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Measures of healthcare decision-making ability in cognitive aging: a scoping review from the Advancing Reliable Measurement in Cognitive Aging and Decision-Making Ability (ARMCADA) research initiative

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Introduction: Declines in decision-making (DM) ability are often observed with increasing age and pose significant risk for negative health, financial, and functional outcomes. The Advancing Reliable Measurement in Cognitive Aging and Decision-making Ability (ARMCADA) research initiative aims to improve measurement of DM ability in aging to facilitate early detection of cognitive and functional decline. This scoping review summarizes the extant literature on DM measures in aging, focusing specifically on measures relevant to healthcare decision-making (HCDM).

Methods: We identified articles published between 2018 and 2023 using keywords related to DM abilities in aging populations. Titles and abstracts were first reviewed by two trained reviewers, followed by full-text review and extraction. Results of the current scoping review are reported in adherence to PRISMA-ScR guidelines.

Results: The scoping review identified 16,286 articles across multiple domains of decision-making, 705 of which met criteria for extraction, and 246 of which were related to healthcare decision-making. There were 86 unique measures across these articles, and 18 of these measures directly targeted decision-making ability. Most measures were administered to clinical groups in English and in-person with a trained examiner. Measures of healthcare DM ability tended to consist of semi-structured interviews or performance-based items, though there were also several self-report measures.

Discussion: The most commonly used measures to assess HCDM ability require trained administration of a semi-structured interview to assess ability to reason about health-related scenarios and are often time-intensive. Creation of a

streamlined, standardized measure to assess HCDM ability will benefit both research and clinical care for the aging population.

KEYWORDS

healthcare decision, decision-making capacity, patient decision-making, health outcomes, capacity assessment instruments, decision-making assessment

1 Introduction

The ability to make effective decisions about one's health has long been recognized as an important aspect of overall wellbeing, particularly as individuals age (e.g., (1)). As the global population continues to rapidly age (e.g., (2)) and medical decisions grow increasingly complex, reliable and efficient measures of even minor declines in decision-making (DM) ability have become critical. However, assessing DM ability has historically been challenging due to inconsistent definitions of decision capacity, low inter-rater reliability, and differing practices among assessors (e.g., (3)).

Healthcare-related decision making (HCDM) refers to the process by which individuals make choices and judgments regarding their own health and health-related matters. Amidst a highly complex healthcare system, individuals are tasked with navigating an increasing number of decisions related to access to and use of healthcare resources, including choices about specific healthcare insurance plans and the feasibility of access to care (4). Whereas ongoing advancements in the treatment of acute and chronic illness have vastly improved overall survival and health, they also contribute to decision complexity. For example, there is no clear correct answer when deciding whether to move forward with a treatment that has a certain percent chance of extending survival but carries a significant chance of side effects that would meaningfully impact patient quality of life. Indeed, health-related choices are often inherently value-based (e.g., (5)), and it is necessary to consider individual values and priorities that may lead to differing decisions when assessing HCDM ability.

HCDM is often conceptualized using a four-component model (6). Under the Grisso and Appelbaum model (6), a patient can demonstrate capacity to make a specific healthcare decision by exhibiting the ability to (1) understand the situation and relevant options, (2) appreciate how a situation applies to them, (3) reason about which choice is most appropriate, and (4) express a choice. Whereas many persons with cognitive decline may be able to express a choice and provide reasons for that choice (7), the capacity to fully understand and appreciate the various features of a choice is often more complex and more likely to be susceptible to even early stages of cognitive decline. It is crucial for measures of healthcare decision-making (HCDM) ability to be adequately sensitive to pick up on subtle changes in understanding, appreciating, and even reasoning about healthcare choices.

The current scoping review is part of the larger Advancing Reliable Measurement in Cognitive Aging and Decision-making Ability (ARMCADA) research initiative, which aims to develop and validate a multidomain DM battery for research and clinical use. To inform this effort, we conducted a scoping review of measures of DM across multiple domains that have been used in adults aged 45 + and with a variety of participant populations (e.g., healthy controls, persons with cognitive impairment, persons with chronic or terminal illnesses). Inclusion of participants aged 45 and above, rather than

typical cut offs of 50–60 years old, allows for investigation of the earliest signs of decline in DM associated with age and neurodegenerative diseases. The goal of the larger scoping review was to identify the most frequently used measures of DM in recent years to establish limitations of currently available approaches to measuring DM ability; the current paper focuses solely on HCDM.

2 Methods

The scoping review was guided by the framework of Arksey and O'Malley (8) with methodology and results reported in line with the PRISMA Extension for Scoping Reviews (PRISMA-ScR; (9)). A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews, and JBI Evidence Synthesis identified no existing or ongoing systematic or scoping reviews on this topic and with this specific participant population (e.g., individuals aged 45 and older) prior to starting our review.

2.1 Protocol and registration

The HCDM domain review was conducted as part of a larger comprehensive scoping review (see (10) for review protocol). This study did not involve human subjects research, and therefore full institutional review board approval was not required (Northwestern University STU00220334).

2.2 Search strategy and eligibility criteria

The initial database search for the multi-domain scoping review included terms broadly related to DM and aging (e.g., “decision making,” “decision capacity,” “decisional impairment”; see (10) for full search terms across domains), as well as domain-specific terms for each included domain (see Table 1 for terms specific to healthcare). Databases included Embase (Elsevier; 10,114 results), MEDLINE (Ovid; 4,528 results), PsycINFO (EbscoHost; 3,615 results), Cochrane Library (Wiley; 831 results), Web of Science (Clarivate), and Scopus (Elsevier; 5,448 results). The search strategy was developed with the help of a medical research librarian at Northwestern University's Galter Health Sciences Library.

We identified articles published between January 1st, 2018 and November 6th, 2023 using keywords related to DM abilities across domains. This scoping review focused on identifying measures used to assess decision-making ability in aging populations, and we limited our search to the prior 5 years to ensure that we captured measures that are being contemporaneously used in research and clinical settings and that are likely to be adaptable to digital formats. Articles were assigned to relevant domains by

trained reviewers during the full-text review and extraction stages. The focus of the current project was to identify measures of individual DM abilities, so articles that only included measures of clinical or shared DM, decision aids, or low-level cognitive abilities (e.g., lexical decision tasks) were excluded.

2.3 Screening, data extraction, and synthesis

Once the initial search was completed, the articles were screened in Covidence (11), a software management system for scoping reviews, using the inclusion and exclusion criteria provided in Table 2. This was carried out in three stages: (1) title and abstract screening, (2) full-text review, and (3) full-text extraction and synthesis. For each stage, all reviewers were trained on sample articles as a group and then completed individual

reviews on a subset of sample articles. After their individual reviews were assessed and approved by the domain scientists, reviewers proceeded to the screening process.

2.3.1 Title and abstract screening

Covidence was utilized for the title and abstract screening. In the first stage of the review, each article was screened by two trained reviewers independently focusing on the title and abstract only. Conflicts between reviewers were resolved by another trained reviewer or doctoral level project scientist. This first stage of screening was conducted from November 10th to December 8th, 2023. The articles included were then entered into the full-text review stage.

2.3.2 Full-text review

The full text review was also conducted using Covidence. Each article's full text was independently assessed by two trained reviewers to confirm inclusion/exclusion using the eligibility criteria (see Table 2). Conflicts were resolved by a third expert reviewer. Full text review of articles was conducted from December 8th to December 22nd, 2023.

2.3.3 Full-text extraction and synthesis

The extraction phase was completed via Qualtrics.¹ Trained reviewers extracted data from articles that were not excluded during title and abstract review or during full-text review. Extracted variables included the age of the sample, DM domain(s) assessed, and various features of the included measures (e.g., language of administration, duration, required technology or materials, mode of administration). Once data extraction was completed on January 31st, 2024, data from Qualtrics was exported to Excel for preliminary categorization (e.g., assignment to relevant DM domains).

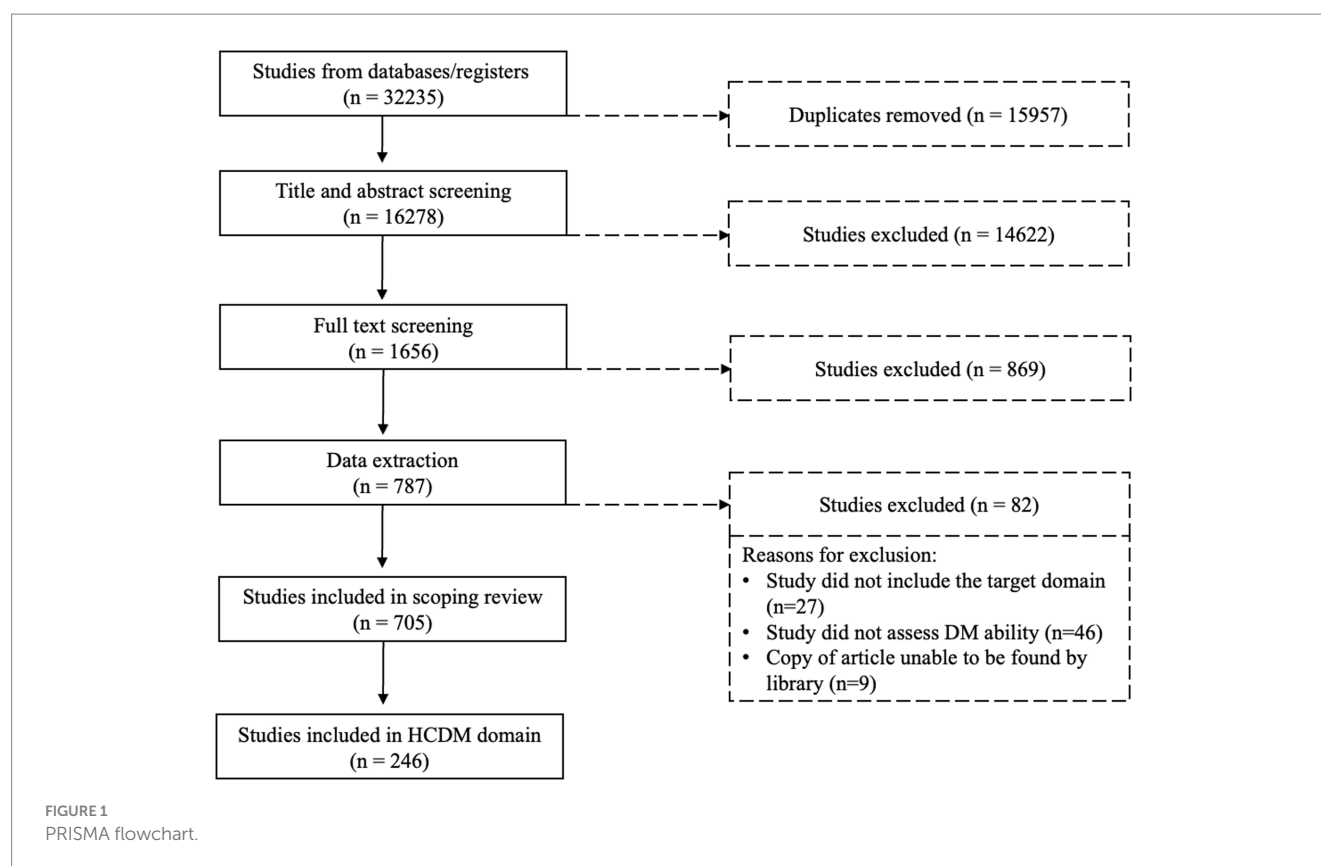
1 Qualtrics © (2023). The extraction for this paper was generated using Qualtrics software, version XM of Qualtrics. Available at: <https://www.qualtrics.com>.

TABLE 1 Example search terms for healthcare decision-making.

	Healthcare specific search terms
General search terms	'patient decision making'
'choice behavior'	'healthcare decision'
'choice making'	'health care decision'
'decisional impairment'	'health related decision'
'decision process'	'medical decision'
'decision making task'	'health care planning'
'decision quality'	'health literacy'
'decision capacity'	'informed consent'
'geriatrics'	'medical information'
'geriatrician'	'attitude to health'
	'health belief model'
'elder abuse'	'aged patient'

TABLE 2 Inclusion and exclusion criteria for overall ARMCADA scoping review.

Factor	Inclusion criteria	Exclusion criteria
Population	- Adults over age 45 - The assessment was conducted with at least one group of individuals over 45 years - Age range includes participants aged 45 and over	Adults ≤45 years old
Study Characteristics	- The study mentions at least one assessment of one or more of the target domains - The domain of interest is an outcome assessed by the study.	- Single-subject research/Case studies. - Focus group - Review articles - Narrative reviews - Gray literature - Conference Proceedings - Books and/or book chapters - Commentaries - Preprints - Other non-research publications
Other	- Language of measures: All languages - Location: All geographical locations	- Article published in a language other than English and no English translation available - Articles that only measure shared decision-making - Articles that only measure decision aids



3 Results

3.1 Search results

The initial search yielded 32,235 records based on the search strategy. Covidence was used to remove 15,957 duplicate records and screen the remaining 16,278 articles, first by title and abstract (14,622 excluded) and then by full-text screening (869 excluded). The remaining 787 were then moved to the extraction phase; 82 articles were excluded during extraction, resulting in a final set of 705 articles (see [Figure 1](#) for details). Of these 705 articles, 246 focused on healthcare decision-making, broadly defined, in persons aged 45 and older. Out of the 246 articles that discussed healthcare decision-making, we excluded an additional 57 articles as they included only measures that fell under other DM domains (e.g., Financial DM or Functional Outcomes) rather than HCDM. Thus, 189 articles included at least one measure directly assessing HCDM or other healthcare-related topics (e.g., decision style, treatment satisfaction, health behaviors). There were 86 unique measures included across the 189 articles, 18 of which were direct measures of healthcare DM ability, ranging from semi-structured interviews and vignettes to self-report questionnaires (see [Table 3](#)). The remaining measures (see [Supplementary Table 1](#)) focused on decision-making behaviors ($n = 11$; e.g., decision-making style, extent of deliberation before making a decision), feelings and attitudes about decisions ($n = 14$; e.g., decisional conflict, decisional regret, satisfaction with decisions), health behaviors and outcomes ($n = 31$; e.g., treatment adherence,

health-related quality of life, health literacy, motivation for treatment), capacity to consent to research ($n = 4$), shared decision-making ($n = 6$), proxy decision-making ($n = 1$), and effectiveness of a decision aid ($n = 1$), all of which fall outside of the scope of this review.

