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Review

Routine Use of Financial Capacity Instruments for Clinical Decisional Capacity Testing: A Scoping Review

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Abstract: Financial capacity instruments are psychometric tools designed to evaluate individual decisional capacity based on financial decisions. As tests are complex and need special conditions for administration and evaluation, it is difficult to use them in daily geriatric clinics.

Our scoping review objective was to evaluate existing financial capacity instruments from the perspective of simplicity and portability. We evaluated one English speaking knowledge database (Medline) using a dedicated MeSH terminology.

The review yielded one independent instrument, The Semi-Structured Clinical Interview for Financial Capacity, that can be easy adapted for every-day clinical use. It is simple to understand and perform and do not need trained personnel for administration. It can be finalized in 15 minutes. Initially validated on 261 subjects (with different forms of cognitive impairment), it showed good accuracy and precision mainly in subjects with cognitive impairment. The test is less apt to detect early or fluctuating cognitive impairment. Simplicity, the main advantage of the test, allows gamification fact that increases portability. Familiar images (coins, money) that are used for performing simple tasks does not need complex translation and adaptation. In form of a game, the test is suitable for serial administration, increasing the chance for early capacity reduction detection. Results reflect a physician judgement related to the subjects' capacity to understand and execute simple financial instructions and not financial proficiency scores.

The main limitation of our review is that we investigated only one, English speaking, knowledge database.

The scoping strategy generated a financial capacity instrument that can be used in geriatric clinics for early diagnostic of decisional capacity reduction. Further studies are needed to evaluate the reliability and validity of the test in conditions of serial administration and in populations having various financial experience.

Keywords: financial capacity instruments; Semi-Structured Clinical Interview for Financial Capacity; decisional capacity; mild cognitive impairment; gamification

1. Introduction

For the first time in human history, most people can expect to live more than 60 years [2] due to an overall increase in life expectancy in all age groups [1]. The modern society is facing an accelerated ageing process [3], a reality that generates new health, economic and legal challenges for both individuals and society [4].

The "senior" age-group is the fastest growing segment of today population [5]. As elderly persons own more than one-third of existing world wealth, seniors are often requested to formalize complex civil transactions [6]. Beyond financial decisions and transfer of fortune, seniors' choices concerning access to treatment, participation in research or advanced life decisions are issues that may generate social, ethical and legal debate [7].

Seniors' ability to make competent choices may be questioned due to suspicion of cognitive impairment. Beside the normal ageing process (a gradual accumulation of a

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wide variety of molecular and cellular damage) [8], many conditions (disease, medication or often mild brain trauma) may affect cognition in this age-group [9].

Today, mental capacity testing is ubiquitous in geriatric population [10] but the evaluation is not a trivial task [11]. Most of the existing psychometric tools are based on four-ability model promulgated by Appelbaum and Grisso [12] in the 1980's and are derivatives of the MacArthur Competence Assessment Tools [13]. However, these tests do not evaluate cognitive abilities and have limited value in a medico-legal setting [14]. The capacity testing process is complex even in nonjuridical cases [15], as individual decisions can be influenced by subjective values and may accept potential risks [16]. There are many published clinical guidelines and handbooks that may steer the (in)capacity assessments/evaluations procedures [17].

There is a constant request coming from everyday practice for better capacity assessment instruments [18]. