Assessing video-based health education in African contexts: a systematic review

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Introduction: Health education is vital for empowering patients with knowledge about their health conditions, treatment options, and self-care, enabling them to make informed decisions. Video-based Health Education (VbHE) has proven to be a powerful tool for enhancing health literacy, often outperforming traditional methods in various circumstances. Previous research has focused on specific diseases in low-resource settings, but a broader understanding of video applications and implementation challenges remains necessary. This systematic review assessed the use of video for health education purposes in the least developed African countries from 2020 to 2024, exploring insights into the types of health content delivered through video, their effectiveness, and implementation obstacles.

Methods: We searched the ScienceDirect, PubMed, Scopus, Google Scholar, PLOS, and AJOL databases, limiting our review to the UN's 33 least-developed African countries. Studies were evaluated based on country, participants, sample sizes, intervention methods, duration, video delivery, educational emphasis, objectives, outcomes, and findings. Adhering to PRISMA guidelines ensured a structured methodology.

Results: From the 218 records identified, 15 studies met our inclusion criteria. These studies highlighted video interventions with a focus on cancer ($n = 5$, 33.3%), HIV ($n = 3$, 20%), maternity care ($n = 5$, 33.3%), and other areas ($n = 2$, 13.3%, including COVID-19 and spinal anesthesia procedures). Most studies ($n = 13$, 86.6%) showed videos positively influenced knowledge retention and health outcomes, while the remaining two ($n = 2$, 13.3%) noted no significant difference from traditional methods. Video dissemination methods featured mobile devices, TV screens, and online platforms, with intervention durations ranging from 30 min to 36 months. Of the included studies, video has proven effective in enhancing health education in the least-developed African nations.

Discussion: Challenges including connectivity issues, cultural adaptation, and digital literacy remain significant. This review highlights the critical role of mobile video health communication in empowering underserved populations and informs future strategies to optimize health outcomes in resource-constrained African Contexts.

KEYWORDS

VbHE, digital health, health education, educational video, African context

1 Introduction

The use of video for information and education has experienced substantial growth (Chatterjee et al., 2021). Among various digital formats, video has proven to be an effective medium for delivering health education due to its ability to enhance knowledge retention and accessibility. However, there are significant challenges; health professionals and ordinary web users often share health-related content within the same online spaces, raising concerns about the reliability of the information (Karlsen et al., 2013), and deviant behavior (Zhou et al., 2022). This is particularly concerning given the increasing trend of individuals posting self-produced health videos on social media, shifting responsibility onto the viewers if adverse outcomes happen. Despite these concerns, health professionals continue to rely on user-generated videos instead of producing original material, which impacts the quality and relevance of the education provided (Farrell et al., 2014; Snelson, 2018).

In recent years, research from the least-developed African countries has shown a shift toward health workers producing their video content for educational purposes (Ferla et al., 2023; Scott et al., 2022). This change signals a growing awareness of the significance of original video content in boosting patient education and involvement (Chatterjee et al., 2021; Adam SAM et al., 2019; WHO, 2024). This awareness became even more pronounced during the COVID-19 pandemic, further emphasizing the importance of digital health tools. During this period, many African nations have successfully utilized mobile devices to disseminate educational videos, illustrating the potential for enhanced health outcomes through digital innovation (Kinkade et al., 2022). However, while these tools have helped share information during the pandemic, they have also hosted rumors that led to misinformation, with traditional media being the only means capable of countering it by promoting critical thinking and limiting the spread of health-related rumors (Guo et al., 2023). Providing clear, credible information can foster more thoughtful engagement and increase user acceptance (Luo et al., 2021).

To encourage the use of digital health tools, the World Health Organization (WHO) has urged 47 countries in Africa to develop and implement digital health strategy plans (Alegana et al., 2023). While many of these nations acknowledge the benefits of such technologies and have started incorporating them into their health systems, a notable number ($n = 14$) still do not have comprehensive plans (Alegana et al., 2023). This initiative reflects a growing recognition across the continent of the value of digital technologies for various applications and emphasizes the need for their effective integration into health care. As part of the 2030 Agenda for the African region, WHO's recommendations on digital health interventions support the pursuit of Universal Health Coverage (UHC) and disease prevention, reinforcing the digital health strategy for 2020–2025 (WHO, 2023). In the context of video utilization, the WHO advocates for mHealth based on initiatives such as 'virtual care,' 'remote monitoring,' 'digital therapeutics' (WHO, 2021), 'video-based training,' 'video recordings,' and leveraging YouTube for health videos (WHO, 2024) to improve health outcomes.