There were 18 measures focusing specifically on assessing HCDM ability (see [Table 3](#)) across 64 articles. Most articles indicated administration of measures in English only (54%), 3% only in Spanish, and 3% of articles administered measures in English and another language. Forty-one percent of articles were administered in another language, including 8% Japanese, 6% Italian, 8% Chinese, 3% Dutch, and 3% German. Sample sizes ranged from 20 to over 1,000. Half of the articles included samples only over age 45 (49%). Across all articles, 77% of articles included participants aged 65–84 and 42% included participants aged 85 and older. Most articles included at least one clinical group in the study sample (65%). Of those articles that included clinical groups, the most common clinical populations were dementia (25%), psychiatric disorders (15%), cancer (12%), and mild cognitive impairment (10%). The majority of measures (79%) were administered in-person, and few measures were administered using technology (e.g., computer, iPad; 16%). Most measures (65%) were administered by a trained examiner, though some were self-administered with (4%) or without supervision (24%). Though we included reliability and validity information as part of the full-text extraction, the vast majority of articles (>90%) did not report reliability or validity information, precluding examination of psychometric properties across measures.

TABLE 3 Characteristics of measures assessing HCDM ability.

Measure	# Citations in scoping review	Citing articles	Original citation	Age ranges covered	Clinical groups	Modality	In-person vs. remote	Examiner- vs. Self-administered
MacArthur Competence Assessment Tool for Treatment (MacCAT-T)	22 (1 modified version)	Aki et al. (36); Carabellese et al. (37); Chang and Bourgeois (38); Curley et al. (39); Curley et al. (40); Kato et al. (41); Kolva et al. (42); Koukopoulos et al. (43); Loughran et al. (44); Mandarelli et al. (45); Murphy et al. (46); Murphy et al. (47); Nystazaki et al. (48); Ogawa et al. (49); Olie et al. (50); Oshima et al. (51); Parmigiani et al. (52); Poth et al. (53); Santos et al. (54); Spataro and La Bella (55); Sugawara et al. (56); Turner et al. (57)	Grisso and Applebaum (6)	18–85+	Mild cognitive impairment; Alzheimer's disease dementia; Dementia; Schizophrenia spectrum disorders; Psychiatric inpatients; Suicide attempters; Terminal cancer; Bipolar disorder; Major depressive disorder; Lung cancer; Amyotrophic lateral sclerosis (ALS)	Semi-structured interview w/ vignettes	In-person	Administered by examiner
Decision Making Competence Assessment Tool (12-item Assessment)	12	Glover et al. (58); Han et al. (59); Kapasi et al. (60); Lamar et al. (61); McSorley et al. (62); Stewart et al. (63); Stewart et al. (64); Stewart et al. (65); Weissberger et al. (66); Wilson et al. (67); Yu et al. (68); Yu et al. (69)	Finucane and Gullion (15)	45–85+	Alzheimer's disease dementia; Common chronic conditions of aging	Performance-based	In-person	Administered by examiner
The Decision Self-Efficacy Scale (DSE)	8 (1 modified version)	Bakhit et al. (70); Cuyppers et al. (71); Guerrero-Peral (72); Ng et al. (73); Owens et al. (74); Pompili et al. (75); Smith et al. (76); Ye et al. (77)	O'Connor (24)	<18–85+	Cancer (prostate, lung, breast); Migraine; Age-related cataract	Self-report questionnaire	In-person or remote	Self-administered without supervision or administered by examiner
Adult Decision-making Competence Scale (A-DMC)	6	Hoffman et al. (78); Matthews et al. (79); Merillat and Gonzalez-Vallejo (80); Peng et al. (81); Szanto et al. (82); Weller et al. (83)	Bruine de Bruin et al. (16)	18–85+	Multiple sclerosis; Depression; Dieters	Performance-based	In-person or remote	Self-administered with or without supervision
Capacity to Consent to Treatment Instrument (CCTI)	4	Fowler et al. (29); Gerstenecker et al. (84); Gerstenecker et al. (85); Parmigiani et al. (52)	Marson et al. (13)	18–85+	Mild cognitive impairment; Alzheimer's disease dementia; Supranuclear Palsy; Parkinson's disease; Metastatic cancer	Semi-structured interview w/ vignettes	In-person	Administered by examiner
Decision-Making Self-Efficacy Scale (DM-SES)	3	Chen et al. (86); Guo et al. (87); Tsai et al. (88)	Bunn and O'Connor (25)	18–84	Lumbar degenerative disease; Age-related cataract and macular degeneration	Self-report questionnaire	In-person	Self-administered with or without supervision

(Continued)

TABLE 3 (Continued)

Measure	# Citations in scoping review	Citing articles	Original citation	Age ranges covered	Clinical groups	Modality	In-person vs. remote	Examiner- vs. Self-administered
Mental incapacity assessed using the relevant criteria in the Assisted Decision-Making (Capacity) Act 2015 (Ireland)	2	Curley et al. (39, 40); Murphy et al. (47)	Assisted Decision-Making (Capacity) Act (2015)	18–85+	n/a	Semi-structured interview	In-person	Administered by examiner
Short Portable Assessment of Capacity for Everyday Decision Making	1	Fenton et al. (14)	Lai and Karlawish (89)	65–84	Mild cognitive impairment	Semi-structured interview	In-person	Administered by examiner
Decision Outcome Inventory	1	Sobkow et al. (90)	Bruine de Bruin et al. (16)	18–64	n/a	Self-report questionnaire	Remote	Self-administered without supervision
Decision-Making Process (DMP)	1	Nakayama et al. (26)	Nakayama et al. (26)	18–84	n/a	Self-report questionnaire	Remote	Self-administered without supervision
Health Decision-Making Problems	1	Thompson et al. (19)	Waters et al. (20)	18–84	n/a	Performance-based	Remote	Self-administered without supervision
Heart Failure Self-Management Decision-Making	1	Edmiston et al. (91)	Xu et al. (21)	45–85+	Advanced heart failure	Performance-based w/ vignettes	In-person	Administered by examiner
Independent Living Scale (ILS)	1	Emmert et al. (92)	Loeb (18)	45–85+	Dementia	Performance-based	In-person	Administered by examiner
Linguistic Instrument for Medical Decision-Making (LIMD)	1	Stormoen et al. (93)	Tallberg et al. (22)	45–84	Mild cognitive impairment; Alzheimer's disease dementia	Performance-based w/ vignettes	In-person	Administered by examiner
Self-Regulation Questionnaire (SRQ)	1	Kooiman et al. (28)	Brown et al. (27)	18–64	n/a	Self-report	Remote	Self-administered with no supervision
Test of Practical Judgment (TOP-J-9)	1	Rabin et al. (94)	Rabin et al. (17)	45–85+	Subjective cognitive decline; mild cognitive impairment; vascular dementia; Alzheimer's disease dementia; behavioral variant frontotemporal dementia	Performance-based	In-person	Administered by examiner
The Current Medical Decision-Making Capacity Rating (CMDRC)	1	Fowler et al. (29)	Fowler et al. (29)	18–84	Metastatic cancer	Self-report	In-person	Self-administered under supervision
The Patient Participation Competence Scale (PPCS)	1	Tang et al. (95)	Liu (23)	18–84	Breast cancer	Performance-based; Self-report	In-person	Administered by examiner

3.2 Semi-structured interviews

The most frequently used measure of HCDM ability ($n = 22$ articles) was the MacArthur Competence Assessment Tool for Treatment (MacCAT-T; (12)). The MacCAT-T is a semi-structured interview that is well-validated and has been used across many different clinical populations (see Table 3). The measure takes about 15–20 min and must be administered by a trained examiner. During administration of the MacCAT-T, examinees are given information about a specific medical condition and the risks, benefits, and outcomes of different treatments; the medical condition used is typically one that the examinee has been diagnosed with, but some studies have used standardized scenarios. The examiner then asks questions to assess the examinee's understanding, appreciation, reasoning, and expression of a choice regarding the specific situation. Several articles also included the Capacity to Consent to Treatment Instrument (CCTI; (13)), which is similar to the MacCAT-T in structure and administration but employs standardized vignettes about a brain tumor and heart blockage to elicit understanding, appreciation, reasoning, and expression of a choice. One article utilized the Short Portable Assessment of Capacity for Everyday Decision Making (SPACED; (14); adapted from (7)), which is akin to the above semi-structured measures but is not focused specifically on healthcare scenarios. Examinees are given a scenario depicting an everyday problem with two possible response options; they then are asked a series of standardized questions designed to assess understanding and appreciation of the situation, as well as to compare between the response options.

3.3 Performance-based measures

The next most frequently used type of measure was performance-based tasks. Specifically, 12 articles used the Decision-Making Competence Assessment Tool (DMCAT; (15)), which includes two subscales (i.e., HCDM; financial DM). The healthcare-related items ask respondents to weigh various characteristics of health maintenance organization (HMO) plans; each item has a correct answer that can be identified using deductive reasoning. The next most frequently used performance-based measure was the Adult Decision-making Competence Scale (A-DMC; (16)), which contains items that fit into several different scales (e.g., Resistance to Framing, Consistency in Risk Perception) that assess overall decision-making abilities, not necessarily HCDM in particular. Two measures, the Test of Practical Judgment (TOP-J; (17)) and the Health and Safety subscale of the Independent Living Scale (ILS; (18)), posit scenarios related to HCDM and other DM domains (e.g., what to do if one runs out of a prescription medication while traveling), with specific examiner prompts to generate additional responses if examinees do not initially provide full-credit answers. Examinees' verbal responses are rated based on completeness and complexity according to scoring guidelines. Several other performance-based measures were identified, though none were used in more than one cited article, including the Health Decision-Making Problems, which consists of four items asking examinees to calculate change in probabilities based on treatment chosen ((19); adapted from (20)); Heart Failure Self-Management

Decision-Making, which asks respondents with heart failure how they respond to symptoms that may signal need for medical intervention (21); Linguistic Instrument for Medical Decision-Making, which provides three vignettes and asks examinees to answer a variety of questions that assess comprehension, evaluation, and intelligibility of decision criteria based on linguistic coding (22); and the Patient Participation Competence Scale, which focuses on examinee involvement in DM in terms of communication, information acquisition, emotion management, and autonomous decision-making (23).

3.4 Self-report measures

The last category of HCDM measures is self-report. The Decision Self-Efficacy Scale (DSE; (24)) and the Decision-Making Self-Efficacy Scale (DM-SES; (25)) were cited by multiple articles and assess individuals' confidence in their DM ability (e.g., "I feel confident that I can figure out the choice that best suits me"). Several other self-report measures were identified in the scoping review but were only cited by a single article, including: (1) the Decision Outcome Inventory (16), which lists negative outcomes of poor decision-making (e.g., "Got blisters from sun burn"); (2) the Decision-Making Process scale (26), which asks respondents to rate whether they take certain approaches to decision-making (e.g., "I make sure I have all the options available to me"); (3) a modified Self-Regulation Questionnaire (27, 28) assessing self-regulation behavior related to health (e.g., "I can usually find several different possibilities when I want to change something in my health behavior"); and (4) the Current Medical Decision-making Capacity Rating (CMDC; (29)), a self-report measure of perceived independence in understanding, appreciating, reasoning, and expressing health choices (e.g., "Are you able to provide good reasons for whichever treatment choice you made?").

4 Discussion

The current scoping review summarized the extant literature on measures of HCDM used in aging research as part of the larger ARMCADA study, which aims to develop an efficient, comprehensive battery to assess multiple domains of decision-making (DM) ability across the cognitive aging spectrum. Though our review identified many articles that focused on HCDM, only a small number of measures used in these articles were directly relevant to HCDM *ability*, which we have defined as the capacity to make decisions and judgments about one's health, healthcare, and treatment. The measures that directly assessed HCDM ability fell into three categories: semi-structured interviews using healthcare vignettes, performance-based tasks, and self-report measures.

The most frequently used measure was the MacCAT-T, which exemplifies the current gold standard approach for assessing HCDM ability. The MacCAT-T utilizes a semi-structured interview focused on a medical situation or treatment decision relevant to the individual examinee to elicit evidence of the four components of DM capacity per the Grisso and Appelbaum model (i.e., understanding, appreciation, reasoning, expression of a choice; (6)). This type of measure is thorough, well-established, and adaptable

to many different healthcare situations. However, semi-structured interviews are time-intensive (e.g., 20+ minutes) and require administration by a trained examiner who can respond appropriately and effectively to various responses, which limits their utility as screening tools; these measures are not always able to be implemented in situations that require rapid medical decision-making or when there is limited time spent with individuals. Indeed, such interview-based measures are better suited to research or clinical settings with ample time for measure administration; the thoroughness of interviews is also appropriate for clinical situations that require a high level of confidence in the measure's outcome (e.g., critical treatment decisions).

Performance-based measures like the DMCAT and TOP-J offer more standardization in scoring and pose a lower burden for administration, especially for measures that can be administered with minimal examiner supervision (e.g., multiple choice items). However, measures with discrete correct answers often rely on health literacy (e.g., specialized knowledge of healthcare systems or health insurance), which may be impaired in older adults with cognitive decline even in the absence of a dementia diagnosis (30–32). Over-reliance on health literacy in DM measures also penalizes individuals from historically marginalized groups who are afforded less access to education and healthcare resources. Performance-based measures are also not typically formulated to directly address the four-component model of DM capacity; rather, they are more likely to assess a specific type of reasoning (e.g., deductive reasoning) or characterize an approach to decision-making (e.g., resistance to framing).

Self-report measures of DM ability are the least time- and resource-intensive option, making them the most accessible for inclusion in screening processes. However, the benefit of expediency comes at a cost, as these measures are likely less accurate compared to performance- and interview-based measures and typically are not able to assess different components of DM ability per the four-component model of capacity. One self-report measure, the CMDC (29), which includes specific items meant to assess the four components of DM, showed poor reliability with traditional interview-based measures of the same components, especially in persons with impaired capacity per traditional measures. Indeed, divergence between subjective (i.e., self-report) and objective (i.e., performance-based) measures is a particular concern in older adults with cognitive decline (e.g., (33–35)).

As noted above, though we aimed to identify measures that specifically assessed HCDM *ability*, most articles elicited through our search parameters included measures that fell outside this scope (see [Supplementary Table 1](#)). That is, most articles included measures that assessed factors related to healthcare and/or decision-making more broadly (e.g., health literacy, decisional conflict, general health behaviors, treatment satisfaction). These measures provide useful information about the process of making a decision, but do not gauge DM ability per se. Measuring HCDM is inherently complex, and it appears that many studies that are not able to include more formalized measures of DM rely on measures of factors that are peripheral to DM ability, which likely contributes to inconsistency in operationalization of HCDM. Researchers should consider whether selected HCDM measures assess HCDM *ability* or other aspects of the decision process, and effort should be made to balance thoroughness with ease of administration.

Several limitations are worth noting in the current scoping review. First, we only included articles published in the last 5 years, which may have excluded older measures that hold promise for assessing HCDM ability. However, this approach allowed for a focus on the current state of the literature that is likely a close approximation of the measures actively being used in clinical and research settings. Second, whereas we did not exclude studies based on the language of administration of measures, we only included articles that were written/published in English; this choice may have limited identification of innovative measures that have only been described in a different language. Third, we did not include reliability and validity information, in part because this was not the main focus of the review, but also because the vast majority of articles identified in the review did not provide this information. Finally, exclusion of non-peer-reviewed works (e.g., theses, conference abstracts) may have biased the final sample of studies; however, we felt it important to focus on published studies to ensure identification of measures of adequate quality.

Overall, the current scoping review identified several frequently used measures of HCDM, but such measures tend to be time- and resource-intensive. The most frequently used and relevant measures are semi-structured interviews (e.g., MacCAT-T, CCTI) and performance-based tasks (e.g., DMCAT, A-DMC), which require administration by a trained examiner with varying levels of subjectivity in scoring. There is a clear need for a streamlined, easy to administer assessment battery suited to clinical screening and research settings that draws on the strengths of existing measures outlined above to allow for direct assessment of DM ability across the cognitive aging spectrum in line with the well-established four-component model of DM per Grisso and Appelbaum (6). Such a battery could be integrated into clinical practice and thus may allow for early detection of changes associated with age-related neurocognitive decline and help older adults avoid negative health-related outcomes.

Data availability statement

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

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.

References

1. Moye J, Marson DC. Assessment of decision-making capacity in older adults: an emerging area of practice and research. *J Gerontol Psychol Sci.* (2007) 62:P3–P11. doi: 10.1093/geronb/62.1.P3
2. United Nations Department of Economic and Social Affairs, Population Division. World population ageing 2020 highlights: living arrangements of older persons. (2020). Available online at: https://www.un.org/development/desa/pd/sites/www.un.org/development/desa/pd/files/undesa_pd-2020_world_population_ageing_highlights.pdf (Accessed December 5, 2024).
3. Palmer BW, Harmell AL. Assessment of healthcare decision-making capacity. *Arch Clin Neuropsychol.* (2016) 31:530–40. doi: 10.1093/arclin/acw051
4. Levitt L, Altman D. Complexity in the US health care system is the enemy of access and affordability. *JAMA Health Forum.* (2023) 4:e234430. doi: 10.1001/jamahealthforum.2023.4430
5. Karel MJ, Gurrera RJ, Moye J. Reasoning in the capacity to make medical decisions: the consideration of values. *J Clin Ethics.* (2010) 21:58–71. doi: 10.1086/JCE201021110
6. Grisso T, Appelbaum PS. Assessing competence to consent to treatment: a guide for physicians and other health professionals. Oxford, England: Oxford University Press (1998).
7. Lai JM, Gill TM, Cooney LM, Bradley EH, Hawkins KA, Karlawish JH. Everyday decision-making ability in older persons with cognitive impairment. *Am J Geriatr Psychiatry.* (2008) 16:693–6. doi: 10.1097/JGP.0b013e31816c7b54
8. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol Theory Pract.* (2005) 8:19–32. doi: 10.1080/1364557032000119616
9. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med.* (2018) 169:467–73. doi: 10.7326/M18-0850
10. Ho EH, Ece B, Novack M, Pila S, Karpouzian-Rogers T, Mather MA, et al. Protocol for a multi-domain scoping review to identify measures of decision-making ability in an aging population. *BMJ Open.* (2024) 14:e084178. doi: 10.1136/bmjopen-2024-084178
11. Veritas Health Innovation (2023). Covidence - Better systematic review management. Covidence. Available at: <https://www.covidence.org/> (Accessed on November 10, 2023).
12. Grisso T, Appelbaum PS, Hill-Fotouhi C. The MacCAT-T: a clinical tool to assess patients' capacities to make treatment decisions. *Psychiatr Serv.* (1997) 48:1415–9. doi: 10.1176/ps.48.11.1415
13. Marson DC, Ingram KK, Cody HA, Harrell LE. Assessing the competency of patients with Alzheimer's disease under different legal standards: a prototype instrument. *Arch Neurol.* (1995) 52:949–54. doi: 10.1001/archneur.1995.00540340029010
14. Fenton L, Han SD, Diguiseppi CG, Fowler NR, Hill L, Johnson RL, et al. Mild cognitive impairment is associated with poorer everyday decision making. *J Alzheimers Dis.* (2023) 94:1607–15. doi: 10.3233/JAD-230222
15. Finucane ML, Gullion CM. Developing a tool for measuring the decision-making competence of older adults. *Psychol Aging.* (2010) 25:271–88. doi: 10.1037/a0019106
16. Bruine De Bruin W, Parker AM, Fischhoff B. Individual differences in adult decision-making competence. *J Pers Soc Psychol.* (2007) 92:938–56. doi: 10.1037/0022-3514.92.5.938

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpubh.2025.1582764/full#supplementary-material>

