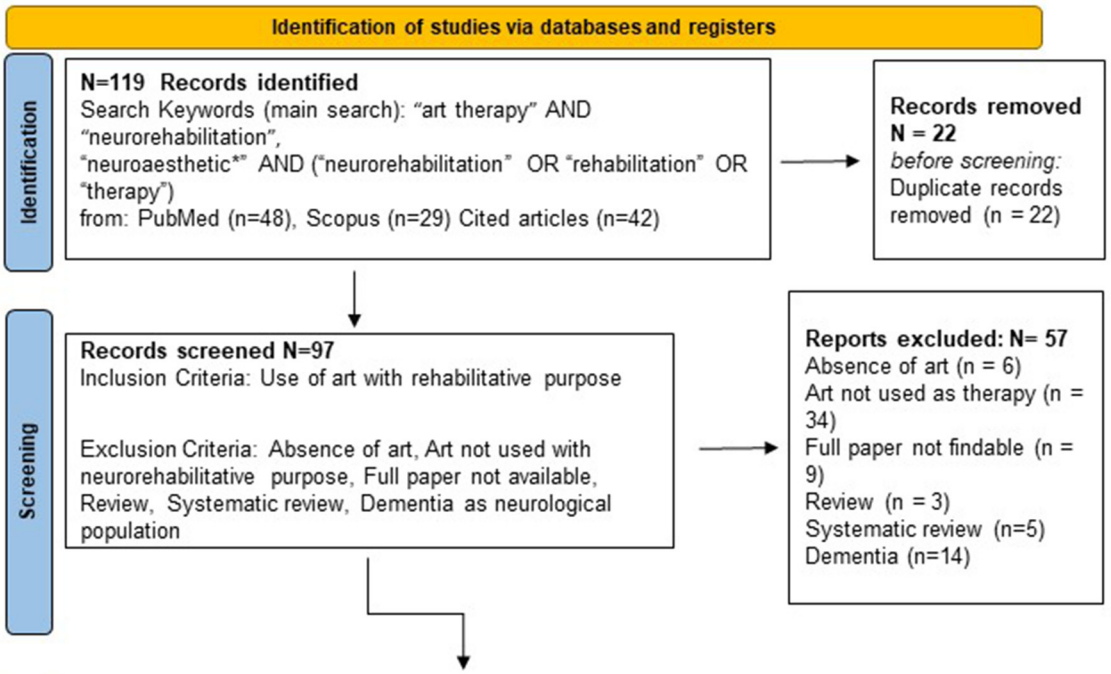
The possible relationship between neuroaesthetic and art-based protocols for rehabilitation is an important area of inquiry because there is a need to develop a roadmap to enhance and enrich art therapies with a greater understanding of neuroscience (King, 2018). The use of arts for health promotion originated in the 20th century in many parts of Europe and America simultaneously in response to the needs of clinical populations (often not being served effectively with traditional approaches to mental and physical health) based on the value of creative, symbolic communication, memory reconsolidation, and emotional regulation of arts. Although arts for health promotion has increasingly well-known and established potentialities, deeper research in the field is needed to better understand the neuropsychological mechanisms based on the intervention's impacts and patients' outcomes (King et al., 2019). Moreover, many studies in the field of neuroaesthetics are limited to laboratory settings, whereas they may suggest translational applications for health promotion (King and Parada, 2021).

This mini-review aimed to analyze the neurorehabilitation protocols exploiting the potentialities of arts and verify if they should translationally take into account the findings of studies conducted in the field of neuroaesthetics.

2. Materials and methods

This systematic review was conducted by searching recent peer-reviewed articles published until August 2022 using the PubMed and Scopus databases.

The scientific literature was reviewed by two independent researchers. In the primary search, the following keywords were used: "art therapy" AND "neurorehabilitation." The objective of the review search was to identify papers that used a systematic protocol for neurorehabilitation based on art therapy. Moreover, rehabilitation outcomes should have been assessed and quantified using clinical scales or biomedical devices. The research question of the mini-review was whether or not art-based therapy was implemented on the neuroaesthetic principle. Therefore, this study aimed to verify the research question. After the removal of the duplicates, all articles were evaluated based on titles and abstracts. Papers were screened and included as valuable studies according to the following criteria: (i) they used art therapy as an experimental treatment; (ii) they were focused on the neurorehabilitation of adult clinical populations; (iii) the papers were written in English; (iv) they clearly reported quantitative outcome measurements; and (v) they had been published in a peer-reviewed journal. We excluded articles that described theoretical models, methodological approaches, algorithms, basic technical descriptions, letters to the editor, and validation of experimental devices without a clear translation to clinical practice and without quantitative measurements. Furthermore, we excluded papers with different populations, such as (i) animal studies; (ii) pediatric studies; and (iii) adult psychiatric research, or with a different format, such as (iv) conference proceedings or reviews and (v) papers that were not fully available. A secondary adjunctive search



Studies included in review (N=26) divided by type of art:	Quantitative studies	Qualitative studies	Feasibility studies	Total
Visual arts	6	8	2	**16**
Dance		1		**1**
Music	1	1		**2**
Multi-art programme		3	2	**5**
Visual art in virtual reality or art technologies			1	**1**
Theatre	1			**1**
Total	**8**	**13**	**5**	**26**

FIGURE 1
Flowchart of the mini-review described according to the PRISMA statement 2020.

was made using the following keywords: "neuro-aesthetic*" AND ("neurorehabilitation" OR "rehabilitation" OR "therapy"). Papers were also screened from previous systematic reviews on this topic and by reading the references of selected papers. For each paper, the type of study, number of patients, therapy duration, main results, and findings have been recorded.

The collected data were summarized as mean ± standard deviation or percentage and were also reporting the statistical significance level of within- or between-group comparisons. Furthermore, a risk-of-bias analysis was conducted on the collected papers using the Risk-of-bias VISualization software (Robvis) for a systematic review (McGuinness and Higgins, 2021).

3. Results

As shown in Figure 1, 119 papers have been identified. After duplication removal, 97 papers were screened, and, according to the criteria described above, 26 papers were finally selected. The results of the present search strategy are reported in Figure 1. Papers were classified by the type of arts used for rehabilitation: visual arts, music, arts in virtual reality, or therapy programs based on the combined use of various arts (visual arts, music, theater, dance, writing, etc.). Among the 26 studies, we found 8 quantitative studies (reported in Table 1), 13 qualitative studies (Carmi and Mashiah, 1996; Pachalska et al., 2008; Michaels, 2010; Beesley et al., 2011; Symons et al., 2011; Baumann et al., 2013; Vija and Lusebrink, 2014; Demers and McKinley, 2015; Morris et al., 2016; Sit et al., 2017; Smith et al., 2017; Vaudreuil et al., 2019), and 5 feasibility studies (Worthen-Chaudharia et al., 2013; Morris et al., 2014; Ellis-Hill et al., 2015; Cucca et al., 2018; Chan et al., 2021) (Supplementary material). We performed a risk of bias analysis on the quantitative studies shown in Figure 2. The colors of the traffic light in Figure 2 indicate that half of them had a high risk of bias, i.e., for an unclear study, while only 3 (Kongkasuwan et al., 2016; Morris et al., 2019; Iosa et al., 2021) out of 8 studies had a low

TABLE 1 Detailed information of the included quantitative studies.

References	Type of art therapy	Type of study	Sample size	Therapy duration	Results	Findings
Cucca et al. (2021)	Visual art (Clay manipulation, painting on canvas, collage, drawing, and murals)	Open-label, prospective, exploratory trial No CG	$N = 18$ PD patients	2 sessions per week for 2 weeks	Number of saccades $_w$: *(19.9 ± 1.0, t(9) = 4.8; p = 6.2e-08);* Saccadic path lengths $_w$: *(1,621 ± 113;* $t_{(9)}$ *= 0.9; p = 3.1e-09)* Horizontal fixation variation $_w$: *(6.8 ± 0.25;* $t_{(9)} = 2.5$*; p = 0.017)* Navon test $_w$: $t_{(10)} = 1{,}601$*; p = 0.138* RCFT $_w$: $t_{(13)} = 2.0295$*, p = 0.0634* UPDRS-III $_w$: $t_{(13)} = -6.16$*; p = 0.0063* UPDRS totale $_w$: $t_{(13)} = -6.93$*; p = 0.0368* Increases of FC in left paracentral lobule within V1 ($p < 0.001$); left middle temporal gyrus in V2 ($p < 0.001$)	Improvement of visual-cognitive skills, general motor function, and functional reorganization of visual networks
Iosa et al. (2021)	Visual digital art (painting on virtual canvas)	RCT CG: interaction with non-artistic masterpieces	$N = 20$ controls (Exp. 1) and 4 stroke patients (Exp. 2)	2 sessions on the same day (Exp. 1) 4 sessions in 8 days (Exp. 2)	Exp. 1 Physical demand $_B$(22.1 ± 21.7% vs. 27.1 ± 18.9% $p = 0.049$) Exp.2 USEQ *mean score = 4.75* NASA TLX: *mental demand* = 9%, *physical demand* = 6%, *temporal demand* = 4%, *self-assessed performance* = 93%, *effort* = 5%, *frustration* = 1%. Pittsburgh Rehabilitation Participation Scale: mean score *ranged from 5.25 to 6 among the 4 sessions*	Reduction of perceived fatigue and kinematic errors with artistic stimuli.
Morris et al. (2019)	Visual arts (drawing, collage, printing)	RCFT CG: usual care	$N = 81$ stroke patients	2 sessions per week for 4 weeks	T1-T2: Positive affect $_B$*(5.4 ± 9.2 vs. 1.7 ± 9.9)* Negative affect $_B$ *(3.2 ± 10.8 vs. 4.5 ± 9.4)* Self-efficacy for art $_B$ *(5.4 ± 9.2 vs. 1.79 ± 9.9)* T2-T3: Positive affect $_B$*(4.3 ± 7.5 vs. 2.8 ± 10.1)* Negative affect $_B$ *(3.3 ± 11.0 vs. 5.2 ± 9.8)* Self-efficacy for art $_B$*(2.1 ± 4.1 vs. 0.4 ± 3.9)*	Increase in self-efficacy and emotional wellbeing
Kongkasuwan et al. (2016)	Music (meditation with music, group singing)	RCT CG: conventional physical therapy	$N = 118$ stroke patients	2 sessions per week for 4 weeks	Functional score $_B$ *(1.2, 95% CI 0.1, 2.3, p = 0.043),* Depression $_B$ *(−4.5, 95% CI −6.5, 2.5, p < 0.001),* QoL $_B$ *(8.9, 95% CI 3.8, 13.8, p < 0.001)*	Decrease depression and increase physical functions and quality of life
Ali and Gammidge (2014)	Visual arts (drawing and painting, camera and iPad)	Pilot study CG: usual care	$N = 27$ stroke patients	2 sessions per week for 6 weeks	TOMs $_B$: *from 9 to 10.5* HAD anxiety $_B$: *from 8 to 6* HAD depression $_B$: *from 10 to 4*	Art therapy helps patients to explore the sequel of stroke
Kim and Kang (2013)	Visual art (colors therapy)	RCT CG: comprehensive rehabilitation	$N = 28$ stroke patients and their 28 caregivers	1 session a week for 13 weeks	Meaning in life $_B$ *P 40.3 ± 3.6 p < 0.05 C 37.4 ± 2.1 p < 0.05* Life value selection $_B$ *P 24.6 ± 4.9 p < 0.05 C 24.6 ± 1.6 p < 0.05* Aim of life $_B$ *P 45.6 ± 5.9 p < 0.05 C42.7 ± 2.2 p < 0.05*	Color therapy improves the purpose in the life of post-stroke patients and caregivers

(Continued)

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TABLE 1 (Continued)

References	Type of art therapy	Type of study	Sample size	Therapy duration	Results	Findings
Kim et al. (2008)	Visual art (drawing)	Case report	$N = 1$ stroke patient	Twice a week for 10 weeks	K-MMSE: from 0 to 6 K-WAIS: from 40 to 59 K-WAB: from 16.8 to 17.0 MVPT: from unmeasurable to measurable Fugl-Meyer: from 6 to 32 FIM: from 41 to 57	Improvement in visual perception, cognition, motor activity, and function
Agnihotri et al. (2014)	Theater (voice work, character development, script analysis, writing skills)	Case study	$N = 4$ youth with ABI $N = 1$ control	Daily for 4 h over a period of 4 weeks	COPM, GAS, Social Networks Inventory CASP, RSES, Emotion Discrimination Task PPIC	Improvement of social skills and participation

RCT, randomized controlled trial; RCFT, randomized controlled feasibility trial; PD, Parkinson's disease; ABI, acquired brain injury; RCFT, Rey-Osterrieth Complex Figure test; UPDRS, Unified Parkinson's Disease Rating Scale; FC, functional connectivity; V1, V2, primary and secondary visual brain networks; USEQ, user satisfaction evaluation questionnaire; NASA TLX, Nasa task load index; QoL, quality of life; TOM, therapy outcome measures; HADS, Hospital Anxiety and Depression Scale; K-MMSE, the Korean version of Mini-Mental Status Examination; K-WAIS, the Korean version of Wechsler Adult Intelligence Scale; K-WAB, the Korean version of Western Aphasia Battery; MVPT, Motor-Free Visual Perception Test; FIM, Functional Independence Measure; COPM, Canadian Occupational Performance Measure; GAS, Goal Attainment Scaling; CASP, Child and Adolescent Scale of Participation; RSES, Rosenberg Self-Esteem Scale; PPIC, Profile of Pragmatic Impairments in Communication; CG, control group; $_W$, within group study; $_B$, between group study.

risk of bias. Quantitative studies used art therapy in patients with Parkinson's disease, stroke, or acquired brain injury. By analyzing the quantitative, qualitative, and feasibility studies, we found that visual arts are the most commonly used (15 studies out of 26, 58%), also in their digital version ($n = 2$, 8%), followed by multi-modal art protocols ($n = 5$, 20%), music ($n = 2$, 8%), and sporadic experiences related to dance ($n = 1$, 4%) and theater ($n = 1$, 4%).

In quantitative studies, the outcomes were evaluated using clinical scales, psychological and behavioral tests, instrumented movement analysis, neuroimaging, and eye-tracking analyses. Significant improvements were obtained with art therapy in terms of functional connectivity (Cucca et al., 2021), reduction of anxiety and depression (Ali and Gammidge, 2014; Kongkasuwan et al., 2016), and reduction of fatigue during therapy (Iosa et al., 2021) but not in terms of the activities of daily living (Cucca et al., 2021) and increment in participation in the therapeutic intervention (Agnihotri et al., 2014; Morris et al., 2019). Specific studies also reported improvements in visual perception (Kim et al., 2008), level of purpose in life (Kim and Kang, 2013), and self-assessed concentration, emotion, self-confidence, motivation, and satisfaction with respect to art therapy (Kongkasuwan et al., 2016).