Recent reports highlight the constraints of video-based health education in the least developed African nations (Kabukye et al., 2021; Mamuye et al., 2022; Till et al., 2023), where some, if not many, local institutions struggle to maintain their promotion. Barriers such as limited access to affordable mobile data, low smartphone usage, and insufficient digital literacy contribute to a digital divide, hindering the reach and efficacy of video interventions. The WHO indicates that, although some countries have made significant strides in adopting digital health tools, many still require 'institutional support' for developing and strengthening their digital health strategies (WHO, 2021). Beyond infrastructure, emphasizing the usefulness of these tools and fostering attitudes through trust and engaging content can significantly enhance adoption (Zhang et al., 2014).

This systematic review aimed to assess the use of video-based health education in the least developed African countries, focusing on studies published from 2020 to 2024 and examining the impact, obstacles, and opportunities for improvement in under-resourced settings. Since African low-resource settings are often facing systemic barriers, such as underfunded health systems and a lack of trained professionals in using digital media tools for health education, traditional health education methods frequently fall short or are unsustainable. In this context, our study highlights these countries as a strategic and relevant area for evaluating the use of video-based health education as a cost-effective and scalable solution. The goal is not only to assess its applicability and impact but also to increase awareness of its potential and promote further research into integrating it into health training programs in similar environments.

2 Methods

2.1 Search strategy and database overview

A comprehensive literature review was conducted using the ScienceDirect, PubMed, Scopus, Google Scholar, PLOS, and AJOL databases. The search was limited to studies conducted in the 33 least-developed African countries as defined by the UN, and adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). The keywords and search terms included combinations of: "Health videos," "Educational videos," "Video-based health education," "Digital health," "Health education," and "Low-resource settings." Boolean operators (AND, OR) were utilized to refine the search results, with filters applied to select studies published between 2020 and 2024, in English, and meeting the specified inclusion criteria.

During full-text review and data extraction, it became apparent that the included studies could be meaningfully categorized based on the primary population addressed by the interventions, namely, Patients and/or citizens (e.g., general public, disease-specific populations, adolescents, pregnant women, rural communities), and Health workers (e.g., doctors, nurses, community health workers, program managers, drug distributors). The latter group highlights the importance of multi-stakeholder approaches grounded in supportive policies to guide the development and promotion of digital health content (Zhang et al., 2017). In these situations, stakeholders are typically dedicated professionals who volunteer their time without pay, reflecting the realities of low-resource environments (Yang et al., 2021). Although the division between Patients and/or Citizens and Health workers was not an initial inclusion criterion, it was identified inductively due to apparent differences in intervention design, educational content, and reported outcomes. Consequently, after screening and extraction, studies were grouped according to the target population (patients/citizens vs. health workers). Subsequent synthesis

and reporting were structured along these two categories to provide a more nuanced understanding of how video-based health education approaches differ according to the intended audience.

2.2 Ligibility and exclusion criteria

The review encompassed studies focused on enhancing, evaluating, designing, advocating for, testing, or investigating the use of video as a medium for health education. The eligibility criteria centered on studies published between 2020 and 2024 that examined Video-based Health Education in low-income or least-developed African nations. Studies lacking educational video content, those conducted outside the least-developed African countries, and those published outside the designated timeframe were excluded.

2.3 Data extraction and synthesis

Data extraction was performed using a predefined data extraction form to ensure uniformity across studies. Key information extracted included study characteristics (such as country, participants, sample size, intervention method, research duration, and video delivery approach) along with a performance summary (including educational contents, objectives, outcomes, and findings). To ensure the accuracy and integrity of all extracted data, two independent reviewers (PFI and JA) initially tested the extraction form on a random sample of included studies. They refined variable definitions until achieving an agreement of over 95%. Subsequently, each reviewer independently extracted data for all studies. Discrepancies were identified through systematic cross-checking in a shared spreadsheet and then resolved through discussion. Both reviewers adjudicated any remaining disagreements. Audit trails documented all changes, and the authors recalculated records to verify consistency. The gathered data were qualitatively synthesized, highlighting the effectiveness of Video-based Health Education interventions. A narrative synthesis was employed to summarize and interpret the results, with a focus on identifying observed patterns, differences, and common themes across the studies. The findings were then organized in tables, and key outcomes were discussed in relation to the research objectives (Table 1).

Following initial study selection, included studies were subsequently grouped by the population targeted by the intervention (patients/citizens vs. health workers) based on data extracted from the full texts.

TABLE 1 The path followed on the method.

Step	Description
Screening & Inclusion	All studies of Video-based Health Education were included, regardless of target population.
Data Extraction	During the review, information was extracted about the population focus (patients/citizens or health workers).
Data Synthesis	Studies were grouped *post hoc* based on the intervention population; results were reported by group.

3 Results

3.1 Study selection

The database search yielded 218 papers, of which 15 met our selection criteria after excluding duplicates ($n = 3$). We excluded 197 articles for the following reasons: (1) no use of educational video ($n = 57$), (2) research was not conducted in the least-developed African countries ($n = 63$), and (3) studies fell outside the 2020–2024-year range ($n = 77$). Participants' demographics included health workers who received video training ($n = 4$), patients, and/or citizens ($n = 11$), all of whom were assessed for their responses to video-based health education (Figure 1).

3.2 Study characteristics

Only 24 countries were identified as implementing video-based health education. These include Tanzania ($n = 4$), Ghana ($n = 3$), Malawi ($n = 2$), Ethiopia ($n = 2$), Nigeria ($n = 2$), Kenya ($n = 1$), Botswana ($n = 1$), Uganda ($n = 1$), Rwanda ($n = 1$), Burundi ($n = 1$), Niger ($n = 1$), the Democratic Republic of the Congo ($n = 1$), São Tomé and Príncipe ($n = 1$), Benin ($n = 1$), Burkina Faso ($n = 1$), Gambia ($n = 1$), Guinea ($n = 1$), Guinea-Bissau ($n = 1$), Liberia ($n = 1$), Mali ($n = 1$), Mauritania ($n = 1$), Senegal ($n = 1$), Sierra Leone ($n = 1$), and Togo ($n = 1$). In this review, Tanzania and Ghana emerged as the countries with the most studies, followed by Malawi, Ethiopia, and Nigeria, as illustrated in Figure 2.

3.2.1 Sample size

The study's sample size varied from 9 to 7,648 participants. Four studies reported an average age range of 22–42 (Holst et al., 2021; Masiano et al., 2021; Godana Boynito et al., 2023; Obasola, 2021); three had an average age of 18 (Martei et al., 2024; Drokow et al., 2021; Kanyeki et al., 2022), while the remaining eight did not provide age data (Ferla et al., 2023; Scott et al., 2022; Tilly et al., 2022; Cooper et al., 2021; Ampofo et al., 2020; Mengistu et al., 2021; Holst et al., 2022; Ansari et al., 2024). The search exclusively targeted the least-developed African countries between 2020 and 2024. According to the UN classification, 33 countries are categorized as least developed (UN, 2024).

3.2.2 Dissemination, method, and duration

The studies utilized various media to present videos, including TV monitors or projectors ($n = 6$), mobile devices ($n = 7$) such as tablets, mobile phones, and portable projectors, online media ($n = 1$) through platforms such as YouTube, Web, and WhatsApp, and other formats ($n = 1$), such as TV, DVD, or compact disks. These video-based health education initiatives occurred in health facilities, schools, and occasionally in residential settings through door-to-door visits. The duration of the education programs varied from 30 to 40 min up to 36 months.

Three of the 15 studies reviewed employed true randomized control designs, assessing both control and intervention groups (Kanyeki et al., 2022; Holst et al., 2022; Ansari et al., 2024). The other 12 were single-group studies, often conducted in focus groups or with individuals, and utilized pre- and post-intervention assessments (Ferla et al., 2023; Scott et al., 2022; Holst et al., 2021; Masiano et al., 2021; Godana Boynito et al., 2023; Obasola, 2021; Martei et al., 2024;
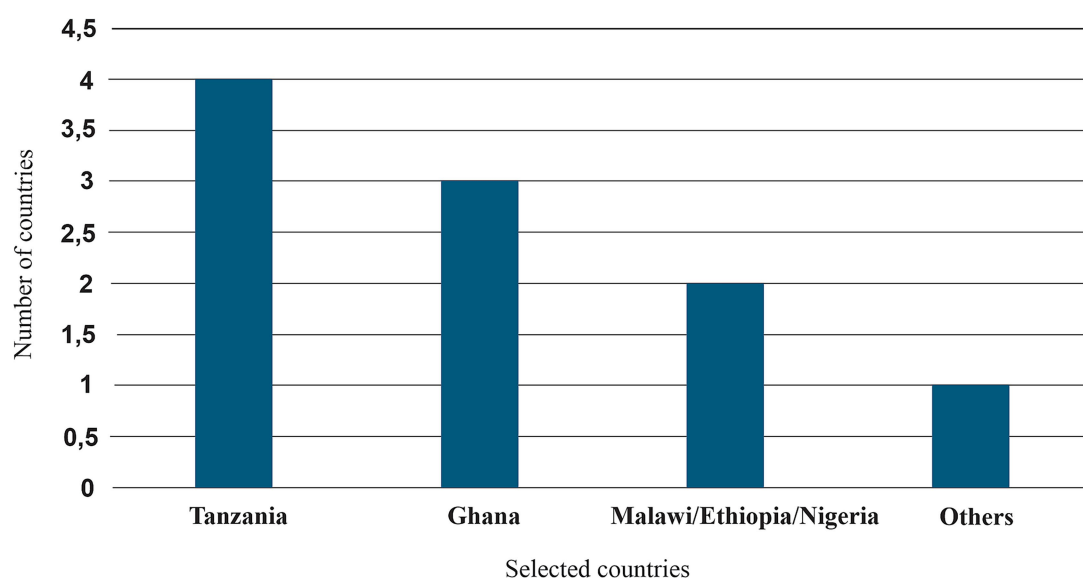
FIGURE 1
PRISMA flow diagram used in the study description.