17. Rabin LA, Borgos MJ, Saykin AJ, Wishart HA, Crane PK, Nutter-Upham KE, et al. Judgment in older adults: development and psychometric evaluation of the test of practical judgment (TOP-J). *J Clin Exp Neuropsychol.* (2007) 29:752–67. doi: 10.1080/13825580601025908
18. Loeb PA. Independent living scales (ILS) stimulus booklet. San Antonio, Texas: Psychological Corp., (1996).
19. Thompson CA, Taber JM, Fitzsimmons CJ, Sidney PG. Math predictors of numeric health and non-health decision-making problems. *J Numer Cogn.* (2021) 7:221–39. doi: 10.5964/jnc.6545
20. Waters EA, Weinstein ND, Colditz GA, Emmons KM. Aversion to side effects in preventive medical treatment decisions. *Br J Health Psychol.* (2007) 12:383–401. doi: 10.1348/135910706X115209
21. Xu J, Gallo JJ, Wenzel J, Nolan MT, Budhathoki C, Abshire M, et al. Heart failure rehospitalization and delayed decision making. *J Cardiovasc Nurs.* (2018) 33:30–9. doi: 10.1097/jcn.0000000000000423
22. Tallberg I, Stormoen S, Almkvist O, Eriksdotter M, Sundström E. Investigating medical decision-making capacity in patients with cognitive impairment using a protocol based on linguistic features. *Scand J Psychol.* (2013) 54:386–92. doi: 10.1111/sjop.12068
23. Liu Q. A study of the composition and status of patient participation competence in Chinese context. Changsha, China: Central South University, Chongqing (2012).
24. O'Connor A. User manual - decision self-efficacy scale. Ottawa, Canada: Ottawa Hospital Research Institute (1995). Available at: https://decisionaid.ohri.ca/docs/develop/User_Manuals/UM_Decision_SelfEfficacy.pdf (Accessed on March 14, 2024).
25. Bunn H, O'Connor A. Validation of client decision-making instruments in the context of psychiatry. *Can J Nurs Res.* (1996) 28:13–27.
26. Nakayama K, Yonekura Y, Danya H, Hagiwara K. Associations between health literacy and information-evaluation and decision-making skills in Japanese adults. *BMC Public Health.* (2022) 22:1473. doi: 10.1186/s12889-022-13892-5
27. Brown JM, Miller WR, Lawendowski LA. The self-regulation questionnaire In: L. Vande Creek and TL Jackson, editors. Innovations in clinical practice: a sourcebook, vol. 17. Sarasota, FL: Professional Resources Press/Professional Resource Exchange (1999). 281–92.
28. Kooiman TJM, Dijkstra A, Kooy A, Dotinga A, van der Schans CP, de Groot M. The role of self-regulation in the effect of self-tracking of physical activity and weight on BMI. *J Technol Behav Sci.* (2020) 5:206–14. doi: 10.1007/s41347-020-00127-w
29. Fowler ME, Marotta DA, Kennedy RE, Gerstenecker A, Gammon M, Triebel K. Reliability of self-report versus the capacity to consent to treatment instrument to make medical decisions in brain metastasis and other metastatic cancers. *Brain Behav.* (2021) 11:e2303. doi: 10.1002/brb3.2303
30. Boyle PA, Yu L, Wilson RS, Segawa E, Buchman AS, Bennett DA. Cognitive decline impairs financial and health literacy among community-based older persons without dementia. *Psychol Aging.* (2013) 28:614–24. doi: 10.1037/a0033103