Findings of qualitative and feasibility studies have been reported in a table of Supplementary material together with the details of the risk of bias analysis, which revealed that only 5 out of the 18 studies had a low risk of bias (28%).

4. Discussion

The main result of our review is that although the studies included in this review used a quantitative approach, it appears that they did not begin with the principles of neuroaesthetics to define systematic protocols of art therapy for neurorehabilitation programs. In addition, there were twice the number of qualitative and feasibility studies than quantitative ones. These two aspects could be strictly intertwined. Art-therapy protocols are often neither based on rigorous protocols based on scientific literature nor included quantitatively and objectively measured outcomes.

According to the analyzed studies, the patient can express internal conflicts, emotions, and his own psychological state through the work of art (Ali and Gammidge, 2014). In other words, art therapy can also be used as a form of group therapy, promoting interaction and communication between patients (Goodill, 2010) and reducing anxiety, depression, and isolation (Eum and Yim, 2015). Creativity is associated with flexible or divergent thinking (Torrance, 1995). It can also help caregivers gain different perspectives on the challenges they face and find new and flexible ways to adapt to their role as caregivers (Houston, 2020).

However, most of the analyzed studies are characterized by small groups of participants or the absence of control groups, which implies poor statistical rigor or a lack of an indicator of the obtained result to support the reported findings quantitatively. In the absence of psychological measures on motivation, participation, and many other cognitive aspects that have been reported as positively influenced by the art experience (Kongkasuwan et al., 2016), the findings of qualitative studies risk remaining positive anecdotic experiences with poor generalizability of the scientific outcomes (Slayton et al., 2010).

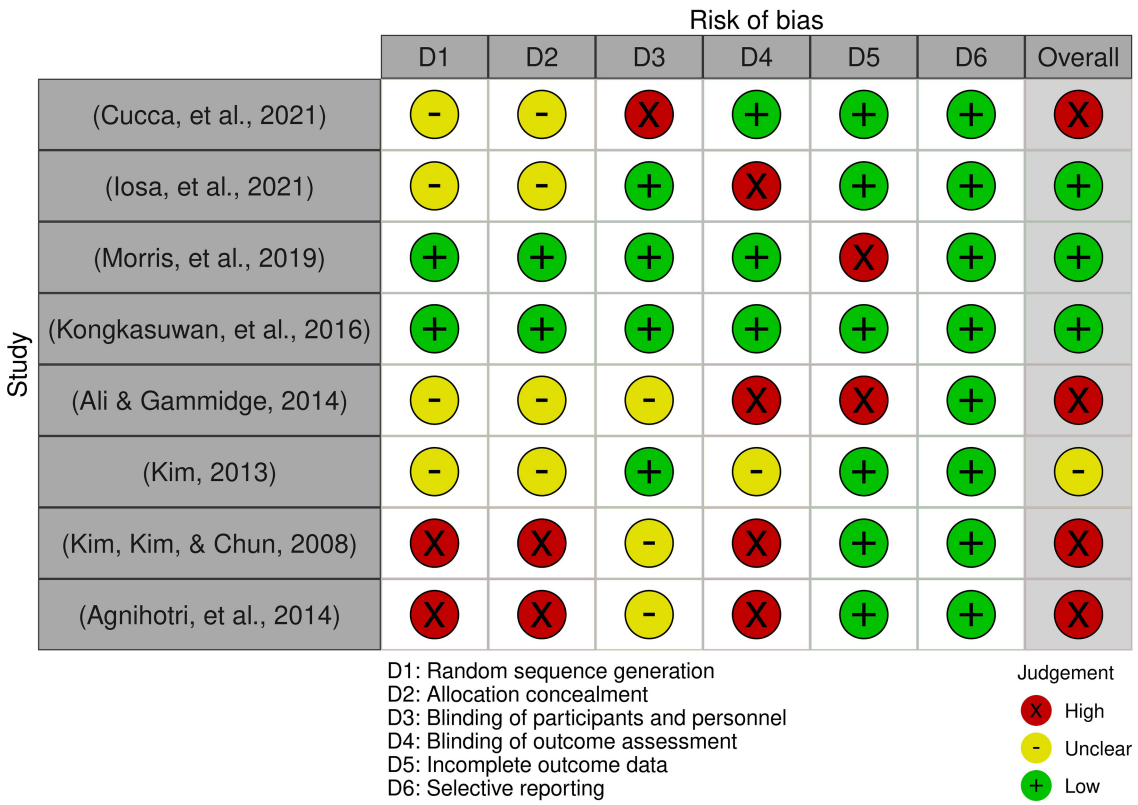

FIGURE 2
Risk-of-bias analysis for quantitative studies. This analysis was performed using Robvis (Risk-of-bias VISualization software for the R package) for systematic review (McGuinness and Higgins, 2021).

The absence of protocols based on solid principles extracted by neuroaesthetic and neuroscientific studies reporting quantifiable outcomes, even for quantitative studies, may be the basis of some skepticism concerning the efficacy of art therapy in neurorehabilitation. In contrast, neuroaesthetics is mainly investigated in studies on general psychology and on healthy subjects, with a poor interest in its application to art therapy in the broadest sense with translational applications to rehabilitation practice (Babiloni et al., 2014; Di Dio et al., 2016; De Bartolo et al., 2022).

A potential bias of our review is the search for art therapy as a generic term, despite some studies that could refer only to specific types of arts, for example, music therapy or dance therapy. However, we aimed to identify studies with a quantitative approach that may have considered neuroaesthetic principles to develop protocols for art therapy. Another aspect to take into account is that our review was mainly focused on neurorehabilitation due to its direct link to neuroscience.

The main finding of our review is that neurorehabilitation protocols exploit the potentialities of arts in increasing the cognitive and emotional engagement of patients that need neurorehabilitation badly while taking into account neuroaesthetic principles. According to the analyzed literature, art therapy is currently widely used in the care of those patients whose impairment is high, such as patients with severe neurological or psychiatric cognitive impairment, in which a direct approach, such as that required by neurorehabilitation, is not possible. In line with these considerations, further evidence is needed; however, we can argue that the use of art therapy could also help patients who have suffered from motor impairment to manage their mood and improve their participation in neuromotor therapy (Iosa et al., 2021).

In conclusion, this mini-review highlighted a gap between the many different protocols using arts for promoting health in neurorehabilitation and the rigorous findings of the study of neuroaesthetics, which are often lacking in translational applications.

As demonstrated by the risk of bias analysis, quantitative studies also have some limitations. Random sequence generation is not present in most of the included studies (Kim et al., 2008; Kim and Kang, 2013; Agnihotri et al., 2014; Ali and Gammidge, 2014; Cucca et al., 2021; Iosa et al., 2021). This implies that learning from having to repeat the same task may have affected the patient's performance. Future studies should take this aspect into account and provide randomization of the stimuli to keep disturbing variables under control. Similarly, in these studies, randomization between the experimental and control groups was not foreseen (or was not declared). This may have affected the participants' performance and their motivation to participate in an experimental or control group. This latter is not always present (Kim et al., 2008; Agnihotri et al., 2014; Cucca et al., 2021) and usually follows normal conventional therapy (Kim and Kang, 2013; Ali and Gammidge,

2014; Kongkasuwan et al., 2016; Morris et al., 2019), so there is no direct comparison between art therapy vs. non-art stimuli, as reported by Iosa et al. (2021).

Given that arts appear to have the potentialities to increase participation, motivation, and confidence during therapy, a more solid approach, based on neuroaesthetic principles and an objective assessment of the outcomes, could be helpful to empower these results and favor the use of arts for improving patients' health and wellness.

Author contributions

MI conceptualized the review. AO and DDB conducted the literature researches and wrote the first draft of this manuscript. GA and MI revised it providing conceptual contributions.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1158304/full#supplementary-material

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Nursing students' perceptions of spiritual needs at the end of life. A qualitative study

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Spirituality is defined as the meaning of life, being the very essence of life made up of all of the aspects inherent to it. During end-of-life processes, this need is shown to be particularly altered in patients and yet it is an aspect that the health professionals accompanying patients in this situation report being least equipped to address, alongside therapies that could help to meet these needs, such as art therapy. An exploratory qualitative study was conducted, adheres to the guidelines of COREQ (41). The study population were final year students undertaking a nursing degree at the University of Huelva, Spain. The sample was selected via intentional sampling using snowball recruitment from the study population. Stratification according to gender was performed due to the feminised nature of the population. Sample size was determined progressively during the research, with recruitment ceasing at 13 informants once information saturation was achieved. Inclusion criteria required that participants were to be final year students enrolled on a nursing degree who had provided consent to participate voluntarily in the research. The analysis Realized was interpretive phenomenological (IPA) as described by Smith (43–45). The present study revealed that students perceive their training on spiritual care to be deficient. Despite them reporting that they possess the skills and tools to provide end-of-life care, this is not enough to provide effective accompaniment, given that this moment brings them into touch with their own insecurities. Students verbalized the need to learn strategies to address this shortcoming regarding final accompaniment, for instance, through art, with creativity being one of the skills with the potential to uncover the meaning of life.

KEYWORDS

spirituality, coping, end of life, nursing, student nursing, palliative care, mental health, wellbeing

Highlights

- Nursing students place a lot of importance on accompaniment at the end of life, perceiving it to be a factor that attenuates fear and other prevailing emotions during this process contributing, in this way, towards mental wellbeing in the patient.
- Students describe the importance of working in line with the patients' spiritual needs but report not having adequate training to carry this out.
- A patient's spiritual needs at the end of life are related with coping during this process and students do not feel equipped to address this.
- Academic training in the degree of nursing is currently not sufficient to meet the spiritual needs of patients during end-of-life processes and address their mental wellbeing at this stage through art therapy.

1. Introduction

Spirituality has been understood as the search for personal meaning that allows us to deepen our experiences, making our lives meaningful and, therefore, contributing to our happiness. It allows us to understand the world and the essence of things, helping us to understand the meaning of life and the human condition (1). Having defined this concept, it is important to highlight its complexity, emphasising that spirituality is an inherent component of human beings through which people seek meaning, purpose and transcendence, whilst also experiencing relationships with themselves, family, others, the community, society, nature, and that which is meaningful or sacred. Spirituality is expressed through beliefs, values, traditions, rituals, and practices (2). Appraisals concerning spiritual health, spiritual wellbeing and its existential and religious dimensions, allow us to consider the way in which the basic nature of human beings makes us both unique and transcendent. This gives all human beings the capacity to interact with their environment through two-way interpersonal relationships in which strengths and weaknesses are identified, opportunities are provided to grow and strengthen each other, and one is able to recognise, through their spiritual health, the support needed to face end of life processes (3, 4).

The spiritual dimension of human beings has become hugely important in health care in recent years, with more and more studies trying to study this phenomenon (5, 6). The holistic view of care favours the spiritual exploration of the sick person, thus enabling nursing interventions to be made available to address these needs. Spiritual care models are founded on valuing the spiritual dimension and training professionals in palliative and spiritual care so that they are able to listen to patients' fears, dreams and pains and, subsequently, provide terminally ill patients with hope and validation (4, 7).

In order for professionals to care for patient needs regarding spirituality at the end of life, it is essential to deal with death and suffering by seeking an approach that meets the needs of the person and attends to transcendent aspects. Most importantly, an attitude of compassion towards the patient and their family is required, in addition to humility and openness towards understanding aspects of the process that are still little understood. This will enable patients to improve their capacity to help, grow in maturity and promote equity in the environment of suffering (8).

The spiritual care model has its foundations in the biopsychosocial-spiritual model (9) and the patient-centred care model (10), serving as a basis for explaining the main spiritual needs in the end-of-life process (11, 12). As shown in Figure 1, the approach to spiritual needs refers to the need to be recognised as a person, since illness threatens the integrity of the person in different areas: the individual self, the self as part of the family, the self as part of society, etc., and is often accompanied by a biographical rupture. Another need addressed in relation to this dimension is the need to find meaning in one's existence and becoming, in other words, the search for meaning in life and suffering (13).

The need to free oneself from guilt and forgive oneself is another of the needs that should be addressed. Patients often analyse the terminal situation which generates internal conflict and frustration, fostering feelings of guilt. Another need that can be addressed is that of reconciliation, in other words, to feel forgiven. This need is more intense in terminally ill people, as there is a need to reconcile and resolve unresolved issues in order to close the circle of their existence and overcome resentment (14). On the other hand, the need to establish one's life beyond oneself can manifest itself in two ways. The first is openness to transcendence, both ethical and religious, and the second is the need to rediscover a sense of solidarity (10); the need for continuity, for an afterlife. This need can be satisfied through offspring, work, enterprise or any type of achievement that can be relived. Another need that can be addressed is the need for authentic hope (11) and the need to express religious feelings and experiences. This need appears in all cultures and is often independent of the person's religious orientation. Finally, the need to love and be loved is one of the most pressing, as it includes all the other needs mentioned above. This need is of vital importance as clinical experience reveals that, a person who loves and feels loved until the end, can die in peace (6).

The sick person has multiple needs—physical, emotional, social and spiritual—that can be projected through their own creativity and show them the meaning of their life. One way to address this individual dimension is through art therapy as it allows for a creative biographical approach that is particularly valuable at the end-of-life stage.

We have described the need to understand the transcendence of addressing these needs during the accompaniment of the person in the final phase of life or in moments of great vulnerability. The holistic vision of care integrates this approach as the essence of care (15). It is, therefore, necessary for both nursing professionals and nursing students to attend to spiritual needs and contemplate the human being in all of their complexity (16). However, despite the existence of different theoretical nursing models, such as Jean Watson's Theory of Human Caring or Betty Neuman's Systems Model that delve into this phenomenon of balance between body, soul and mind, both groups report a lack of knowledge on how to provide spiritual care (17).

Several authors (18, 19) conclude that end-of-life patients demand the spiritual component of care from professionals but are met with an ineffective response. To this end, it is necessary to improve the university training of nursing students and health professionals who are tasked with accompaniment as part of the final process (20). A study developed with nursing students from Jiangsu University, Zhenjiang, China (21) concluded that we should pay special attention should be paid to psychosocial and spiritual care teaching and

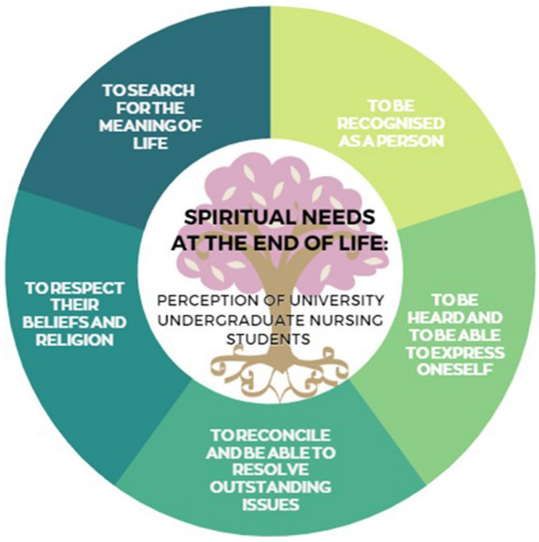

FIGURE 1
Spiritual needs at the end of life: perception of university undergraduate nursing students. Developed by the authors.

preparing students to psychologically deal with the challenges in the process of patient's dying. Coinciding with (22, 23) that affirm the need to address belief and spiritual needs in the academic curriculum of the degree in nursing, as well as ensuring that palliative care nursing is recognised and certified as a specialty in all European countries.

The health benefits of spirituality (24, 25) enable individuals to make beneficial lifestyle changes and become aware of the way in which beliefs, attitudes and behaviours can positively or negatively affect their health. This concept of spiritual well-being can be achieved through creative expressions such as art therapy (26), family rituals, meaningful work and religious practices. In this way, spirituality is configured as a personal tool that allows us to tackle the circumstances that we are faced with throughout life. This makes it a bedrock of intervention strategies delivered by health professionals.

Specifically, nursing requires not only technical skills but, also, skills related to all dimensions pertaining to the being of the person being cared for. It is, therefore, essential to consider the spiritual dimension, especially, in the final stage of life, where unpleasant feelings related to fear and anguish tend to develop (25), making it one of the most altered dimensions in this process (27). In this sense, various studies have shown that nursing plays an important role in coping with death (28–30), understanding the practice of spirituality as an instrument for the transformation and regulation of emotions (31).

Historically, nursing faculties have not been sufficiently aware of the need to address such needs, with the spiritual dimension only being mentioned exclusively in relation to specific subjects, such as palliative care. As interest in issues such as compassion, the helping relationship and spirituality has increased, universities are embracing this new health demand. In consideration of existing research (32–35), the University of Huelva is responding to the need to upskill future nursing professionals by addressing spiritual needs, not only in a conceptual way but, also, by incorporating a spirituality module within the subject of coping with death. The university is, in this way, a pioneer in achieving a holistic approach to care.

In consideration of other studies that have addressed this phenomenon (36–39), the aim of the present study was to uncover nursing student perceptions around spirituality and the way in which it is addressed through their clinical practice. The study will also identify possible areas for improvement, considering a phenomenon that has not yet been addressed, namely, self-knowledge (i.e., how nursing students' own spirituality and search for personal meaning influences the care they provide) as a training need that is intrinsically linked to this concept.

2. Objectives

2.1. General objectives

Explore nursing student perceptions of the competencies needed to address spiritual care at the end of life.

2.2. Specific objectives

- Identify whether training received during nursing degree students is enough to deliver adequate spiritual care during end-of-life processes.
- Identify whether students perceive the need to allude to art as a strategy for addressing patient spiritual needs at the end of life.
- Describe the knowledge, practices and attitudes of nursing degree students with regards to spirituality.

3. Methodology

The objectives proposed by the present study enable the exploration, on the one hand, of the skills of nursing degree students regarding the spiritual component in patients going through the end-of-life process and, on the other hand, of the way in which students experience their own spirituality and how this enables them to accompany patients at this stage of their illness.

An exploratory qualitative study was conducted with a phenomenological approach. An in-depth examination was conducted of the experiences lived by students during accompaniment in end-of-life processes and the meanings attributed to this with respect to spiritual needs. Semi-structured interviews were conducted which enabled greater detail to be gathered from the descriptions given by participants of their experiences (40). The present research adheres to guidelines laid out by COREQ (41).

3.1. Study population

The selected sample was made up of nursing students who had studied palliative care or coping with death. This ensured that all participants had the same baseline regarding training on the issue under study. Initially, a convenience sampling approach was planned to target fourth year (final year) students who had received training

on the end-of-life. Thus, the study was based on the validity and reliability of information provided by the selected population (36) and on the evidence produced by other similar studies (25, 42). In order to be considered for inclusion in the present study, students were required to meet criteria around training, be of adult age and voluntarily sign an informed consent sheet. The present study adhered to international ethical recommendations set out in the Declaration of Helsinki. All personal information provided was stored in compliance with legal requirements for the protection of personal data and the guarantee of digital rights (Organic Law 15/1999 of December 13th 1999 and Organic Law 3/2018 of December 5th 2018).

3.2. Data collection

Informants were recruited through collaboration with a class delegate who performed a leadership role for the project. This role served as a link to connect with potential candidates from which participants were selected and voluntarily agreed to conduct an in-depth interview. Participants were contacted by telephone by a project researcher who was experienced in this technique. After verifying that potential participants met pre-established criteria, they were summoned for interview, which was conducted by a different researcher. Interviews were conducted in a classroom in the faculty of nursing, considered a neutral space.

The entire procedure described above was recorded in field notes by a member of the research team. Interviews lasted a maximum of 70 min and always began with the same main question: do you feel prepared to accompany patients and meet their spiritual needs in the end-of-life process? Responses were not directed with informant freedom of speech being guaranteed. Where necessary, researchers re-centred the interview in line with a previously established interview guide until no new content emerged.

In order to ensure validity and reliability, the entire process of coding and discourse analysis was carried out independently by three members of the research team. One such member was external to the research and participated as a control for contact bias by participating only in data analysis. Discrepancies were discussed until a consensus was reached.

This triple-blinded approach aimed to minimise the implicit bias of physical contact between actors. A total of 13 in-depth interviews were conducted with 12 female students and 1 male student. This reflects the actual gender ratio in the student nurse population. Fieldwork was conducted between October and February 2021.

3.3. Data analysis

The analysis Realized was interpretive phenomenological (IPA) (43–45). The IPA emphasizes the study of personal experiences, focuses on facts that acquire great relevance for those who live them, for this, it formulates questions that suggest an in-depth exploration of the meanings built on these experiences. The stages of the analysis process were performed according to the model described by Smith. First of all the transcripts of the interviews and their reading, the emerging categories that arise from the speeches, the grouping of topics or lines of argumentation, the elaboration of the thematic tables and the writing of results.

Interviews were recorded and transcribed by the research team. These were reviewed on several occasions in order to make a first overall interpretation and to obtain general insights. Next, more in-depth analysis of the transcripts enabled discourse to be associated with student expressions of their lived and felt experiences of spirituality via the identification of codes and dimensions pertaining to common ideas as well as emerging categories.

Repeated use of the same codes-dimensions by different members of the research team (blind analysis) indicated that analysis got to the essence and exposed the meaning of the studied phenomenon.

Methodological rigour was achieved by following requisites for verification, validation and validity described by Meadows and Morse (46). Verification was achieved during the planning and informant recruitment phase, which also included the delegation of tasks to different members of the research team as described above. Validation was achieved through the different methods of data collection (interviews and observation of field notes). Data analysis and coding was done by the most experienced researcher and cross-checked by another team member. Internal validity of the study was achieved by cross-referencing with a research team member who did not belong to the same research group but had expertise in the subject matter.

4. Results

The final study sample at discourse saturation pertained to 13 fourth-year nursing students who had studied the subject of coping with death. Twelve were women and 1 was a man. The average age was 23.30 years. With regard to beliefs, 7 reported being atheists and 6 reported being Christian.

The basis of this research assumes that participants are an essential resource that allow reliable information to be obtained from which their perceptions and experiences in relation to the subject in question can be revealed. Initially, a number of main categories were proposed from the observation of field notes, with further categories emerging following examination of conducted interviews. Initial categories are shown in white, with additional categories emerging from interviews being shown in grey (Table 1).

Following analysis of informant data, eight lines of argument are established as the main bedrock of the discourse. Each of these lines of argument is described using the codes or categories that define them, in addition to quotations extracted from analysis. Shaded sections pertain to categories that emerged from informant discourse.

The first line of argument discusses the need to understand the concept of spirituality perceived by those interviewed. This construct is described as an individual's reason for being (a category emanating from actual discourse) and their search for meaning. It is related with the individual's social and moral network, with having a sense of hope and purpose in life, enabling them to forgive and be forgiven. This coincides with the theoretical construct laid out in Figure 1.

> E5: "*I believe that spirituality is the essence of each person, their reason for being.*"

TABLE 1 Description of analysed categories, codes and number of citations using ATLAS ti.

Dimension	Lines of argument	Codes	Citations
Spiritual care	Spirituality	Reason for being	8
		Meaning	7
		Knowledge and training	8
	Spiritual needs	Expressing their death	6
		Be at peace	6
		Respect	4
		Farewell	3
	Demand for spiritual care	Fear and insecurity	8
		Conversations with patients	7
	Care provision	Abilities	8
		Support	5
		Accompaniment	8
		Art therapy	5
End-of-life and their relationship with spirituality	Sickness and end-of-life	Positive influence	8
		Coping	8
		Greater transcendence	8
Ethical aspects	Religion	Relatedness	8
		Individuals without religious beliefs	8
	Beliefs and family traditions	Respect	7
		Quality care	6
		Coping	4
Aspects that reinforce spirituality	Resilience and reconciliation	Protection	8
		Coping	6
		Wellbeing	5
Obstacles to spirituality	Conspiracy of silence	Spiritual needs	8
		Fear to act	7
		Care challenges	6

Developed by the authors.

> E10: "*For me spirituality is what you are, the meaning that people give to things and how you live your life.*"

As professionals, in order to be able to deliver care in this context it is necessary to count on key knowledge. Such knowledge was considered by those interviewed to be in short supply during university training, with students stating that, although this skill should be developed transversally, it was only tackled as part of an optional module ("coping with death") during the fourth year. As it was not a compulsory module, not everybody opted to take it, meaning that many students finished their studies without any training on this topic.

> E7: "*I have no knowledge whatsoever of how I have to care for or deal with a person's spirituality. It has only been covered in one part of one subject. We should not finish our studies without knowing how to deal with this.*"

> E11: "*Sometimes I have been next to a patient who was leaving us and I have not known how to tell them how I felt, how to express to them that I was there to accompany them, I lack this know-how … we need more specific training to know what the person needs at any given moment.*"

Given that presented, although participants knew how to define the concept, the lack of knowledge made it difficult for them to identify **patients' spiritual needs**. This formed the second line of argument identified by the present study.

In the case of patients who find themselves in terminal situations, the need to be at peace with oneself and others was highlighted, in addition to the need to feel respected throughout the entire process until the moment at which life ends. This demands the ability to express the way in which one wishes to die, making it easier to say goodbye.

> E4: "*Not all professionals have that compassionate outlook that is so necessary. It is necessary to understand what worries the individual: family, money, feeling a burden … so that they can leave in peace, with nothing left to say or do, favouring the process of saying goodbye.*"

The third line of argument, the **way in which patients make spiritual demands**, has a dual nature. On the one hand, those interviewed stated that these demands caused them fear and insecurity, due to them not having the tools and knowledge required to address this spirituality. On the other hand, patients reported feeling a sense of satisfaction at feeling needed by patients. In order to address this need, holistic and comprehensive care should be provided to patients, favouring active listening and the expression of feelings.

> E9: "*I would feel insecure, because I think I am not able to deal with it. I am afraid of the unknown, but surely with the passage of time I would be more confident and so would the patient … then … their days would be better … I think that would be a win–win situation for both parties. Because afterwards that fear would become satisfaction at being able to help them.*"

> E1: "*Talking to the patient alone, telling them that I am not there to judge them or mistreat them, or make them feel bad, but that I am there to help. If that person really has a conflict, talking to them can make them come out and be the one who communicates their concerns to us.*"

In order to address this need, holistic and integrated individual care must be provided. Strategies such as active listening and the expression of feelings should be encouraged.

The nursing interventions alluded to above make up the fourth line of argument, specifically, referring to the **spiritual care offered by**

nursing professionals. Despite being an incredibly broad category, informants emphasised the importance of nursing professionals at the time of perceiving demands from sick individuals for spiritual care. In this sense, informants believed that nurses could offer spiritual care through a variety of abilities such as listening to patients and giving them time to discuss and explore their fears, anxieties and problems. For this, it is necessary to speak with the patients and earn their trust. This enables the patient to discuss their concerns with the nurse, feeling supported by it. Such trust can be earned by accompanying the patient and providing spiritual care. In other words, always taking into consideration what the patient thinks and feels. Types of care provided by nurses that were mentioned included active listening and providing support, encouragement and strength.

> E7: "*Being there, offering them support, being empathetic … often simply listening to them is enough and we manage to make them feel calmer.*"

> E12: "*Have in mind that the spirituality of the patient has quite an influence of accompaniment because, at the end, it is like another aspect in itself of the person, so if you are not considering spirituality, you are leaving a part of their needs "uncovered" and, at the end of the day, nursing tries to cover all needs, whether they are apparent or not.*"

When students were asked about patient care and whether they feel that they manage to instil spiritual harmony in patients through art, most reported the need to avoid unpleasant thoughts by providing patients with options. However, although students showed favourable attitudes towards meeting patient needs and reported a desire to possess the knowledge required to be able to offer quality spiritual care, they do not know how to use techniques to help patients clarify their beliefs and values. Such techniques could include the use of meditation, relaxation and guided imagery; however, students instead tend to rely on other resources drawn from their own experiences.

> E3: "*When I am at university, far away from my home and family, and I feel homesick or melancholic, I start drawing. This makes me feel close to my family, so maybe I would try to give this resource to the person who needs or wants it.*"

It is clear that the satisfaction of patient spiritual needs positively influences coping with illness, emphasising the importance of nursing as a means to satisfying these needs. The **relationship that exists between illness and end-of-life** makes up the fifth line of argument. Over the course of the interviews, it was mentioned that patients' spiritual needs are there throughout their lifetime, however, at the end of life spirituality and these needs take on greater importance, whilst also being different to the needs of an individual who does not know that the end is upon them. In this sense, becoming aware of one's own death allows one to reflect on present needs, which, with the collaboration of health professionals, will try to be covered to achieve the end of life desired by the person.

> E3: "*I think that one's spiritual state has quite an influence, I would change their attitude, their way of seeing things, of communicating with their family, the way of seeing life in a different way and it helps you to try to adapt and accept what you have. If these spiritual needs are covered then one can cope better with illness.*"

This greater intensity in end-of-life situations leads patients to recap all of the stages of their life, which can lead them to experience a lot of pain. In order to manage this, the sixth line of argument refers to **religion** and its relationship with spirituality. Over the course of the interviews, it was reflected that students were aware of an existing relationship between both of these aspects, mentioning that religion is included as one of the spiritual needs that can be present in patients. These students commented that nurses should be able to provide spiritual care by arranging meetings with the hospital chaplain, priest, pastor, rabbi or spiritual leader, where relevant to the patient.

> E1: "*For many people, spirituality and religion go hand in hand, thinking that when they die they will go to a better world, that they will be with relatives, that God will protect them….*" *I think that can help a lot of people to cope with problems and … whatever comes their way in life.*"

A distinction is therefore made between the two terms, transcending spiritual care beyond religion and also being applicable to atheists and agnostics.

> E11: "*Spirituality is a very broad concept, you can be spiritual and an atheist. It is achieving internal harmony through the things that make you happy and one of those things may or may not be religion.*"

Besides religion, other important aspects in the lives of individuals exist that are related with spirituality, such as **beliefs and family traditions**. These aspects make up the seventh line of argument. Our family heritage at birth configures a set of values, life principles and norms, beliefs and traditions, as a part of our ancestral setup. Family is a unique space characterised by acceptance and love for those who enter it, giving members a sense of belonging. Each family member plays an important role as life plays out. Informants agreed that keeping in mind and respecting these beliefs and family traditions would enable better accompaniment of the ill patient, making it possible for them to deliver quality nursing care. The majority believe that nurses are capable of delivering spiritual care whilst respecting patient privacy, dignity and religious and cultural beliefs.

It was mentioned that all of these aspects lead to better coping with illness, which will lead to the satisfaction of spiritual needs within the individual.

> E4: "*I believe that they have a big influence because it is what has formed you as a person and sharing that with your family means that they person lives better … because if you do not respect these traditions or beliefs, then the person will not be well cared for or attended … so then it would be useful if we knew what these traditions or beliefs are to be able to respect them and for the patient to feel better … because if we do not do that then spirituality will end up being compromised.*"

The eighth line of argument refers to **resilience and reconciliation** and the way in which these affect spirituality. The former term is taking on increasing importance with regards to the maintenance of good health and psychological wellbeing in an ever more dynamic and

challenging environment. Resilience shields mental health during times of sickness, enabling sickness to be overcome and leading to better spiritual wellbeing in the patient.

> E1: "*Resilience is … constant and personal growth, knowing how to recognise when something that affects you can happen again and you learn from the situations you are given in life. I think it's very important because it makes you learn from problems and be able to help deal with them and solve them in a better way … or in the most positive way you can.*"

With regards to reconciliation with one's own issues, in other words, forgiving and being forgiven, this is one of the most important needs to arise in end-of-life patients. Due to the proximity of death, the need to reconcile with themselves, resolve pending issues, bring an end to the circle of their existence and overcome resentment becomes more urgent. Over the course of the interviews, aspects were mentioned such as saying goodbye, which is perceived as an indispensable part of reconciliation. Further, family is held in high esteem, given that reconciliation allows relatives to be more at peace, whilst the individual themself can also be more at peace with themselves, achieving wellbeing.

> *E5*: "*Reconciliation is going to help them leave more at ease, thinking that they have solved the problem they were worried about. It allows you to leave in peace, satisfied.*"

Nonetheless, the expression of feelings and resolution of outstanding conflicts is not always favoured, as patients sometimes fall into a **conspiracy of silence**. This forms the ninth and final line of argument. Informants were all in agreement that the conspiracy of silence negatively impacts the accompaniment provided by professionals. It causes professionals to tread carefully out of fear when dealing with patients and impedes them from delivering quality care. In addition, this argument reasons that the conspiracy of silence prevents spiritual needs from taking on greater importance and, likewise, stops these needs from being met.

> E9: "*If you want to help someone to die well, peacefully, and that person is not aware of what they have and what is happening to them, that's a pretty big bump in the road. If you are not taking spirituality into account, you are leaving a part of their needs "unmet.*"

This causes professionals to act with fear of approaching the patient, not knowing what to say or do, and prevents quality care from being carried out.

> E8: "*Professionals already tread with the fear of … thinking about what they have said, what they have not … because the patient is going to ask you questions and you have to take a bit of a step back. The professional is not going to know how to manage this and in reality, what it does is affect the patients themselves more … and it is going to mean that we cannot provide them with sufficient care or the care that they really need.*"

Students also refer to the fact that it prevents spiritual needs from taking on real importance and, therefore, prevents them from being met.

> E4: "The patient, not having all the information, does not know what is happening to them, does not know if they will survive or not…. This prevents the development of that spirituality, makes it difficult for their needs to be met. Because your needs, knowing that you are going to die, may be different. The patient must have complete information so that they themselves can know how they feel, what they need and what they want."

5. Discussion

End-of-life accompaniment must include care that is focused on patient spiritual needs, in such a way that the patient also perceives their needs to be met in the process. Various authors (14–16, 29–31) agree that tackling the end-of-life by considering spiritual needs through care or different strategies, such as art therapy, lead to better acceptance of the severity of illness. Patients who feel accompanied on a spiritual level recover their dignity and this, at the same time, influences family wellbeing (18, 19). This idea coincides with perceptions reported by the study sample, from which it was observed that those who verbalise the importance of meeting this need, did not consider equipping themselves with specific training until the time of end-of-life, nor did they consider informing themselves about the different therapies used to tackle this process, such as art therapy (47).

With regards to the main aim of the present research which was to identify student perceptions of spirituality and its care, students described the difference between the concepts of spirituality and religion. They referred to the more clinical acceptance of these terms and highlighted that it is possible to provide spiritual care to individuals regardless of their faith. In accordance with that reported by authors such Fernández et al. (48), the present study identified that it is common practice to combine the two concepts of spirituality and religion as a single reference to the same patient need, particularly, in the final moments of life when patients cling to their beliefs, whether they are religious or not. A study carried out in universities in Portugal and Brazil (49) again agree on the need to address these differences with students; both groups of students (Portugueses and Braziliam) indicated they should be prepared to address religiosity and spirituality with patients, that these subjects should be included in the curriculum and that they were not properly prepared to address spiritual issues.

Students identified the need to respect the beliefs and decisions of individuals, together with the need to be able to provide solutions to clarify any confusion that patients may have in this process in order to provide them with an end that is adapted to their needs.

Informants described the skills required to address spirituality at the end of life. In accordance with various authors (50–54), they highlighted the importance of working on compassion, listening, empathy, respect and worry. This will enable a climate of trust to be established between the nurse and the patient, leading to a greater degree of satisfaction in patients and families. The study sample referred to not addressing this need due to the fear it caused them and not having the necessary tools. In addition, they referred to the need for more training on these abilities, alongside diverse strategies to work with these patients during this phase, such as art therapy (47).

Given the need for more training was reflected in the discourse of all participants, leading to information saturation by the fourth interview, a dimension was included that pertained to having enrolled

on the optional module, Coping with Death, as part of the nursing degree at the University of Huelva. This generated responses that touched on the capacity to deliver accompaniment characterised by compassion and listening, in addition to the development of greater creativity (art therapy) at the time of conducting interviews with patients who found themselves at the end of life and their families. Reference was also made to projects carried out during the development of the subject as a facilitating factor in the acquisition of these competences. This coincides with the research developed by Cano and Sáenz Castro (54) in which the realization of research projects in the classroom were an alternative that allowed the development of higher thinking skills, as well as learning for life and values to accompany in the final process.

Students were aware of the importance of spirituality, although discourse evidenced a lack of training on the topic and a failure to tackle the issue through the academic nursing degree course (in the case of those who had not enrolled on specific training). Participating students emphasised the need to modify what was on offer academically through modules focused on end-of-life care. This is supported by findings reported by Bennet and Thompson (55), from a study conducted with students from the University of Liverpool in the United Kingdom.

Present findings describe the way in which students who have received specific end-of-life training recognise the importance of accompanying patients during the final process, helping them to resolve pending issues and overseeing mediation with relatives to ensure dignity during this stage given that it forms part of their final wishes in relation to their spiritual needs. This argument emerged over the course of interviews and has also been highlighted by authors such as (33, 34, 36, 37). Students reported a need for professionals to be equipped with tools that allow patients to be able to reconcile themselves with their personal affairs, recognising the huge magnitude of this need when it comes to enabling a "good death," in addition to enabling families to cope and grieve in a more positive way.

The present study coincides with previously conducted research (47, 56), with regards to identification of factors such as the conspiracy of silence (53). This factor acts to prevent health professionals and students from delivering quality end-of-life care, leading to deficient accompaniment. This will mean that the spirituality and spiritual needs of the individual receiving care will be compromised. The sick person themselves, their family and implicated professionals face serious challenges when it comes to speaking openly about spiritual needs given that these are associated with imminent death. Nonetheless, when the opportunities to communicate are available, both the sick person and their relatives can be at peace and find a serenity that is wholly comforting (57). For this reason, participating nursing students considered it important to be able to obtain the tools needed for professionals to be able to talk with the patient and their families. Such communication enables an agreement to be reached around the information that both sides would like to receive, emphasising the importance of this for coping with the process and, in this way, benefitting the spiritual state of the patient.

The present sample emphasised the value of accompanying patients in this process. In fact, some of the discourse recorded identified this as an attenuating factor when it comes to fear of the unknown. This finding coincides with those reported in other studies (30, 31). These authors identified spiritual care models as providing a reference framework through which health professionals can connect with their patients, listen to their fears, dreams and pains, collaborate with their patients as allies in their care and provide, via the therapeutic relationship, the chance for healing. Canteros (58) in a recent study by the University of Chile concludes as spiritual accompaniment provides comprehensive and holistic healthcare, which generates multiple clinical benefits, humanizing and dignifying health care. Thus, accompaniment creates the required climate of trust between the professional and patient for enabling the type of physical and psychological comfort which allows the end of life to occur with dignity.

6. Limitaciones

To minimize investigator bias, COREQ (41) criteria were used.

The use of the snowball selection method could have introduced bias, however, new topics—emerging categories—were identified from the data, adding meaning to the data confirmed by the conceptual framework, this gives us security of the heterogeneity of the discourse analyzed.

The students subject to study are trained in a subject where spiritual needs are addressed, that may imply the competences described in some of the results, probably not coinciding in other populations where this specific training is lacking, although this characteristic has been taken into account throughout the content analysis and in the description of the findings.

7. Conclusion

The present study enabled identification of the deficient training received by nursing students on spirituality, despite the fact that they perceive themselves to have the necessary skills and tools to address it (empathy, presence, active listening, compassion). At present, nurses report acquiring their skillset from the training received from the academic course. Students verbalise the need to learn strategies for approaching end-of-life accompaniment through art therapy. Creativity is a manifestation of the inner harmony of human beings that allows connections to be formed with oneself and others. This ability allows individuals to get in touch with the meaning of life.

However, for some professionals who accompany people in their end-of-life process, a relationship is established that favours addressing spiritual needs despite the lack of specific training on spirituality. This is due to the therapeutic relationship established with the vulnerable patient and the innate need of the professional to accompany in a compassionate way.

The particularity of this accompaniment allows some professionals to develop innate skills such as presence, respect for silence (favouring introspection of the accompanied person), active listening, compassion and, even, the promotion of moments of relaxation despite not having been trained to do so. All of these skills make it possible to continue accompanying the vulnerable person in a better way during times of suffering. At the same time, it provides professionals with strategies to identify their own spiritual needs and become aware of their existential inner world in order to provide spiritual care.

The present study provides evidence of the need for training in these aspects, not only with regard to spirituality but, also, with regards to end-of-life care.

In relation to the implications of the study, it is important to consider a greater focus on how practice and school can collaborate for the best learning outcome and how nurse managers can play an active role in this.

The priorities identified here should be used to guide future spiritual care research and clinical and educational initiatives.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee PPEIBA, government of Andalusia, Spain (protocol code 01/2020 CEPP and date of approval 18/01/2020). The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

EG-N was responsible for coordination, study design, analysis, data interpretation, and writing of the manuscript. SN participated in fieldwork, study design, analysis, data interpretation, and writing of the manuscript. EG-N, SN, LS, HJ, MC-T, and ÁO-G, participated in data interpretation and writing of the manuscript. All of the Spanish researchers participated in the translation of the interview guide and interview delivery. The international team (LS and HJ) conducted the double-blind analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2023.1132581/full#supplementary-material

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The effect of group art therapy on acculturative and academic stress of Chinese graduate students in South Korea

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Background: Research has shown that international students, specifically Chinese graduate students in South Korea, are vulnerable to stress and depression because of various factors. These include environmental changes, economic constraints, interpersonal difficulties, discrimination, and cultural conflict.

Objective: This study investigates the effectiveness of group art therapy in reducing acculturative stress and academic stress among Chinese graduate students in South Korea.

Method: Thirty participants were recruited and randomly assigned to the experimental ($n = 15$) and control groups ($n = 15$). The experimental group received eight 120-min sessions of group art therapy. Both groups were tested for acculturative stress (perceived discrimination, homesickness, perceived hate, fear, stress due to change/culture shock) and academic stress (schoolwork stress, future stress, social stress, living environment stress) before and after the art therapy intervention. Results were compared using the Mann–Whitney U test and the Wilcoxon signed-rank test.

Results: The results showed that there was a significantly greater reduction in acculturative and academic stress in the experimental than the control group.

Conclusion: Group art therapy can provide psychological and emotional support to international students studying abroad.

KEYWORDS

art therapy, Chinese students, South Korea, acculturative stress, academic stress, study abroad

1. Introduction

With the rapid development of globalization, exchanges between countries are becoming increasingly active. Since the establishment of diplomatic relations between China and South Korea in 1992, there has been continuous communication between the nations in politics, economics, culture, education, and other fields (Luo, 2022; Yang, 2022). According to a survey conducted by the Korean Educational Statistics Service (2022), there are 166,892 foreign students residing in South Korea, of which 67,439 (40%) are Chinese students.

However, Chinese students who come to South Korea to obtain a degree often face difficulties in adapting to university life due to their insufficient language ability, differences in beliefs and mindset, and lack of adequate assistance in academic and daily life (Zhao and Lee,

2018; Qiao, 2020; Song et al., 2020). The representative challenge faced by Chinese graduate students in South Korea is communication difficulty due to language barriers. In addition to studying the academic subjects, they also have to learn the Korean language and culture, which adds to their academic burden.

The depression, anxiety, and mental stress experienced by students in dealing with school life and academic requirements can be defined as a state of psychological maladjustment (Kim et al., 2014; Shin et al., 2017). When academic pressure exceeds personal abilities, it causes psychological strain and social isolation, leading to maladjustment and ultimately depression (Rice et al., 2016; Zhao, 2016). Indeed, Chinese graduate students who leave their homeland for South Korea with aspirations for academic achievement experience various difficulties in the adaptation process. In leaving the familiar cultural circle and during the early stages of their study in South Korea, these students generally experience emotional and physical stress, academic maladjustment, as well as environmental, linguistic, and dietary discomfort (Hu, 2011; Hoang, 2021). Economic burdens, difficulties in interpersonal relationships, family expectations, and complexities in self-identity formation also increase the cultural adaptation pressure on international students, leading to psychological stress (Xu, 2021). Thus, Chinese graduate students in South Korea face psychological burdens and inconveniences in daily life due to environmental and role changes, identity confusion, discrimination, and cultural conflicts (Park et al., 2010; Lee and Yoo, 2022).

Culture adaptation pressure can cause negative impacts on mental health, day-to-day functioning, and overall well-being and is accompanied by the following: physical, psychological, and social confusion; anxiety; depression; alienation; serious physical symptoms; and identity confusion. A study conducted with Chinese students visiting school counseling centers showed that 50% of them were in a state of depression, mainly due to cultural adaptation pressure and academic pressure (Zhao, 2016). In addition, various research collectively indicate that there is a meaningful connection between the cultural adaptation difficulties of Chinese students in South Korea and the academic pressure they feel, including the following: empirical surveys on Chinese students in South Korea (Park, 2009; Yang, 2013; Kang and Ko, 2019); qualitative studies on Chinese graduate students' adaptation to university life in South Korea (Park et al., 2010; Lee, 2012; Lee and Kim, 2015; Kim and Yoon, 2017); studies on the relationship between cultural adaptation pressure, academic pressure, and adaptation to university life as a single variable (Kim, 2007; Kim Y. K. 2010; Park et al., 2010). Foreign students who experience cultural adaptation and academic pressure tend to develop mental health problems such as anxiety or depression (Koung, 2010; Zhao et al., 2023). Moreover, like native Korean students, upon graduation, Chinese students will also be expected to play their roles as productive and responsible members of the society they settle down into. Therefore, their psychological and emotional well-being is not only important for themselves but also for the entire society.

Art therapy can be used as a nonverbal method to assist language-deficient international students from China to adapt to the Korean culture and achieve academic success. By offering a space for free exploration and creative work, art therapy can provide the following: facilitate the expression of things that are difficult or impossible to articulate in words; evoke numerous defense mechanisms; induce responses that may be ambiguous or confusing (Rubin, 1984; Greenberg, 2017). Thus, art therapy and art making can serve as effective means of emotional expression for individuals with emotional or psychological difficulties, including those who have difficulty expressing their emotions directly (Wadeson, 1987; Malchiodi, 2005). By stimulating internal group interactions, art therapy delivers a platform for people to discuss life issues and improve their interpersonal relationship skills (Park, 2020), then reducing academic stress and deepening life satisfaction (Kim, 2022). Cho (2022) showed that painting-centered group art therapy can help foreign students enhance their self-awareness and expression, increase intimacy within the group, reduce stress in the community, and improve quality of life. These previous studies collectively suggest that group art therapy has a positive impact on reducing stress. However, no researcher thus far has examined group art therapy application to alleviate cultural adaptation and academic stress among Chinese graduate students in South Korea.

This evokes the need for research attempting to verify whether group art therapy can reduce the acculturative and academic stress commonly faced by Chinese graduate students in South Korea. Accordingly, in this study, we hoped to propose a group art therapy intervention that helps to alleviate the physical and psychological stress experienced by these students, specifically through encouraging them to engage in a therapeutic creative activity in a supportive environment. We expected that this could help them cope with the acculturative and academic stress that they experienced. We also conducted this study in the hopes to lay the foundation for the development of effective group art therapy programs applicable to real clinical settings for Chinese graduate students in South Korea. To confirm the effectiveness of group art therapy on acculturative stress and academic stress in this population, the following research questions were tested.

Research Question 1: Does group art therapy affect the acculturative stress of Chinese graduate students in South Korea?

Research Question 2: Does group art therapy affect the academic stress of Chinese graduate students in South Korea?

2. Research method

To recruit participants for the experiment, the background and purpose of the study were posted on a network chat software (WeChat) used by Chinese graduate students in South Korea. The recruitment period for participants was from March 20 to April 20, 2022, and applications from voluntary participants were received *via* the researcher's WeChat or email. After the announcement ended, 30 applicants who met the recruitment criteria were selected for the study. The criteria for participation included enrollment in a degree program in Korea, being raised and born in mainland China, experiencing acculturative and academic stress, and the ability to participate in eight face-to-face sessions of group art therapy. The recruited participants were randomly divided into an experimental group of 15 and a control group of 15.

A survey questionnaire was distributed to investigate participants' general demographic characteristics (Table 1). Results of an analysis of these characteristics showed that, regarding biological sex, there were 10 men (66.7%) and 5 women (33.3%) and 12 men (80.0%) and 3 women (20.0%) in the experimental and control groups, respectively. Regarding residency in South Korea, in the experimental group, 4 participants (26.7%) had stayed for less than 12 months and 11 participants (73.3%) had stayed for more than 12 months in the country; in the control group, the corresponding numbers were 6

TABLE 1 Demographic characteristics of participants.

Domain	Area	EG (n = 15)		CG (n = 15)		Total	
		n	%	n	%	n	%
Sex	Male	10	66.7	12	80.0	22	73.3
	Female	5	33.3	3	20.0	8	26.7
Residency in South Korea (months)	< 12	4	26.7	6	40.0	10	33.3
	≥ 12	11	73.3	9	60.0	20	66.7
TOPIK level	Under 2	12	80.0	10	66.7	22	73.3
	Over 3	3	20.0	5	33.3	8	26.7
Major	Arts	10	66.7	2	13.3	12	40.0
	Natural Sciences	5	33.3	5	33.4	10	33.3
	Humanities and Social Sciences	0	0.0	8	53.3	8	26.7
Degree	Bachelor and Master's degree	7	46.7	4	26.7	11	36.7
	Doctorate	8	53.3	11	73.3	19	63.3

EG, experimental group; CG, control group.

(40.0%) and 9 participants (60.0%), respectively. Thus, the control group had a closer balance of newer and older residents.

In terms of TOPIK (Test of Proficiency in Korean) level, in the experimental group, 12 participants (80.0%) had a level below 2 and 3 participants (20.0%) had a level of 3 or higher; among the 12 students with a level below 2, 10 students (66.7%) did not have a TOPIK level, which is a relatively high percentage. In the control group, 10 participants (66.7%) had a level below 2—9 of which (60.0%) did not have a TOPIK level—and 5 participants (33.3%) had a level of 3 or higher. In terms of academic degree, there were 7 master's degree students (46.7%) and 8 doctoral students (53.3%) in the experimental group, and 4 master's degree students (26.7%) and 11 doctoral students (73.3%) in the control group. Thus, more than half of the participants in both the experimental and control groups were doctoral students.

2.1. Measurement instrument

The Acculturative Stress for International Students (ASIS) and Academic stress scales were administered individually to participants 1 week before the start of the project and again upon completion of the program.

2.1.1. Acculturative stress scale

Originally designed by Sandhu and Asrabadi (1994) and modified by Lee (1995) to evaluate the cultural adaptation stress of international students in South Korea, this study used the modified version of the Acculturative Stress for International Students (ASIS) scale to assess acculturative stress. The modified self-assessed 24-item scale ("cultural adaptation stress scale") measures the following seven sub-factors of acculturative stress: "perceived discrimination" (9 items), "homesickness" (3 items), "perceived hate/rejection" (5 items), "fear" (4 items), "stress due to change/culture shock" (3 items). Each item is self-assessed using a 5-point Likert scale, with higher scores indicating higher levels of stress. The results of the reliability test of the acculturative stress scale are shown in Table 2.

TABLE 2 Sub-factors and reliability of the cultural adaptation stress scale.

Sub-factors	Item identifier	Number of items	Cronbach's α
Perceived discrimination	3, 7, 8, 10, 12, 14, 17, 19, 21	9	0.842
Homesickness	1, 5, 24	3	0.688
Perceived hate	4, 11, 15, 18, 23	5	0.745
Fear	6, 13, 20, 22	4	0.787
Stress due to change/culture shock	2, 9, 16	3	0.758
All	24		0.923

In this study, the overall reliability of the acculturative stress scale was 0.923, and that of its sub-factors were 0.842 ("perceived discrimination"), 0.688 ("homesickness"), 0.745 ("perceived hate/rejection"), 0.787 ("fear") and 0.758 ("stress due to change/culture shock").

2.1.2. Academic stress scale

In previous studies, Oh and Cheon (1994) developed an academic stress questionnaire, Chon et al. (2000) developed a life stress questionnaire, and Kim (2018) supplemented both these questionnaires with language suitable for college students in order to create a modified scale to assess academic stress. This scale created by Kim (2018) was then translated into Chinese by Li (2019), and Li's (2019) scale was the one used in the current study for assessing academic stress.

This self-assessed 23-item scale comprises four sub-factors, as described herein: "schoolwork stress" (9 items), "future stress" (5 items), "social stress" (5 items), and "living environment stress" (4 items). Each question was answered using a 5-point Likert scale, with higher scores indicating greater academic stress.

Reliability checks were conducted on the collected data, and results are shown in Table 3. In this study, the overall reliability of this scale was 0.879, and the reliability of each sub-factor was as follows:

TABLE 3 Sub-factors and reliability of academic stress scale.

Sub-factors	Item identifier	Number of items	Cronbach's α
Schoolwork stress	1, 2, 3, 4, 5, 6, 7, 8, 9	9	0.655
Future stress	10, 11, 12, 13, 14	5	0.752
Social stress	15, 16, 17, 18, 19	5	0.766
Living environment stress	20, 21, 22, 23	4	0.792
All	23		0.879

0.655 ("schoolwork stress"), 0.752 ("future stress"), 0.766 ("social stress"), and 0.792 ("living environment stress"). All questions showed an appropriate level of reliability.

3. The Group Art Therapy Project

3.1. Design model of the Group Art Therapy Project

To determine the impact of group art therapy on cultural adaptation stress among Chinese graduate students in South Korea, this study conducted a pretest on the experimental and control groups. Only the experimental group received group art therapy. Subsequent tests were conducted on both the experimental and control groups, as shown in Table 4.

The Group Art Therapy Project was conducted from June 4 to June 28, 2022, on Tuesdays and Saturdays at 2 p.m. for a total of 8 sessions. Considering translation time and group size, with the agreement of group members, each session lasted approximately 120 min. To ensure the safety of participants, the group art therapy was conducted in a classroom in a university located in South Korea.

In selecting the art therapist for the Project, a professional with a master's degree in Art Therapy and more than 8 years of experience in group therapy was chosen. An expert who has provided art therapy for multicultural clients for several years also verified the project. During the project sessions, a Chinese translator was present to support the communication between the participants and the art therapist. With the consent of the participants, the researchers also participated as observers.

3.2. Project content

This study aimed to demonstrate the effectiveness of group art therapy in reducing cultural adaptation stress and academic stress among Chinese graduate students in South Korea. Thus, the therapy focused on stabilizing emotions, expressing emotions and thoughts, and reducing stress related to cultural adaptation and academic pressure. Additionally, the therapy aimed to help students understand and develop themselves through art. The process of the Group Art Therapy Project is briefly presented in Table 5.

The Project consisted of three phases within total of eight sessions, namely the initial (session 1 and 2), intermediate (session 3–6), and final periods (session 7–8). In the initial phase, a sense of closeness was formed between participants, generating interest in art therapy and guiding them towards self-expression. In the intermediate phase, participants explored their negative emotions, cultural adaptation stress, and academic stress, showing self-awareness and suppressed emotions. Additionally, through collective resonance and support, the recognition of external and internal resources was encouraged. In the final phase, participants formulated concrete future plans through self-identification and acceptance, focusing on the formation of a positive self-image and a strategy to overcome stressful situations in the future. Examples of the products of art produced in each session are presented in Figure 1.

TABLE 4 Study design model.

Group	Pretest	Experimental treatment	Posttest
EG ($n = 15$)	Q1	X	Q2
CG ($n = 15$)	Q3	–	Q4

EG, experimental group; CG, control group; Q1 and Q3, pretest (acculturative stress, academic stress); X, eight sessions of group art therapy; –, control group with no treatment; Q2 and Q4, posttest (acculturative stress, academic stress).

In each stage of the Group Art Therapy Project, during the introduction step, participants greeted each other and conversed about their current mood. In the execution step, the background, purpose, and sequence of the program were explained. At this point, the therapist first demonstrated or explained the assignment. If additional assistance was required, the researchers played the role of assistant therapists. After the program ended, participants introduced their work and shared their thoughts and feelings on each other's combined work.

3.3. Data analysis

SPSS version 26.0 was used in all analyses. First, we verified the reliability of both scales used in this study through internal consistency reliability (Cronbach's α). Second, to check the homogeneity of the experimental and control groups before program implementation, a Mann–Whitney U test was performed. Third, to investigate differences in the scores of the two groups regarding acculturative stress and academic stress between pretest and posttest, a Wilcoxon signed-rank test was performed.

3.4. Ethical consideration

The therapy activities and data collection procedures of this study were approved by the relevant institution review board (JJ IRB-220421-HR-2022-0407). This paper is a modified version of part of a doctoral dissertation (Yin, 2023).

4. Results

4.1. Changes in acculturative stress

4.1.1. Homogeneity verification for adaptation stress

We investigated the homogeneity of cultural adaptation stress scores between groups before project implementation using Mann–Whitney

TABLE 5 Process of group art therapy.

Phase	Session #	Theme	Purpose
Initial period	1	Self-introduction activities	– Self-introduction and formation of group cohesion.
	2	The culture I have lived in	– Awareness of the nature of culture. – Share experiences with group members and receive emotional support.
Intermediate period	3	Difficulties I encountered	– Expression of conflict between culture and personal nature. – Share the difficulties in the process of cultural adaptation.
	4	Five facial expressions	– Recognize feelings and express them.
	5	The wall in front of me	– Emotional expression and empathic experiences of academic stress. – Improve problem-solving skills to relieve academic stress.
	6	The miracle question of Aladdin's lamp	– Exploration of inner desires and their manifestation. – Share experiences with others about desire for support and receiving support.
Final period	7	The card that represents me	– Pursue life and self-image expression. – Internal resources to explore and motivate goals.
	8	A gift box for me	– Inner positive self-image.