Drokow et al., 2021; Tilly et al., 2022; Cooper et al., 2021; Ampofo et al., 2020; Mengistu et al., 2021) (Table 2).

3.3 Performance summary

3.3.1 Educational contents and outcomes

In general, the studies focused on video education initiatives covering topics such as cancer (*n* = 5, 33.3%; Martei et al., 2024; Drokow et al., 2021; Tilly et al., 2022; Cooper et al., 2021; Ampofo et al., 2020), HIV (*n* = 3, 20%; Holst et al., 2021; Masiano et al., 2021; Holst et al., 2022), maternity care (*n* = 5, 33.3%; Ferla et al., 2023; Godana Boynito et al., 2023; Obasola, 2021; Mengistu et al., 2021; Ansari et al., 2024), and other areas (*n* = 2, 13.3%, including COVID-19 and spinal anesthesia procedures; Scott et al., 2022; Kanyeki et al., 2022). In terms of preliminary outcomes, most studies (*n* = 13, 86.6%) found that the use of video proved effective, and in the remaining (*n* = 2, 13.3%), no significant differences were noted between video usage and no video.

The studies focusing on patients and/or citizens (*n* = 11) covered a range of topics. Of these, five (*n* = 5) focused on cancer-related subjects, using videos to discuss common myths, diagnostic procedures, bodily diseases, treatments, reactions to aftereffects, and quality of life (Martei et al., 2024). They aimed to raise awareness and knowledge about the screening and risks associated with human papillomavirus infection, the treatment and experiences of breast cancer survivors, and to promote vaccination, awareness, and counseling for the Pap smear test. Three studies (*n* = 3) addressed HIV-related issues (Holst et al., 2021; Masiano et al., 2021; Holst et al., 2022), through videos that highlighted the importance of antiretroviral therapy and addressed significant concerns regarding HIV/AIDS, tuberculosis, Taenia Solium (neuro) cysticercosis, taeniasis, and anthrax. Finally, the last three studies (*n* = 3) covered maternal and child health (Godana Boynito et al., 2023; Ansari et al., 2024), as well as spinal anesthesia procedures, including a video that reviews the pre-operative anxiety state (Kanyeki et al., 2022).
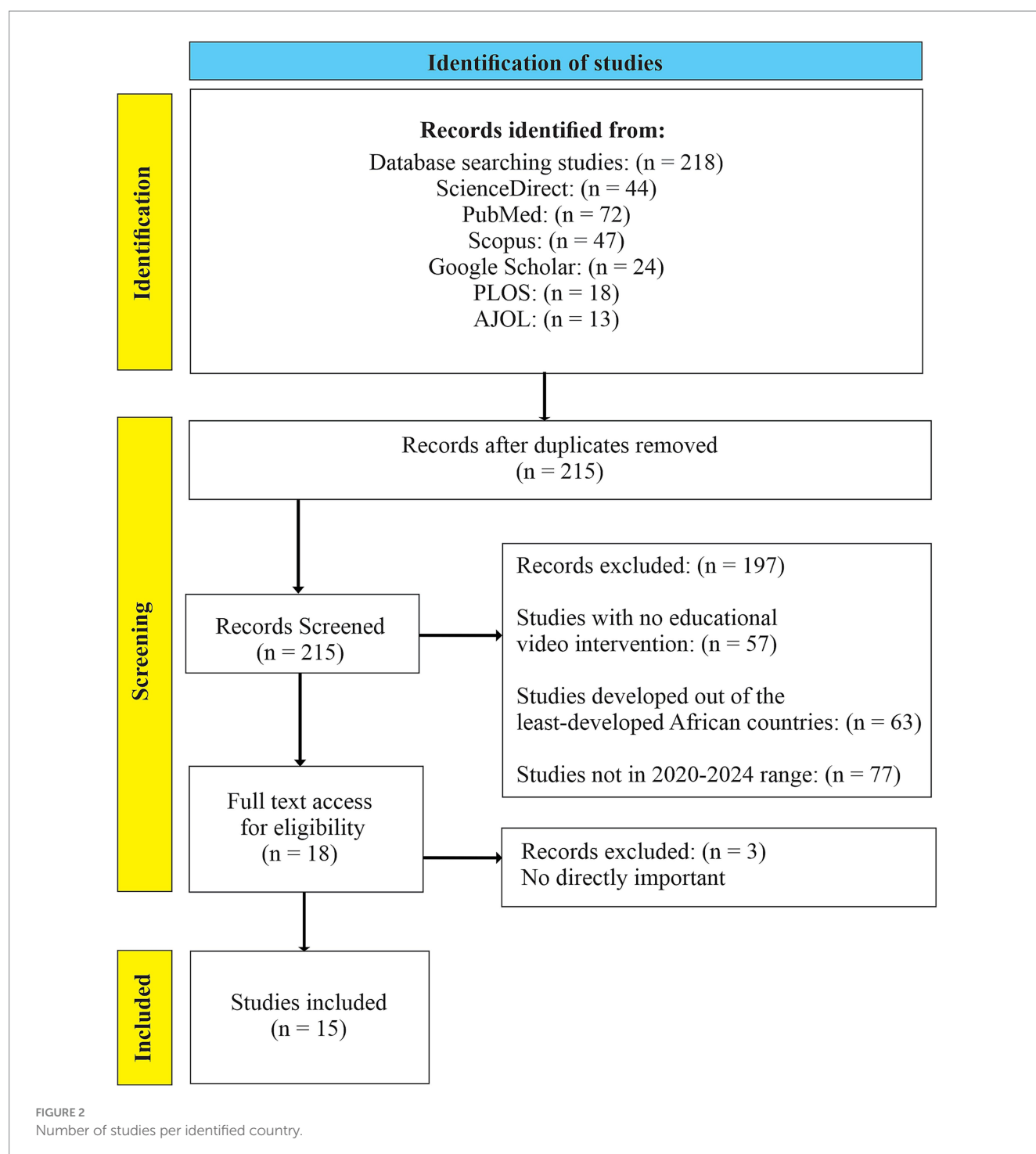
Similarly, studies focusing on health workers (*n* = 4) featured content related to maternity care topics that included testimonials from mothers (Mengistu et al., 2021), COVID-19 education, showcasing a video that guided handwashing, mask-wearing, and maintaining social distancing (Scott et al., 2022), motherhood, neonatal, and maternal child healthcare (Obasola, 2021), and finally, counselors offering guidance on nurturing care for caregivers (Ferla et al., 2023).