31. Han SD, Boyle PA, James BD, Yu L, Bennett DA. Poorer financial and health literacy among community-dwelling older adults with mild cognitive impairment. *J Aging Health*. (2015) 27:1105–17. doi: 10.1177/0898264315577780
32. Lovett RM, Curtis LM, Persell SD, Griffith JW, Cobia D, Federman A, et al. Cognitive impairment no dementia and associations with health literacy, self-management skills, and functional health status. *Patient Educ Couns*. (2020) 103:1805–11. doi: 10.1016/j.pec.2020.03.013
33. Frischt T, McClendon MJ, Wallendal MS, Hyde TF, Larsen JD. Prevalence and cognitive bases of subjective memory complaints in older adults: evidence from a community sample. *J Neurodegen Dis*. (2014) 2014:1–9. doi: 10.1155/2014/176843
34. Hess C, Levy B, Hashmi AZ, Hogan J, Greenspan S, Elber A, et al. Subjective versus objective assessment of cognitive functioning in primary care. *J Am Board Fam Med*. (2020) 33:417–25. doi: 10.3122/jabfm.2020.03.190265
35. Wong IY, Smith SS, Sullivan KA. The relationship between cognitive ability, insight and self-regulatory behaviors: findings from the older driver population. *Accid Anal Prev*. (2012) 49:316–21. doi: 10.1016/j.aap.2012.05.031
36. Aki ÖE, Ak S, Mutlu E, Karakaşlı AA, Gürel ŞC. The validity and reliability of the Turkish version of MacArthur competence assessment tool for treatment decision: correlates of competence in schizophrenia patients. *Noropsikiyatri Arsivi*. (2021) 58:327–33. doi: 10.29399/npa.27553
37. Carabellese F, Felthous AR, La Tegola D, Piazzolla G, Distaso S, Logroscino G, et al. Qualitative analysis of the capacity to consent to treatment in patients with a chronic neurodegenerative disease: Alzheimer's disease. *Int J Soc Psychiatry*. (2018) 64:26–36. doi: 10.1177/0020764017739642
38. Chang WZD, Bourgeois MS. Effects of visual aids for end-of-life care on decisional capacity of people with dementia. *Am J Speech Lang Pathol*. (2020) 29:185–200. doi: 10.1044/2019_AJSLP-19-0028
39. Curley A, Murphy R, Fleming S, Kelly BD. Age, psychiatry admission status and linear mental capacity for treatment decisions. *Int J Law Psychiatry*. (2019) 66:101469. doi: 10.1016/j.ijlp.2019.101469
40. Curley A, Murphy R, Plunkett R, Kelly BD. Concordance of mental capacity assessments based on legal and clinical criteria: a cross-sectional study of psychiatry inpatients. *Psychiatry Res*. (2019) 276:160–6. doi: 10.1016/j.psychres.2019.05.015
41. Kato Y, Matsuo T, Eguchi Y, Iiboshi K, Koumi H, Nakamura K, et al. Anxiety impacts consent capacity to treatment in Alzheimer's disease. *Front Psychol*. (2021) 12:685430. doi: 10.3389/fpsyg.2021.685430
42. Kolva E, Rosenfeld B, Saracino RM. Neuropsychological predictors of decision-making capacity in terminally ill patients with advanced cancer. *Arch Clin Neuropsychol*. (2020) 35:1–9. doi: 10.1093/arclin/acz027
43. Koukopoulos AE, Mandarelli G, Maglio G, Macellaro M, Cifrodelli M, Kotzalidis GD, et al. Evaluation of the capacity to consent to treatment among patients with bipolar disorder: comparison between the acute psychopathological episode and the stable mood phase. *J Affect Disord Rep*. (2020) 2:100037. doi: 10.1016/j.jadr.2020.100037
44. Loughran O, Finnegan M, Dud I, Galligan T, Kennedy M, McLoughlin DM. Decision-making capacity for treatment after electroconvulsive therapy for depression. *J ECT*. (2022) 38:24–9. doi: 10.1097/YCT.0000000000000804
45. Mandarelli G, Carabellese F, Parmigiani G, Bernardini F, Pauselli L, Quartesan R, et al. Treatment decision-making capacity in non-consensual psychiatric treatment: a multicentre study. *Epidemiol Psychiatr Sci*. (2018) 27:492–9. doi: 10.1017/S2045796017000063
46. Murphy R, Fleming S, Curley A, Duffy RM, Kelly BD. Who can decide? Prevalence of mental incapacity for treatment decisions in medical and surgical hospital inpatients in Ireland. *QJM Int J Med*. (2018) 111:881–5. doi: 10.1093/qjmed/hcy219
47. Murphy R, Fleming S, Curley A, Duffy RM, Kelly BD. Convergence or divergence? Comparing mental capacity assessments based on legal and clinical criteria in medical and surgical inpatients. *J Leg Med*. (2019) 39:213–27. doi: 10.1080/01947648.2019.1622476
48. Nystazaki M, Pikouli K, Tsapakis EM, Karanikola M, Ploumpidis D, Alevizopoulos G. Decision-making capacity for treatment of psychotic patients on long acting injectable antipsychotic treatment. *Arch Psychiatr Nurs*. (2018) 32:300–4. doi: 10.1016/j.apnu.2017.11.019
49. Ogawa A, Kondo K, Takei H, Fujisawa D, Ohe Y, Akechi T. Decision-making capacity for chemotherapy and associated factors in newly diagnosed patients with lung cancer. *Oncologist*. (2018) 23:489–95. doi: 10.1634/theoncologist.2017-0187
50. Olié E, Catanzaro T, Malesroit M, Guija JA, Giner L, Courtet P. The capacity to consent to treatment is altered in suicidal patients. *Ann General Psychiatry*. (2023) 22:35. doi: 10.1186/s12991-023-00459-w
51. Oshima E, Takenoshita S, Iwai R, Yabe M, Imai N, Horiuchi M, et al. Competency of aMCI patients to consent to cholinesterase treatment. *Int Psychogeriatr*. (2020) 32:211–6. doi: 10.1017/S1041610219000516
52. Parmigiani G, Del Casale A, Mandarelli G, Barchielli B, Kotzalidis GD, D'Antonio F, et al. Decisional capacity to consent to treatment and research in patients affected by mild cognitive impairment: a systematic review and meta-analysis. *Int Psychogeriatr*. (2021) 34:529–42. doi: 10.1017/s1041610220004056
53. Poth A, Penger S, Knebel M, Müller T, Pantel J, Oswald F, et al. Empowering patients with dementia to make legally effective decisions: a randomized controlled trial on enhancing capacity to consent to treatment. *Aging Ment Health*. (2023) 27:292–300. doi: 10.1080/13607863.2021.2024797
54. Santos RL, Neto JPS, Belfort T, Lacerda IB, Dourado MCN. Patterns of impairment in decision-making capacity in Alzheimer's disease and its relationship with cognitive and clinical variables. *Braz J Psychiatry*. (2022) 44:271–8. doi: 10.1590/1516-4446-2021-2180
55. Spataro R, La Bella V. The capacity to consent to treatment in amyotrophic lateral sclerosis: a preliminary report. *J Neurol*. (2021) 268:219–26. doi: 10.1007/s00415-020-10136-7
56. Sugawara N, Yasui-Furukori N, Yamada S, Aoki M, Takeuchi Y, Miyazaki K, et al. Relationship between cognitive functions and decision-making capacity in older institutionalized patients with schizophrenia: a preliminary study. *Neuropsychiatr Dis Treat*. (2022) 18:891–7. doi: 10.2147/NDT.S357067
57. Turner DT, MacBeth A, Larkin A, Moritz S, Livingstone K, Campbell A, et al. The effect of reducing the “jumping to conclusions” bias on treatment decision-making capacity in psychosis: a randomized controlled trial with mediation analysis. *Schizophr Bull*. (2019) 45:784–93. doi: 10.1093/schbul/sby136
58. Glover CM, Yu L, Stewart CC, Wilson RS, Bennett DA, Boyle PA. The association of late life cognitive activity with healthcare and financial decision-making in community-dwelling, nondemented older adults. *Am J Geriatr Psychiatry*. (2021) 29:117–25. doi: 10.1016/j.jagp.2020.06.010
59. Han SD, Barnes LL, Leurgans S, Yu L, Bennett DA, Boyle PA. Literacy mediates racial differences in financial and healthcare decision making in older adults. *J Am Geriatr Soc*. (2020) 68:1279–85. doi: 10.1111/jgs.16381
60. Kapasi A, Yu L, Stewart C, Schneider JA, Bennett DA, Boyle PA. Association of amyloid- β pathology with decision making and scam susceptibility. *J Alzheimers Dis*. (2021) 83:879–87. doi: 10.3233/JAD-210356
61. Lamar M, Wilson RS, Yu L, Stewart CC, Bennett DA, Boyle PA. Associations of decision making abilities with blood pressure values in older adults. *J Hypertens*. (2020) 38:59–64. doi: 10.1097/HJH.0000000000002220
62. McSorley VE, Lamar M, Yu L, Bennett DA, Barnes LL, Boyle PA. Decision making and blood sugar indicators in older African American adults. *J Aging Health*. (2023) 35:221–9. doi: 10.1177/08982643221122639
63. Stewart CC, Yu L, Wilson RS, Bennett DA, Boyle PA. Healthcare and financial decision making and incident adverse cognitive outcomes among older adults. *J Am Geriatr Soc*. (2019) 67:1590–5. doi: 10.1111/jgs.15880
64. Stewart CC, Yu L, Glover CM, Mottola G, Bennett DA, Wilson RS, et al. Loneliness interacts with cognition in relation to healthcare and financial decision making among community-dwelling older adults. *Gerontologist*. (2020) 60:1476–84. doi: 10.1093/geront/gnaa078
65. Stewart CC, Yu L, Glover CM, Bennett DA, Wilson RS, Boyle PA. Purpose in life and cognition interact to impact healthcare and financial decision making in old age. *J Appl Gerontol*. (2022) 41:1887–95. doi: 10.1177/07334648221095514
66. Weissberger GH, Han SD, Yu L, Barnes LL, Lamar M, Bennett DA, et al. Impact of early life socioeconomic status on decision making in older adults without dementia. *Arch Gerontol Geriatr*. (2021) 95:104432. doi: 10.1016/j.archger.2021.104432
67. Wilson RS, Yu L, Stewart CC, Bennett DA, Boyle PA. Change in decision-making analysis and preferences in old age. *J Gerontol B Psychol Sci Soc Sci*. (2023) 78:1659–67. doi: 10.1093/geronb/gbad037
68. Yu L, Mottola G, Barnes LL, Han SD, Wilson RS, Bennett DA, et al. Correlates of susceptibility to scams in community-dwelling older black adults. *Gerontology*. (2021) 67:729–39. doi: 10.1159/000515326
69. Yu L, Mottola G, Bennett DA, Boyle PA. Adverse impacts of declining financial and health literacy in old age. *Am J Geriatr Psychiatry*. (2021) 29:1129–39. doi: 10.1016/j.jagp.2021.02.042
70. Bakhit M, Del Mar C, Gibson E, Hoffmann T. Shared decision making and antibiotic benefit-harm conversations: an observational study of consultations between general practitioners and patients with acute respiratory infections. *BMC Fam Pract*. (2018) 19:165. doi: 10.1186/s12875-018-0854-y
71. Cuypers M, Lamers RED, Cornel EB, van de Poll-Franse LV, de Vries M, Kil PJM. The impact of prostate cancer diagnosis and treatment decision-making on health-related quality of life before treatment onset. *Support Care Cancer*. (2018) 26:1297–304. doi: 10.1007/s00520-017-3953-8
72. Guerrero-Peral ÁL, Porta-Etessam J, Rodríguez-Vico J, Núñez M, Ciudad A, Díaz-Cerezo S, et al. Adaptation and validation of the Spanish version of decisional conflict scale in people with migraine in Spain. *Patient Prefer Adherence*. (2022) 16:3291–302. doi: 10.2147/PPA.S384333
73. Ng YK, Shah NM, Loong LS, Pee LT, Hidir SAM, Chong WW. Attitudes toward concordance and self-efficacy in decision making: a cross-sectional study on pharmacist-patient consultations. *Patient Prefer Adherence*. (2018) 12:615–24. doi: 10.2147/PPA.S159113
74. Owens OL, Wooten NR, Tavakoli AS. Adaptation and initial psychometric evaluation of an informed prostate cancer screening decision self-efficacy scale for African-American men. *J Racial Ethn Health Disparities*. (2020) 7:746–59. doi: 10.1007/s40615-020-00702-0
75. Pompili C, Holch P, Rogers Z, Absalom K, Clayton B, Franks K, et al. Patients' confidence in treatment decisions for early stage non-small cell lung cancer (NSCLC). *Health Qual Life Outcomes*. (2020) 18:237. doi: 10.1186/s12955-020-01496-9