U test (Table 6). At pretest, the difference between groups for the total score of cultural adaptation stress was non-significant ($p = 1.000$), and the differences between groups in the scores for all sub-factors were also non-significant, as follows: "perceived discrimination" ($p = 0.917$), "homesickness" ($p = 0.131$), "perceived hate/rejection" ($p = 0.148$), "fear" ($p = 0.061$), and "stress due to change/culture shock" ($p = 0.645$).

The mean scores for cultural adaptation stress and its sub-factors were higher in the experimental group than in the control group, but these differences were not statistically significant ($p > 0.05$). These results suggested homogeneity between groups for cultural adaptation stress.

4.1.2. Pretest and posttest score differences for cultural adaptation stress

To assess the effect of group art therapy on cultural adaptation stress, we compared differences between pretest and posttest scores for both groups using Wilcoxon signed-rank test. We also compared the posttest scores for cultural adaptation stress between groups (Table 7).

In the experimental group, the total score for cultural adaptation stress decreased significantly from pretest to posttest (pretest, 3.53; posttest, 1.70; $p < 0.01$). The decrease was similarly significant for all sub-factors, namely "perceived discrimination" (pretest, 3.27; posttest, 1.58; $p < 0.01$), "homesickness" (pretest, 4.09; posttest, 1.91; $p < 0.01$), "perceived hate/rejection" (pretest, 3.60; posttest, 1.80; $p < 0.01$), "fear" (pretest, 3.63; posttest, 1.65; $p < 0.01$), and "stress due to change/culture shock" (pretest, 3.47; posttest, 1.73; $p < 0.01$; Table 8).

In the control group, the total score for cultural adaptation stress increased non-significantly from pretest to posttest (pretest, 3.21; posttest, 3.60; $p > 0.05$). The increase was similarly non-significant for all sub-factors of "perceived discrimination" (pretest, 3.21; posttest, 3.48; $p > 0.05$), "homesickness" (pretest, 3.60; posttest, 4.00; $p > 0.05$), "perceived hate/rejection" (pretest, 3.20; posttest, 3.63; $p > 0.05$), "fear" (pretest, 2.93; posttest, 3.55; $p > 0.05$), and "stress due to change/culture shock" (pretest, 3.20; posttest, 3.58; $p > 0.05$).

Thus, the Group Art Therapy Project significantly reduced cultural adaptation stress in the experimental group, but not in the control group. This suggests the positive impact of the therapy project on reducing cultural adaptation stress among Chinese graduate students in South Korea.

Upon comparing posttest scores for cultural adaptation stress between groups, we observed that the scores for all sub-factors and total score were significantly lower in the experimental than in the control group ($p < 0.01$). This once more suggests that the Group Art Therapy Project had a more positive impact on the total score and scores for all sub-factors of cultural adaptation stress in the experimental than in the control group, and the effect was significant.

4.2. Changes in academic stress

4.2.1. Homogeneity verification for academic stress

Again, we tested the homogeneity of academic stress scores in the groups before project implementation. At pretest, the difference between groups for the total score of academic stress was non-significant ($p = 1.000$), and the differences between groups in the scores for the sub-factors of academic stress were also non-significant, as described herein: "schoolwork stress" ($p = 0.454$), "future stress" ($p = 0.546$), "social stress" ($p = 0.646$), "living environment stress" ($p = 0.573$; Table 9).

The mean scores for academic stress and its sub-factors were higher in the experimental group than in the control group, albeit the difference between groups was non-significant ($p > 0.05$). These results suggested homogeneity between groups for academic stress.

4.2.2. Pretest and posttest score differences in academic stress

Wilcoxon signed-rank test was used to verify differences between pretest and posttest scores for academic stress in both groups. We also compared posttest scores for academic stress between groups (Table 10).

In the experimental group, the total score for academic stress decreased significantly from pretest to posttest (pretest, 3.86; posttest 2.05; $p < 0.01$). The decrease was also significant for all sub-factors of academic stress, as follows: "schoolwork stress" (pretest, 4.25; posttest, 2.28; $p < 0.01$), "future stress" (pretest, 4.07; posttest, 2.07; $p < 0.01$), "social stress" (pretest, 3.19; posttest, 1.80; $p < 0.01$), "living environment stress" (pretest, 3.58; posttest, 1.83; $p < 0.01$).

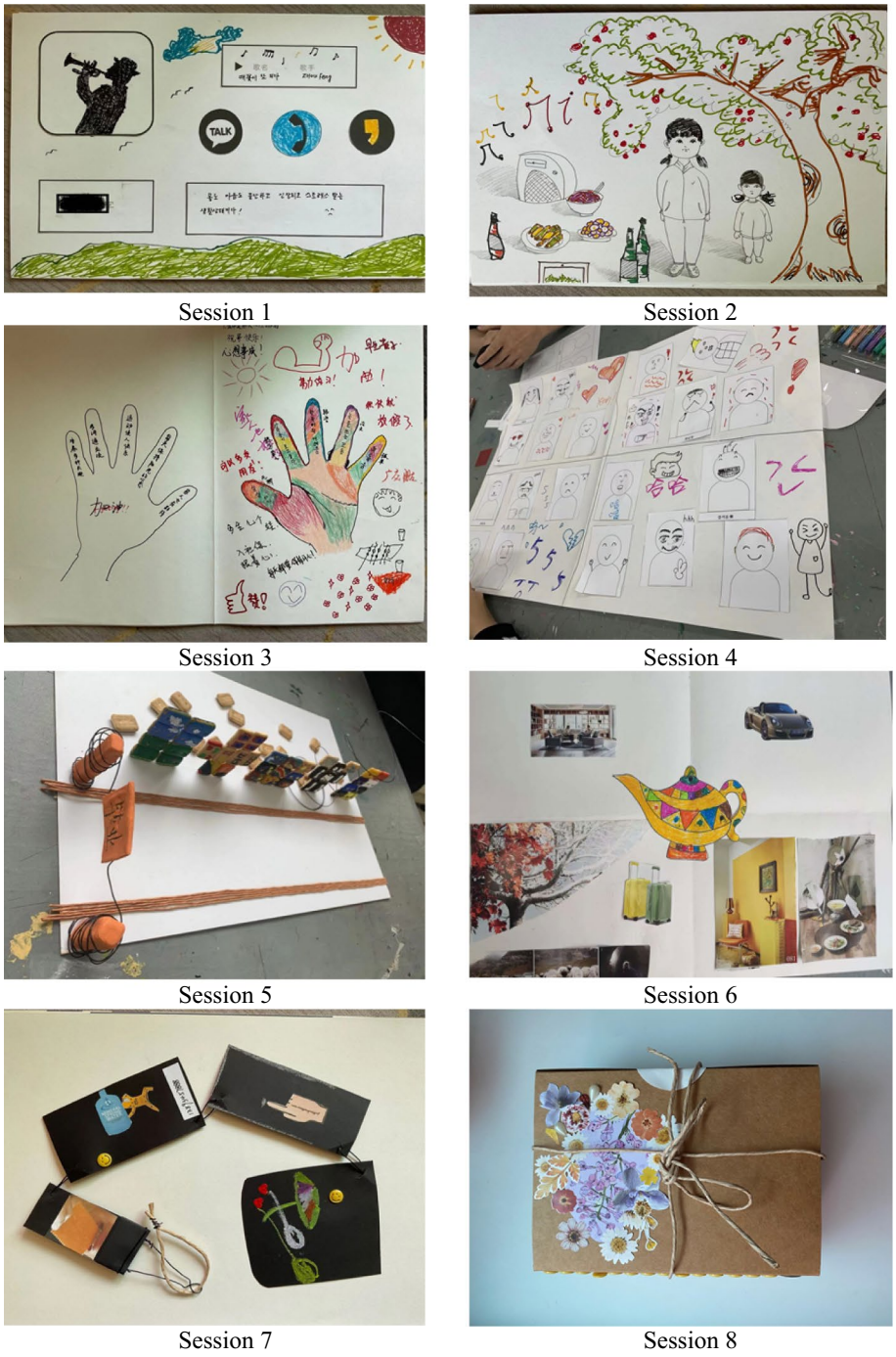

FIGURE 1
Representative art products of each session of the Group Art Therapy Project.

In the control group (Table 11), the total score for among the academic stress decreased significantly from pretest to posttest (pretest, 3.59; posttest 3.69; $p < 0.01$). the changes in the scores for the sub-factors of academic stress from pretest to posttest were all non-significant, and as follows: increased for "schoolwork stress" (pretest, 3.96; posttest, 4.04; $p > 0.05$), "social stress" (pretest, 2.93; posttest, 3.17; $p > 0.05$), and "living environment stress" (pretest, 3.40; posttest, 3.67; $p > 0.05$); decreased for "future stress" (pretest, 3.75; posttest, 3.51; $p > 0.05$).

Thus, the experimental group experienced a significant decrease in academic stress, while the control group experienced a non-significant change for this variable. These findings suggest that group art therapy has a positive effect on reducing academic stress in Chinese graduate students in South Korea.

Upon comparing the post-hoc tests for academic stress among the experimental and control groups, the results showed that the scores for the total scale and all sub-factors of academic stress were significantly lower in the experimental group compared with the

TABLE 6 Homogeneity verification of acculturative stress between groups.

Lower factor	EG (n = 15)		CG (n = 15)		Z
	M	SD	M	SD	
Perceived discrimination	3.27	0.630	3.21	1.152	−0.104
Homesickness	4.09	0.761	3.60	0.910	−1.510
Perceived hate/rejection	3.60	0.605	3.20	0.855	−1.480
Fear	3.63	0.870	2.93	1.193	−1.875
Stress due to change/culture shock	3.47	0.915	3.20	1.265	−0.605
All	3.53	0.592	3.21	1.010	−0.913

EG, experimental group; CG, control group.

TABLE 7 Differences in pretest and posttest scores for acculturative stress in the experimental group.

Lower factor	Pre-post		Ex-post		Z
	M	SD	M	SD	
Perceived discrimination	3.27	0.630	1.58	0.455	−3.412**
Homesickness	4.09	0.761	1.91	0.980	−3.417**
Perceived hate/rejection	3.60	0.605	1.80	0.646	−3.413**
Fear	3.63	0.870	1.65	0.632	−3.417**
Stress due to change/culture shock	3.47	0.915	1.73	0.594	−3.302**
All	3.53	0.592	1.70	0.558	−3.408**

**$p < 0.01$.

control group ($p < 0.01$). In other words, the Group Art Therapy Project had more positive effects on the total scale and all sub-factors of academic stress in the experimental group compared with the control group, with significant results.

5. Discussion

5.1. Changes in cultural adaptation stress

Our results for the comparison of pretest and posttest scores for cultural adaptation stress in both groups showed a significant reduction in the experimental group. Thus, group art therapy showed positive effects on overall cultural adaptation stress and its underlying factors in the study sample. The findings also demonstrated that the scores for the total scale and sub-factors of cultural adaptation stress at posttest were significantly lower in the experimental than in the control group.

These results are consistent with those of previous studies conducted with Korean and Chinese international students by Cho (2022), Park (2013), Hu (2011), and Lee (2008), and with a study on female immigrant marriage by Kwon (2009). Therefore, the evidence suggests that expressing personal emotions and experiences through artistic media for cultural adaptation stress should ideally not be a solitary activity. This is because collective psychological support experiences have a more positive impact on relieving cultural adaptation stress. From this perspective, sharing personal experiences, expressing feelings, finding empathy, and understanding from kindred souls, collectively discussing solutions to challenges, and listening to others' stories may have given the experimental group participants a sense of comfort and relieved their cultural adaptation stress.

TABLE 8 Difference in pretest and posttest scores for acculturative stress in the control group.

Lower factor	Pre-post		Ex-post		Z
	M	SD	M	SD	
Perceived discrimination	3.21	1,152	3.48	1.293	−0.629
Homesickness	3.60	0.910	4.00	1.069	−1.260
Perceived hate/rejection	3.20	0.855	3.63	1.146	−1.053
Fear	2.93	1.193	3.55	1.347	−1.386
Stress due to change/culture shock	3.20	1.265	3.58	1.324	−1.018
All	3.21	1.010	3.60	1.209	−1.022

TABLE 9 Verification of homogeneity of academic stress between groups.

Lower factor	EG (n = 15)		CG (n = 15)		Z
	M	SD	M	SD	
Schoolwork stress	4.25	0.379	3.96	0.836	−0.749
Future stress	4.07	0.766	3.75	1.070	−0.604
Social stress	3.19	0.860	2.93	1.267	−0.459
Living environment stress	3.58	1.063	3.40	1.113	−0.564
All	3.86	0.547	3.59	0.899	−1.100

EG, experimental group; CG, control group.

5.2. Changes in academic stress

Our findings showed that there was a significant reduction in overall academic stress and its sub-factors in the experimental group. They also indicated that the experimental group had significantly lower scores for overall academic stress and its sub-factors at posttest than the control group.

These findings are consistent with those of the studies by Kim (2022), which was focused on the implementation of non-face-to-face collective art therapy with college students, and Wang (2022), which

TABLE 10 Differences in pretest and posttest scores for academic stress in the experimental group.

Lower factor	Pre-post		Ex-post		*Z*
	M	SD	*M*	SD	
Schoolwork stress	4.25	0.379	2.28	1.123	−3.237**
Future stress	4.07	0.766	2.07	0.827	−3.326**
Social stress	3.19	0.860	1.80	0.986	−3.079**
Living environment stress	3.58	1.063	1.83	1.068	−3.953**
All	3.86	0.547	2.05	0.963	−3.295**

**$p < 0.01$.

TABLE 11 Pretest and posttest scores for academic stress in the control group.

Lower factor	Pretest		Posttest		*Z*
	M	SD	*M*	SD	
Schoolwork stress	3.96	0.836	4.04	0.937	−0.221
Future stress	3.75	1.070	3.51	1.202	−0.833
Social stress	2.93	1.269	3.17	1.278	−0.315
Living environment stress	3.40	1.113	3.67	1.227	−1.105
All	3.59	0.899	3.67	1.049	−0.142

delved into the effects of fusion art therapy programs for Korean and Chinese international students. Both cited studies showed the positive effects of art therapy in reducing academic stress. These results suggest that the expression and dissolving of negative emotions induces psychological relaxation, resulting in reduced academic stress (Kim H. J., 2010; Lee, 2012; Kim, 2017).