3.3.2 Finding summary

Eleven of the fifteen selected studies focused on patients and/or citizens, including students and women. Nine of these studies reported increased (1) knowledge (Holst et al., 2021; Drokow et al., 2021; Tilly et al., 2022; Cooper et al., 2021), (2) awareness and information retention (Masiano et al., 2021; Godana Boynito et al., 2023; Ampofo et al., 2020), and overall, (3) the video content was found to be acceptable, usable, and recommendable (Holst et al., 2021; Martei et al., 2024). Two studies reported "no statistical difference" in outcomes with or without video use, yet indicated increased knowledge (Ansari et al., 2024) and no discernible benefits (Kanyeki et al., 2022) (Table 3). Meanwhile, the remaining four studies, which involved health workers comprising health professionals, healthcare providers, program managers, and community health workers, showed improvements and clarity in understanding health content presented in video format (Ferla et al., 2023; Scott et al., 2022; Obasola, 2021; Mengistu et al., 2021). These studies recognized the potential of video for delivering effective health content, and overall, video-based health education interventions were reported to have a positive impact on the target audience (Table 4).

4 Discussion

This review systematically compiles evidence on video-based health education initiatives in the 24 least-developed African countries from 2020 to 2024. Among 15 eligible studies, most (13 out of 15, 86.6%) reported positive effects on knowledge, awareness, or self-efficacy among patients,

FIGURE 2
Number of studies per identified country.

4.1 Effectiveness and reach

Video-based health education is an impactful method for engaging patients effectively across various healthcare intervention sectors, including diagnosis, treatment, and self-care (Ploderer et al., 2022). Research conducted in some of the least-developed African nations highlighted this potential. Ansari et al. (2024) and Masiano et al. (2021) reported that video is a valuable tool for promoting health education among pregnant women regarding maternal and childbirth health (Ansari et al., 2024), and improving maternal retention in HIV care and the uptake of antiretroviral therapy (Masiano et al., 2021), respectively. Furthermore, Tilly et al. (2022) demonstrate that video is a cost-effective tool. Their study reveals that video-based health education saves patients time and money compared to traveling by

citizens, and health workers. These results support global findings that multimodal media, such as video, can enhance understanding and memory (Ferguson, 2012; Robert et al., 2023; Yang et al., 2021), particularly in settings with low literacy levels (Ferguson, 2012; Liu et al., 2025).