76. Smith CA, Chang E, Gallego G, Khan A, Armour M, Balneaves LG. An education intervention to improve decision making and health literacy among older Australians: a randomised controlled trial. *BMC Geriatr.* (2019) 19:129. doi: 10.1186/s12877-019-1143-x
77. Ye G, Qu B, Shi W, Chen X, Ma P, Zhong Y, et al. Knowledge about benefits and risks of undergoing cataract surgery among cataract patients in southern China. *Int Ophthalmol.* (2020) 40:2889–99. doi: 10.1007/s10792-020-01473-7
78. Hoffmann JA, Bareuther L, Schmidt R, Dettmers C. The relation between memory and decision-making in multiple sclerosis patients. *Mult Scler Relat Disord.* (2020) 37:101433. doi: 10.1016/j.msard.2019.101433
79. Matthews G, Reinerman-Jones LE, Burke CS, Teo GWL, Scribner DR. Nationalism, personality, and decision-making: evidence from an SJT for military multi-national teaming scenarios. *Pers Individ Differ.* (2018) 127:89–100. doi: 10.1016/j.paid.2018.01.045
80. Merillat BD, González-Vallejo C. Compensatory health beliefs relate to decision-making coherence and health patterns. *Ohio J Sci.* (2019) 119:79–91. doi: 10.18061/ojs.v119i2.6709
81. Peng J, Ren L, Yang N, Zhao L, Fang P, Shao Y. The network structure of decision-making competence in Chinese adults. *Front Psychol.* (2020) 11:563023. doi: 10.3389/fpsyg.2020.563023
82. Szanto K, Galfalvy H, Vanyukov PM, Keilp JG, Dombrovski AY. Pathways to late-life suicidal behavior: cluster analysis and predictive validation of suicidal behavior in a sample of older adults with major depression. *J Clin Psychiatry.* (2018) 79:17m11611. doi: 10.4088/JCP.17m11611
83. Weller J, Ceschi A, Hirsch L, Sartori R, Costantini A. Accounting for individual differences in decision-making competence: personality and gender differences. *Front Psychol.* (2018) 9:2258. doi: 10.3389/fpsyg.2018.02258
84. Gerstenecker A, Grimsley L, Otruba B, Cowden L, Marson DC, Gerstenecker KT, et al. Medical decision-making in progressive supranuclear palsy: a comparison to other neurodegenerative disorders. *Parkinsonism Relat Disord.* (2019) 61:77–81. doi: 10.1016/j.parkreldis.2018.11.022
85. Gerstenecker A, Gammon M, Marotta D, Fiveash J, Nabors B, Mulhauser K, et al. Using cognition to predict the ability to understand medical treatment in brain and metastatic cancer. *Psycho-Oncology.* (2020) 29:406–12. doi: 10.1002/pon.5277
86. Chen CH, Chuang HY, Lee Y, Elwyn G, Hou WH, Kuo KN. Relationships among antecedents, processes, and outcomes for shared decision making: a cross-sectional survey of patients with lumbar degenerative disease. *Med Decis Mak.* (2022) 42:352–63. doi: 10.1177/0272989X211024980
87. Guo W, Wan J, Zhang F, Liu M, Tan M, Bian W. Development and pilot-testing of a patient decision-making aid for nutrition in age-related macular degeneration. *Patient Prefer Adherence.* (2022) 16:2567–77. doi: 10.2147/PPA.S377748
88. Tsai CB, Fang CL, Chen MS, Yen MY, Yeh CY, Lai ZM, et al. Development and pilot usefulness testing of an interactive computerized patient decision aid for intraocular lens selection before cataract surgery. *Patient Prefer Adherence.* (2022) 16:189–96. doi: 10.2147/PPA.S343655
89. Lai JM, Karlawish J. Assessing the capacity to make everyday decisions: a guide for clinicians and an agenda for future research. *AJGP.* (2007) 15:101–11. doi: 10.1097/01.JGP.0000239246.10056.2e
90. Sobkow A, Olszewska A, Traczyk J. Multiple numeric competencies predict decision outcomes beyond fluid intelligence and cognitive reflection. *Intelligence.* (2020) 80:101452. doi: 10.1016/j.intell.2020.101452
91. Edmiston EA, Hardin HK, Dolansky MA. What are key characteristics of adults with advanced heart failure discharged from ICU? *Nurs Crit Care.* (2024) 29:493–500. doi: 10.1111/nicc.12914
92. Emmert NA, Schwarz LR, Vander Wal JS, Gfeller JD. Neuropsychological predictors of health and safety abilities in dementia. *Appl Neuropsychol Adult.* (2021) 28:94–106. doi: 10.1080/23279095.2019.1599893
93. Stormoen S, Tallberg IM, Sundström E, Eriksdotter M, Sundström E. Decisions and attitudes regarding participation and proxy in clinical trials among patients with impaired cognitive function. *Dementia.* (2019) 18:2049–61. doi: 10.1177/1471301217737413
94. Rabin LA, Guayara-Quinn CG, Nester CO, Ellis L, Paré N. Informant report of practical judgment ability in a clinical sample of older adults with subjective cognitive decline, mild cognitive impairment, and dementia. *Aging Neuropsychol Cognit.* (2022) 29:139–57. doi: 10.1080/13825585.2020.1859081
95. Tang H, Wang S, Dong S, Du R, Yang X, Cui P, et al. Surgery decision conflict and its related factors among newly diagnosed early breast cancer patients in China: a cross-sectional study. *Nurs Open.* (2021) 8:2578–86. doi: 10.1002/nop2.791