5.3. Limitations and future directions

This study has the following limitations. First, the study focused on Chinese graduate students studying in a university in A city, South Korea, with limited selection criteria and sample size. Therefore, it is difficult to generalize the findings to all Chinese graduate students in South Korea. Participants were selected based on voluntary participation, which limited the possibility of screening. Therefore, it is suggested for future research to expand the scope of the study, such as by increasing the number of participants and selecting them based on screening to identify those facing challenges with cultural adaptation and academic stress.

Second, eight sessions of group art therapy were conducted over 4 weeks. The short duration of the intervention hinders, once more, our ability to generalize the findings. Therefore, future research should investigate the effectiveness of long-term group art therapy programs.

Third, the study did not conduct follow-up evaluations to examine the sustained effects of the intervention. Therefore, it is suggested that future research measure and validate changes in the levels of cultural adaptation stress and academic stress among Chinese graduate students in South Korea through follow-up evaluations after the completion of the group art therapy program.

This study shows that providing group art therapy to Chinese graduate international students in South Korea, who may have difficulties in adapting to the new culture and face academic stress, can help alleviate cultural adaptation stress and academic stress. Moreover, it can be used to help international students optimize their potential to make academic achievements in a foreign environment. This study contributes to the exploration of psychological and emotional support solutions for Chinese graduate international students studying in a foreign country, particularly South Korea. It is hoped that this study will serve as a useful reference for various types of therapeutic programs for such students.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by IRB at Jeonju University JJ IRB-220421-HR-2022-0407. The patients/participants provided their written informed consent to participate in this study.

Author contributions

YY, as the first author, completed the initial draft of the article along with the experiments, data collection, and data analysis. KK as the corresponding author, provided feedback, revised, and edited the first draft of the article. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Art therapy in Alzheimer's disease. An opportunity of collaboration between intersectoral public and private organizations in the co-design of health and social care services

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Introduction: The World Health Organization (WHO) has recognized art therapy as an effective supportive mechanism for the maintenance and restoration of mental health. In recent years, art therapy has been integrated in the assistance pathways of older people affected by neurocognitive disorders according to the demonstrated benefits, as no conflicts with pharmacologic treatments and the reduction of anxiety and stress. The shortage of organizational, economic, and professional resources in social-health public organizations does not allow for guaranteeing the provision of these services without the help of the private ones, not exclusively belonging to social-health sector. This research aims to investigate how the collaboration between public and private organizations of different sectors in the co-provision of non-pharmacological approaches guarantees the economic sustainability and the quality improvement of the provided services.

Methods: The Alzheimer Café of Prato was selected as a significant case study.

Results and Discussion: Art therapy programs intended for taking care of older people in the first stages of the Alzheimer's disease have been developed, planned, supplied, and managed over the years as a result of the integration of resources, ideas, and professionals provided both by public and private sectors, the social-health sector, and cultural organizations.

Conclusions: The peer-to-peer co-responsibility of all organizations (public and private, from the cultural sector as well as the social and health sector) involved in the co-design of art therapy programs, not limiting their actions to only co-financing and/or co-delivery of the service, enabled the achievement of the economic sustainability of the services and the improvement of their quality.

KEYWORDS

art therapy, social-health care services, public-private collaboration, co-design, co-responsability

1 Theoretical framework

In America, the "art therapy" term was made up by psychoanalytic scholars around the middle of the 20th century, and they prepared different roles of art in psychoanalysis: from art

productions as symbolic communication of the unconscious material in a direct, uncensored, and concrete form to art as therapy (1). Art therapy is based on the idea that the creative process for making art or for living with art helps people in the expression, exploration, and understanding of their emotional and psychological spheres (2–4). The quality of the final artistic product is less important than the use of art to help people in expressing themselves (5). Both in America and in Europe, the 1970s through the early 1990s showed the exponential increase of interest on art therapy due to the identification of a broad range of art therapy's applications with many patient targets (6–8) of all ages (9–11). The same WHO has recognized the fundamental contribution of art in the promotion of wellbeing and correct lifestyles, thereby improving their quality of life. Art therapy is an unconventional tool to overwhelm and resolve critical issues that occur due to both social and health conditions (12, 13), working as a preventive intervention (14).

The most important social-health areas for art therapy application are as follows:

- Psychosocial care is focused on the personal expression of the patients about their physical and physiological difficulties (15–18). Art therapy supports the self-efficacy of patients who can find a new version of themselves after they lose control of their lives due to social and/or health frailty.
- Rehabilitation with the use of art therapy helps the patients to maintain their cognitive and physical abilities or rather slow down their cognitive and physical ability decay (19, 20).
- Health and social benefits from art therapy is complementary to health and social care treatments, increasing the achievement of positive health and social outcomes (21–23).
- Other aspects include the re-authoring of the dominant narrative of the illness or physical disability by the patient, thereby personally describing the own condition (24).

In recent years, the introduction of art therapy in many health and social care settings (i.e., inpatients wards, outpatient services, nursing homes, hospice, rehabilitative centres) has been favoured for its application in humanizing care (25).

Among all possible targets, art therapy is especially used with older people owing to its contribution in healthy aging and its action as a protective factor against the physiological loss of physical and cognitive functions (26). Art therapy as a non-pharmacological approach (27) is especially strongly recommended to older people with complex clinical conditions for the management of mild, moderate, and, sometimes, severe neurological symptoms as are no effective pharmacological treatments to alleviate the disease effects (28, 29). In fact, it avoids interference and lacks side effects due to the consumption of drugs (30, 31). Art therapy is the most widespread treatment for Alzheimer's disease as it reduces the phenomena of psychosis, wandering, and restlessness, thereby relaxing these patients (32).

Art therapy is a commonly known non-pharmacological treatment option, and art therapy programs require the investment of many resources (fundings, locations, time, and professionals) for the development of personalized interventions (33) to maximize the possible health and social outcomes (34, 35). Finding a solution on how to continue guaranteeing the provision of these expensive health and social care services over time has been a priority in the recent years. In public sector, the resources have been always more limited in the face of the progressive increase in demand due to the ageing of the population and the development of preventive interventions as the ever-increasing costs for the provision of these services due to for their greater complexity (36–38). At the worldwide level, the co-financing of these services by private organizations has been identified as the main solution for guaranteeing not only the provision of integrated health and social care services (39, 40) on account of resource shortage in the public sector but also their economic sustainability and their quality improvement (41, 42). The private sector is not here to replace the services provides by the traditional public sector but rather to collaborate for finding joint solutions through co-funding, and co-provision (43, 44). These studies, however, are focused only on the collaboration between public and private organizations working in the health care and/or in the social care sectors. However, referring to non-pharmacological approaches, the frequency of collaboration between public and private organizations in the education or cultural sectors, similar to others, is daily. To the best of our knowledge, there are no studies on the consequences related to the collaboration of public and private organizations in the co-provision of health and social care services based on different reference sectors. For example, the promotion of art therapy in museum is extensively studied (45–47). However, the engaged public and/or private cultural organizations are considered exclusively as hosts of art therapy programs and are not integrated in the decision-making. This research has the purpose to investigate the outputs of the collaboration between public and private organizations of different sectors in the joint implementation of art therapy programs in terms of economic sustainability and the quality improvement. The object of the study is the Alzheimer Café in Prato, where the provision of art therapy programs is the co-responsibility of a network composed by public and private organizations of the health and social care and cultural sectors.

2 Materials and methods

The methodology of the case study was considered the most suitable for pursuing the goal of this research (48, 49). The case study is represented by Alzheimer Café in Prato (Italy). This experience is relevant because here art therapy is a means to create a wider collaboration between partners of different legal nature (public and private) and sectors (health, social and cultural) in a joint decision-making. The case analysis was conducted in three phases:

a. *Within case analysis.* Data from each organization involved in the selected case study were acquired through prior documentary analysis of primary and secondary sources. It offered an overview on their governance model and management (50).
b. *Data acquisition.* The operative information about the co-provision of art therapy was collected by a focus group including professionals. The research group invited potential participants to join the online focus group via email. The focus group was chosen for the own high sensitivity and specificity for the collection of qualitative data (51, 52). In terms of choosing a focus group with a limited number of people, it was concluded that six members can represent the organizational dimension of their organizations. Each organization has a plurality of activities executed in the field of action of art therapy (involvement of more than 800 old people, who are

TABLE 1 Focus group questions.

I. Professionals	II. Experience	III. Intersectoral public-private collaboration	IV. Future challenges
a. Presentation of participants' professional profile, current role, work experience, and work context b. Have you had specific training about art therapy or have you trained yourself on-the-job?	c. What activity do you carry out together? d. With how many people have you carried out art therapy activities over time? e. How would you plan and apply an art therapy program for the elderly, especially with Alzheimer's disease, and for their caregivers?	f. How much is the synergy between public and private organizations important? g. What are the advantages associated with your private nature? What are the issues? h. What are the opportunities of working in the health and social sectors where the presence of private organizations is becoming much more prevalent than that of public organizations? What are the threats? i. On the other hand, what are the benefits and difficulties of being public?	j. What are your prospects for growth in the field of art therapy, guaranteeing the sustainability of the service?

hosted in nursing homes, participate in day care centres, or receive some domiciliary services assisted by the two health and social care consortia or the thousands of visitors of the three involved museums). The focus group was conducted online to limit as much logistical and temporal issues as possible to the participants. Before the start of the online meeting, each participant was required to sign a privacy policy document. The gathered research group collected responses (M.G. - focus group's master and N.P. - observer). The focus group was audio-recorded with the respondents' consensus and then transcribed. Before the analysis of the collected data, the focus group's transcription was sent to all participants for the validation of the rightness of the contents. None of the participants suggested any correction or change.

c. *Data analysis.* Coding method was used for analyzing qualitative data of focus group and synthetizing them (53–55). Four reference categories were applied as coding categories according to the main variables that influence the co-provision of art therapy into collaboration: (I) professionals; (II) experience; (III) intersectoral public-private collaboration; and (IV) future challenges (Table 1).

Focus group's members were selected for their professional experience and their then-current role in each organization employed in the considered case study and not as a patient or a member of a sample. They subscribed the privacy policy document to consent the management of their personal data in compliance with the European (Regulation (EU) 2016/679, Regulation (EU) No. 536/2014) and national regulation (Italian Law 2019/2017). The request for the approval of research by the ethics committee or the institutional board was not required because of the absence of sensitive health data related to medical treatment and of any research involving human participants (56, 57).

3 Results

3.1 Case study

The object of the case study was the Alzheimer Café in Prato (Italy). In 1997, the Alzheimer Café were ideated by psychogeriatrician Bere Miein in Leiden (Netherlands) for people in the first stages of the Alzheimer's disease. The Alzheimer Café was conceptualized as an informal, deinstitutionalized space. At this Café, people with Alzheimer's disease meet people with a same or similar condition, finding mutual support in their struggle against the illness and loneliness (58). Greater knowledge of their own condition reduces anxiety, stress, and a sense of shame (59). In recent years, Alzheimer Café have spread all over the world due to the effectiveness of this method. In Alzheimer Café, recreational activities are carried out for stimulating memory, supporting psycho-physical wellbeing, and socialisation. These activities have always included non-pharmacological approaches that have often taken the form of arts-based programs (60).

In 2019, the Alzheimer Café was designed, implemented, and managed by a temporary association of enterprises in Prato. The temporary association of enterprises has been composed by two health and social care consortia (Astir consortium and Il Borro consortium) in collaboration with the Health Society of Prato.[1] The Alzheimer Café was financed by the Health Society of Prato with €21,000.00 and resources were received from the Tuscany Region for the provision of health and social care services. The Health Society of Prato also made available a location for the provision of the Alzheimer Café. The temporary association of enterprises in collaboration with the three museums of Prato (the Textile Museum,[2] the PARSEC Foundation, Museum of Planetary Sciences[3] and Foundation for Contemporary Arts Luigi Pecci Centre[4]) had deputed to co-provide an art therapy program at the Alzheimer Café since 2019 (see Figure 1). Art therapy sustains the integration of health and social responses and taking care of the users, i.e., older people in the first

1 The Health Society is a public consortium established between the municipalities of the province of Prato and the Local health Authority USL Toscana Centro. It is an organisational model for the government of the health, social, and welfare services of the territory, introduced by Regional Law no. 40/2005 in order to guarantee more efficient and effective services, high quality of services, universality and equal access to services, proximity and participation of the citizens, and the no profit organizations.

2 Textile Museum of Prato (https://www.museodeltessuto.it/).

3 Foundation of Comtemporary Arts Pecci Centre (https://centropecci.it/).

4 PARSEC Foundation and Museum of Planetary Sciences (https://www.fondazioneparsec.it/it/il-museo-di-scienze-planetarie/).

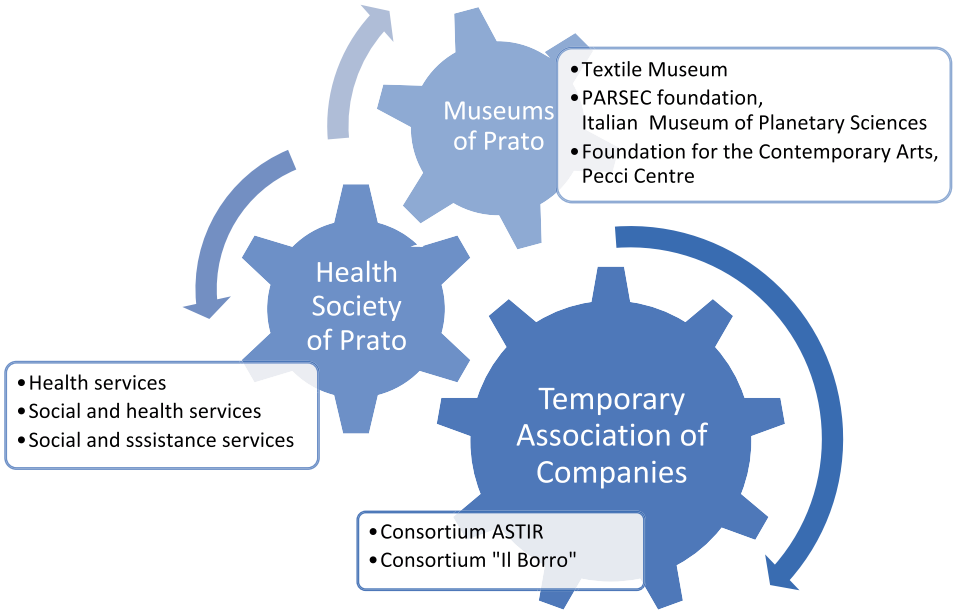

FIGURE 1
Intersectoral public-private collaboration deputed to art therapy into the Alzheimer Café in Prato.

stages of Alzheimer's disease, by enabling them to be part of the entire society.