TABLE 2 Study characteristics.

Author/Year	Study participants	Sample size	Intervention method	Research duration	Video delivery
Tilly et al. (2022)	Patients and/or Citizens	100	Pre and post	6 months	TV monitor or projector
Masiano et al. (2021)		132	Pre and post	1 month	TV monitor or projector
Cooper et al. (2021)		760	Pre and post	2–5 days	TV monitor or projector
Ampofo et al. (2020)		50	Pre and post	1 session	TV monitor or projector
Kanyeki et al. (2022)		38	Cg. and Ig.	8 months	Tablet and compact disc
Holst et al. (2021)		12	Pre and post	24 months	Mobile phone
Holst et al. (2022)		302	Cg. and Ig.	12 months	Tablet
Ansari et al. (2024)		7,684	Cg. and Ig.	36 months	Android handsets
Martei et al. (2024)		106	Pre and post	8 months	Tablet
Drokow et al. (2021)		645	Pre and post	12 months	TV monitor or projector
Godana Boynito et al. (2023)		Focus group of 10–12	Pre and post	12 months	Mobile projector
Mengistu et al. (2021)	Health workers	106	Pre and post	27 months	TV monitor or projector
Scott et al. (2022)		52	Pre and post	1 month	WhatsApp, YouTube Web and PCs
Ferla et al. (2023)		113	Pre and post	10 months	Mobile devices
Obasola (2021)		9	Pre and post	30–40 min. Per session	TV/DVD

Cg, Control group; Ig, Intervention group.

bus or other means to attend awareness sessions at health centers. Patients can watch videos from home as often as they like using smartphones or other internet-enabled devices. The rapid sharing and widespread availability of health-related videos online have established them as a leading medium for health education and promotion (Ghozali, 2023).

Understanding health conditions helps diminish the barriers between doctors and patients, transforming doubt into informed dialogue. This improved understanding leads to higher patient satisfaction, whether it comes from real-time online support delivered by a physician (Tan et al., 2023), or from a pre-recorded health education video that engages both visual and auditory senses (Anasi, 2004). Further to the above, research from Tilly et al. (2022), Cooper et al. (2021), Holst et al. (2021), and Drokow et al. (2021) demonstrated how effective videos were in increasing knowledge among their audiences, primarily focusing on cancer, human papillomavirus infection, and HIV/AIDS. This increase in knowledge encourages patients to engage with the content anytime, anywhere, thereby enhancing comprehension retention (Naderyanfar et al., 2019; Gusdorf et al., 2023) and positively influencing memory, understanding, and emotions. These cognitive and emotional attitudes are primarily driven by how the information is tailored to the audience and how effectively it is delivered (Wang et al., 2018).

Numerous systematic reviews evaluating the effects of video-based health education in the least-developed African countries have shown steady growth in its application throughout the continent (Till et al., 2023). This approach has been shown to enhance knowledge among individuals with low literacy levels markedly (Mbanda et al., 2021); it acts as an effective decision-making tool (Mwase et al., 2022) and improves patients' comprehension of health-related information (Boynito et al., 2024). Yet, several challenges hinder the implementation of video-based health education in these regions, which local governments need to tackle. These challenges include inadequate funding, limited technological literacy, a scarcity of technological resources (Kabukye et al., 2021), a lack of a health information exchange policy (Mamuye et al., 2022), and an overreliance on text-based communication (Till et al., 2023). Nevertheless, at least four studies from the least-developed African countries indicate that health institutions actively promote health education through videos: (1) Mengistu et al. conducted a survey with multidisciplinary health professionals, finding video-based education to be a powerful method for enhancing care (Mengistu et al., 2021), (2) Scott et al., through their study of program managers and drug distributors, discovered that educational videos with health content effectively reinforce messages and are easy to understand (Scott et al., 2022), (3) Ferla et al. explored video-based health education with community health workers, who reported improved counseling performance and enhanced mentorship (Ferla et al., 2023), and finally, (4) Obasola investigated healthcare providers' perspectives, finding that implementing information and communication technology with

TABLE 3 Performance summary (patients and/or citizens).

Author/Year	Educational contents	Objectives	Outcomes	Findings
Tilly et al. (2022)	Cancer	Assess change in cancer knowledge and care experience.	A low-cost tool that educates and empowers patients.	Significant improvement in knowledge.
Masiano et al. (2021)	HIV	Improve maternal retention in HIV care and ART uptake.	Acceptable, feasible, and supported decision-making tool.	Reduced anxiety and fear, and an increase in hope.
Cooper et al. (2021)	HPV/Cervical Cancer	Measure the impact of the HPV/cervical cancer educational video.	Knowledge acquisition improved.	Significant improvement in knowledge.
Ampofo et al. (2020)	Cervical Cancer	Evaluate the video's impact on awareness of screening.	Raised awareness, understanding, and belief.	Significant increase in awareness.
Kanyeki et al. (2022)	Spinal anesthesia procedure	Test video information on pre-procedure anxiety.	No benefit from the video.	No statistical difference
Holst et al. (2021)	HIV/AIDS, TB, Cysticercosis, anthrax	Demonstrate a multi/interdisciplinary design process.	An animated video developed key health messages.	Recommended for multidisciplinary design.
Holst et al. (2022)	HIV/AIDS, TB, Cysticercosis, anthrax	Assess knowledge uptake and retention in the rural community.	Animated video significantly improved health knowledge.	Significant improvement in knowledge.
Ansari et al. (2024)	Maternal and Child Health	Improve maternal and child health through "edutainment" videos.	Knowledge and attitudes improved, but not significantly.	No statistical change in attitudes.
Martei et al. (2024)	Breast Cancer	Develop and assess a survivor-narrative video for treatment support.	Highly acceptable and usable.	Highly acceptable and usable.
Drokow et al. (2021)	HPV vaccination /Cervical Carcinoma	Promote HPV vaccination and Pap tests via behavior-change videos.	Influenced perception, self-efficacy, and understanding.	Significant improvement in knowledge.
Godana Boynito et al. (2023)	Maternal and Infant Community Care	Test the acceptability and feasibility of community-based video.	Acceptable and feasible for promoting behavior change.	Acceptable and feasible intervention tool.

HIV, Human Immunodeficiency Virus; ART, Antiretroviral Therapy; TB, Tuberculosis; HPV, Human Papillomavirus.

TABLE 4 Performance summary (health workers).

Author/Year	Educational emphasis	Objectives	Outcomes	Findings
Mengistu et al. (2021)	Maternity care	Describe the development and implementation of improving respectful maternity care.	Testimonial-based video education is an effective way to improve care.	Significant improvement in knowledge.
Scott et al. (2022)	COVID-19	Describe the development and evaluation of video job aids to support the safe delivery of SMC during COVID-19 and improve seasonal malaria chemoprevention quality.	Users easily understand video-based health education and are reinforced by key messages by allowing for repeated viewing.	Significant improvement in the quality of message delivery.
Ferla et al. (2023)	Nurturing care/Early Child Development counselling	Evaluate the effect of ECD video with mentorship and supervision to improve CHW nurturing care/ECD counselling.	Video-based health education, enhanced supervision, mentorship, and improved CHW performance in providing counselling	Significant improvement in education.
Obasola (2021)	Maternal Child Health	Explore healthcare providers' experiences with using ICT tools (e.g., videos) for MCH and optimize their application.	The growing demand for ICT, particularly educational videos in health services, has led to demonstrable improvements in education outcomes.	Significantly relevant.

SMC, Seasonal malaria chemoprevention; ECD, Early Child Development; CHW, Community Health Worker; ICT, Information and Communication Technology.

video usage positively impacted health education interventions and received strong recommendations for its effectiveness (Obasola, 2021).

Compatibility issues with legacy devices, such as DVD players, outdated smartphones, and analog TVs, as well as the lack of standardized educational platforms in low-resource settings, continue to limit the adoption of AR/VR tools (Mondal and Mondal, 2025). Moreover, the rapid obsolescence of such devices, coupled with high maintenance costs, contributes to financial strain. Within this context, specialized outreach programs can capitalize on the widespread availability of smartphones, observed as early as 2015, by distributing smartphone-based VR kits like Google Cardboard. This strategy enables the delivery of immersive training experiences without requiring significant infrastructure investments (Mondal and Mondal, 2025). The Pragati study conducted in rural India demonstrates this approach by using Google Cardboard-mounted phones to train community health workers in maternal and child health (Sorathia et al., 2017). Adopting 360° guided audiovisual modules that simulated an Assamese home environment (Sorathia et al., 2017), participants experienced a training method distinct from those employed by Ferla and Obasola in training health workers across various African contexts (Ferla et al., 2023; Obasola, 2021).