At the end of the first year of the art therapy program at the Alzheimer Café, it was decided that the temporary association of enterprises in collaboration with the three involved museums would continue this art therapy program owing to the excellent results achieved, despite the absence of regional funding. This program was directly financed by the abovementioned organizations with their resources from 2020 to 2022.

In 2023, the Health Society of Prato had received a new regional funding to finance a laboratory (€120,000.00), which permits the activation of Alzheimer Café in Prato for the following 2 years (January 2023–December 2024), the provision of the Café at one more location for a better coverage of the territory (in the North and in the South of Prato), and the increase of weekly accesses (from 3 to 5) to the same number of users due to a much more conspicuous nature of the resources.

3.2 Focus group data

3.2.1 Professionals

Participants to focus group were three operators of the Alzheimer Café (D.S., coordinator; F.V., professional educator; and S.M., health and social worker) and three educators of the museums (I.I., art historian, coordinator of the educational department of the Foundation for Contemporary Arts Luigi Pecci Centre; S.C., astrophysicist, responsible of the educative and informative activities of the PARSEC Foundation and Museum of Planetary Sciences; F.S., art historian, responsible of the educative service of the Textile Museum of Prato).

The health and social care professionals have not received any specific training on art therapy. They have acquired their competencies on this subject directly on the job or by borrowing skills obtained from other courses (for example, a course on communication with persons with dementia or a course for professional geriatric educators). On the other hand, museum educators received a specific training on art therapy and on the implementation of related programs. Since 2017, indeed, the Tuscany Region has promoted a training course free of charge for museum educators as part of the regional project "Tuscan System for Alzheimer Museums"[5], which is dedicated toward the acquisition of specific skills for the reception, integration, and inclusion of people with Alzheimer's disease in museum contexts by museum educators.

3.2.2 Experience

From 2019 to date, the Alzheimer Café in Prato followed up 26 older people with Alzheimer's disease, divided them into two groups for meeting three times a week. Albeit with a slight decrease in the number of participants (between five and eight in each group), Alzheimer Café continued during the COVID-19 pandemic. The face-to-face meetings were replaced with online meetings and telephone meetings, according to the specific communication skills and needs of the attended participants.

The interventions in the art therapy program were not limited to the organization of practical laboratories; however, attention should be paid to ensure that everyone can enjoy art.

The art therapy program in the case study has been composed by the collection of multiple interventions (for example, the adoption of multisensorial explorative paths for the fruition of multiple kinds of art), each one tailored on every user's needs (i.e., those who are

5 Tuscan System of Museums for Alzheimer (Chi siamo - Musei Toscani per l'Alzheimer:- https://www.museitoscanialzheimer.org/chi-siamo/).

visually impaired, those who are deaf, those with reduced mobility, those of different ages, or those from different social backgrounds). In this way, the enjoyment of art has been offered to everybody by the breaking down of all possible barriers that could limit art fruition.

3.2.3 Intersectoral public-private collaboration

The added value of Alzheimer Café in Prato is due to the co-design and co-provision of the art therapy program by the intersectoral public-private collaboration.

The collaboration began with the co-financing of an art therapy program for guaranteeing the economic sustainability of the service. The integration of different reference networks has offered major possibilities of fundraising (other public announcements, different type of resources, both services and goods, distinctive professional profiles, etc.), enforcing more and more the economic sustainability of the art therapy service.

Over time, the collaboration has evolved in the sharing of not only economic resources but also ideas, time, spaces, professionals, and reference networks, thereby strengthening the mutual knowledge. It has favoured the co-design and co-responsibility for the provision of art therapy in Alzheimer Café. It improved the service quality in terms of achieved health outcomes. These results were certificated by the psychologist who recognized and reported the effectiveness of the personalized pathway into art therapy program (reduction of anxiety, greater willingness to socialize, active participation of the proposed activity, effective management of symptoms such as psychosis, wandering, restlessness, etc.) and by users' satisfaction (persistence of the desire to participate and high scores on the satisfaction questionnaire filled both by users and caregivers at home). Positive results were achieved owing to the optimisation of the delivery process of service: no turnover of personnel; progressive extension of the offer; widening of the available places; adoption of always more comfortable and safe locations for the everyday conduction of the Café; and involvement of qualified collaborators.

Learning constantly from past experiences through the application of rigorous evaluation and control mechanisms was possible with the help of performance-oriented strategies and the progressive adaptation of the route to the emerging needs. This approach is peculiar of the private sector and seldom detectable in the public sector. In the intersectoral public-private collaboration, these strategies were borrowed and applied in public organizations (61). At the same time, the public-private collaboration enforced the leader position of the private sector in the competitive market. It was demonstrated by the objective and verified increase of the attributed scores during the selection of other public and private calls for proposals.

Nevertheless, the public sector continued to impose on all network the respect of stringent bureaucratic and only formal constraints, placing limits and clauses even in the face of years of excellent results. In this way, the public sector is still anchored to its old role of a mere funder and controller.

3.2.4 Future challenges

In the future, the intersectoral public-private collaboration should has as its main purpose the development of a specific art therapy program that will take care of caregivers also. Caregivers often feel resigned to no longer living their full life due to being completely immersed in the assistance of a person with Alzheimer's disease. Caregiver stress can lead to caregivers putting themselves at risk of getting sick. Instead, they should preserve their identity and their physical and mental wellbeing perhaps by attending to an art therapy program.

The intersectoral public-private collaboration should include all public institutions, no profit organizations, and families for the purpose of engaging all stakeholders in order to efficiently execute this program (Figure 2).

4 Discussion

Although the first art therapy courses could be dated back to the early 1970s (1, 5), these courses are, at present, still exclusive for psychologists and psychoanalysts or are organized separately for each profile involved in art therapy. The absence of integrated professional training on that topic, especially for health and social care professionals and museum educators, severely limited the matching of supply and demand. The joint training of these two categories probably will resolve the current issues and catalyze the implementation of the art therapy program. In the case study, the intersectoral public-private collaboration was proposed as a concrete solution in order to provide over time an art therapy program that satisfies the emerging needs of this specific target in terms of memory stimulation (19, 20), psycho-physical wellbeing (58, 59), and socialization (22, 23). The implementation of this organizational model was the starting point for the passage from a give-and-take relationship among the public and private organizations involved in the provision of art therapy to the process of co-design, co-provision, and co-responsibility in the results achieved by means of art therapy (41–44).

The added value of the intersectoral public-private collaboration was the mutual support among public and private, health and social care, and cultural organizations. The mutual support was a solution to the resource shortage and the inadequacies in order to keep up with the complex requirements settled on health and social care services provision, i.e., quality improvement, affordability, economic sustainability, budgeting or introduction of evaluation, and control mechanisms (62, 63). The intersectoral public-private collaboration as organizational model can be reproposed in each context where a plurality of subjects, public and private, based on different reference sectors, whether structured or not, want, in general, to collect their resources to invest them in the joint taking care of a frail target.

Putting together their professionals, well-equipped locations, resources, and ideas, each member of the intersectoral public-private collaboration is relying on the resources of the other partner as, otherwise, only their resources would not be enough (64).

In this way, the case study was unknowingly experimenting the implementation of the personal health budget, having already created the needed organizational and managerial substrates for its application (65). The personal health budget is an accounting tool that consents the anticipated determination of the quantity, the type, and the quality of economic, professional, and structural resources that public institutions, no profit organizations (both public and private), and community and personal network should be made available for the

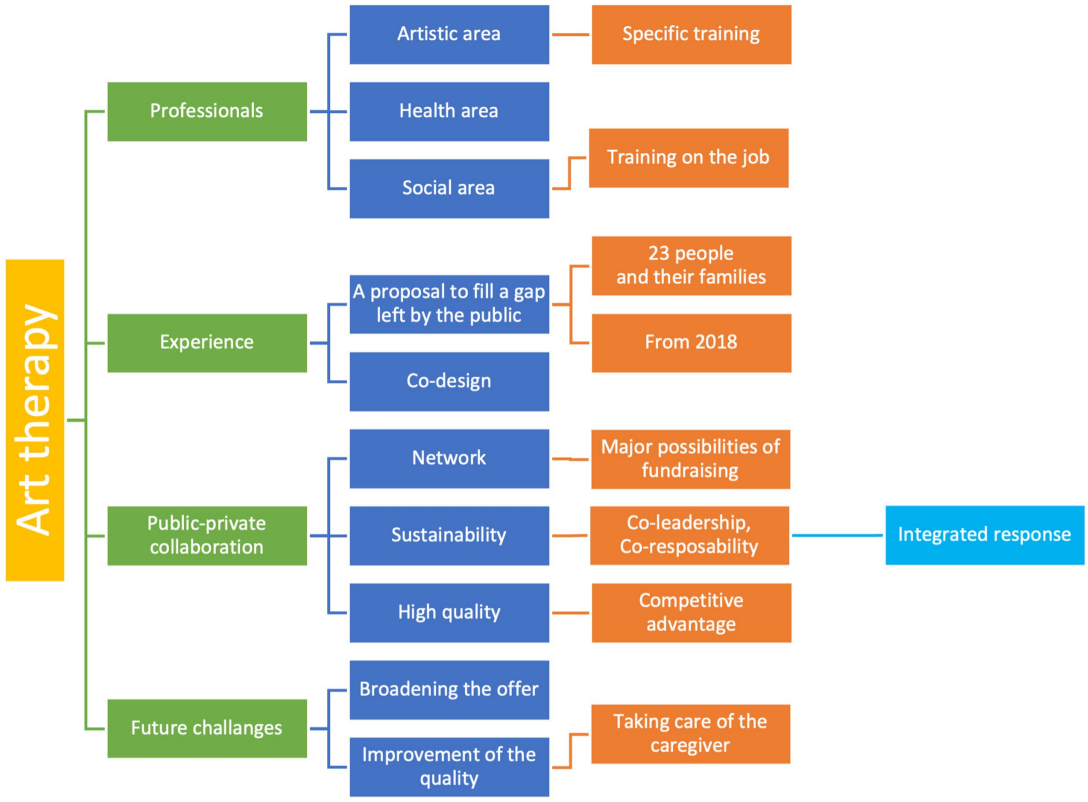

FIGURE 2
Coding three of focus group's information.

joint supply of health and social care pathways for a person with health and/or social complex needs (66, 67).

This tool was created to finance the health and social care pathways of persons with disabilities according to their needs (68, 69). In 2022, in Italy, where the object of the case study is located, the Ministerial Decree No. 77/2022 (70) identified this tool for the economic coverage of all social and health care pathways of frail persons in accordance with their risk level. Despite the strong political mandate and endorsement for the adoption of personal health budget, its use is still contained. An issue for the wider adoption of personal health budget is the absence of an organizational model that creates pre-conditions for the integration of resources. The intersectoral public-private collaboration can, indeed, support this process by proposing first an organizational model that allow for and favor the integration of resources and, as said, something more.

The organizations in the public-private collaboration are applying for having in mid-long future a new role in the community as promoters of pathways for the humanisation of care by means of art (14) and for the population healthy ageing (26, 71, 72). They are working for the promotion of wellbeing and wellness in the society (12, 73). According to these future objectives, the commitment for the next short future of the intersectoral public-private collaboration, such as the case study, is taking care of caregivers also. It must be considered a preventive intervention against the possible onset both of physical and mental diseases. The reduction of the stress and anxiety levels in these persons fully dedicated to the assistance of patients can limit the probabilities of future illness (74–76).

5 Conclusions

The intersectoral public-private collaboration for the co-design of health and social care services, especially non-pharmacological approaches such as art therapy, is an effective organizational model. In this context, the integrated use of the different economic, organizational, professional, and structural resources made available by each organization improved safety, quality, and economic sustainability. The achievement of these goals was possible because public and private organizations based on different reference sectors operated all together as a single entity, sustaining co-design, co-funding, and co-provision of inclusive services.

The implementation of a personal health budget is proposed as an operative tool to start and consolidate the integration both of ideas, projects and, only at the end, resources, having an approach of co-leadership and co-responsibility.

The peer-to-peer intersectoral public-private collaboration for the provision of these kinds of service fully satisfies the needs of social integration, acceptance, and cohesion of frail target into the society, as older patients with Alzheimer's disease and their caregivers in the selected case study, the Alzheimer Café of Prato.

The intersectoral public-private collaboration can be reproposed in every context, in which the shortage of resources and the insufficient quality levels are not guaranteeing over time the provision of integrated and innovative health and social care services referring to non-pharmacological approaches that are more complex and more expensive.

The limitations of this study are the absence of a comparison with other similar realities for the conduction of a cross-case analysis that could consolidate the generalization of the obtained results. Possible developments of this research could be the development of a new study that compares the organizational model adopted for non-pharmacological approaches' provision in multiple Alzheimer Cafés as a result to their spreading all over the world. It could be also interesting to consider the influence of various national financing, normative, and managerial field of action in the replication of the proposed intersectoral public-private collaboration.

Data availability statement

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required in accordance with local and national guidelines. Written informed consent to participate in this study was provided by the participants.

Author contributions

MG: conceptualization, data curation, writing-original draft preparation, visualization, and project administration. NP: resources and supervision. MG and NP: methodology, formal analysis, investigation, writing-review and editing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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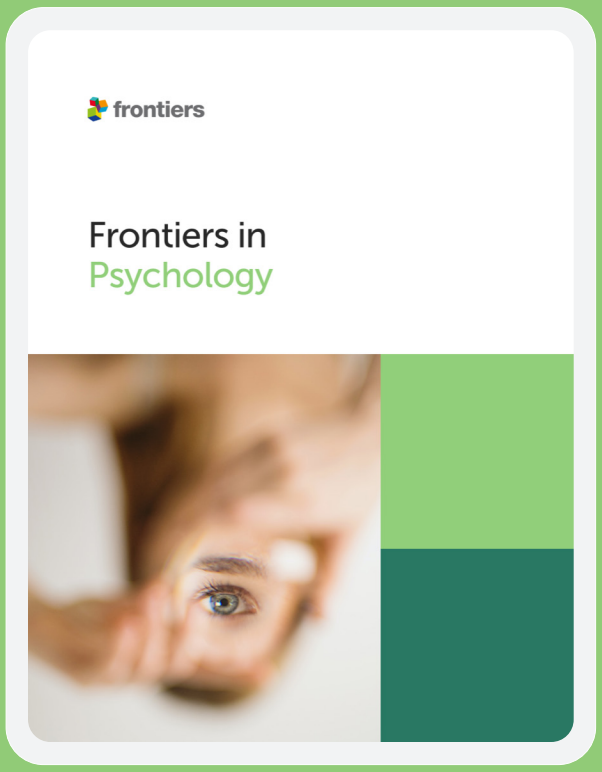

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