Beyond the Google Cardboard approach, Neuwirth and Ros proposed the use of 180° video viewed through VR head-mounted displays (HMDs) or 3D-capable computer monitors (Neuwirth and Ros, 2021). These were deemed affordable and practical solutions, particularly suitable for training healthcare professionals in Africa. Compared to educational videos delivered via mobile phones, televisions, projectors, or DVDs, this approach is more effective in fostering engagement. Unlike the least-developed countries in Africa, more developed nations, including the United States, Europe, and parts of Asia, have successfully utilized VR-embedded video as a medium for health education (Costa et al., 2024; Jia et al., 2021). In the United States, for example, this broad application has led to the establishment of online public databases containing videos on various health education topics (Media GH, 2024; Plus, 2024), as well as VR websites dedicated to health education, such as medvr.education (USA), exr.education (England), SIMx (USA), among others.

4.2 Core findings

The assessment of selected studies in this systematic review was divided into two data subsets: "study design" and "performance summary" (Tables 2–4). These datasets were crucial for illustrating the role of video in health education in the least developed African countries from 2020 to 2024. The intervention methodologies employed in these studies to reach their audience were essential for evaluating the impact of videos designed for health education. Randomized controlled trial studies ($n = 3$) consisted of two groups (e.g., control group with no video and intervention group with video) to compare the effects of video-based health education versus traditional methods. Single-group studies ($n = 12$) assessed the effectiveness of video by examining a single group through pre- and post-intervention measures.

All included studies reported positive outcomes, although two ($n = 2$) found no significant difference between video-based methods and conventional practices. Research involving patients and citizens ($n = 9$) revealed increased knowledge, awareness, and retention of

information related to cancer, HIV, human papillomavirus, and maternal and child health care. Furthermore, these studies indicated that video-based health education was deemed acceptable, feasible, and usable. Various sharing tools were employed to evaluate video effectiveness, including TV monitors, projectors, mobile phones, tablets, compact disks, PCs, and digital platforms such as WhatsApp, YouTube, and websites. Additionally, four studies ($n = 4$) involving health workers highlighted video as an effective educational tool due to its comprehensive nature. They reported understanding health content better when presented in video format, acknowledging its potential for effective health education delivery.

4.3 Future directions

Future research should focus on longitudinal studies to determine whether observed knowledge gains result in lasting behavioral changes, such as regular cancer screenings or consistent adherence to ART. Comparative studies assessing the cost-effectiveness of video versus traditional methods, as well as the level of engagement generated by live-action versus animated videos, are also recommended. Technological innovations, such as AI-driven adaptive videos and gamified features, could further enhance engagement and effectiveness. Equity-oriented research questions remain urgent, including how female participants respond and how to deliver health video education to nomadic and conflict-affected populations.

Ultimately, this review serves as a crucial reminder for the least-developed African nations about the efficacy of digital solutions in overcoming educational obstacles and enhancing health education strategies. Importantly, although limitations and challenges, this review concludes that significant attention is being given to the delivery of Video-based Health Education in most target countries ($n = 24$, 72.7%).

5 Conclusion

Video-based Health Education has demonstrated substantial potential in enhancing health literacy, knowledge retention, and patient engagement across various health issues in the least-developed African nations. This systematic review highlights the successful use of videos for educational health content, particularly in areas such as cancer, HIV, COVID-19, Human papillomavirus infection, spinal anesthesia procedures, and maternal health. The findings reveal that Video-based Health Education can help bridge gaps left by traditional healthcare delivery, offering a more accessible and engaging resource for patients, health workers, and the general public to enhance their understanding of health matters.

However, several challenges still need to be addressed, such as limited access to digital infrastructure, low levels of technological literacy, and inconsistent internet connectivity. These issues create a digital divide that hinders the broad adoption of video education approaches. Furthermore, the absence of institutional backing and inadequate incorporation of digital health strategies in many African nations restricts the full realization of its benefits. To address these challenges, further research is needed to assess the scalability, sustainability, and long-term effects of the Video-based Health Education initiative. For instance, comparing offline and online

delivery methods in both rural and urban areas can help assess the health outcomes, such as knowledge acquisition and behavior change, alongside operational metrics like cost per user, training duration, and technology uptime. Incorporating formal cost-effectiveness and cost–benefit analysis into these studies will provide police makers with essential ROI (Return on investment) data to justify infrastructure investment. Longitudinal cohort studies that combine quantitative surveys and detailed qualitative interviews can also shed light on how digital literacy efforts for patients and healthcare workers influence engagement with video-based health education, as well as identify relevant facilitators or barriers in different contexts.

In conclusion, when carefully adapted and implemented, Video-based Health Education can substantially bridge knowledge and healthcare service gaps in marginalized African populations, empower patients, and provide scalable solutions for the development of health workers. Nevertheless, its effectiveness remains context-dependent, and continued evaluation is needed to maximize its transformative potential while addressing persistent challenges in resource-constrained settings.

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.

Author 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.

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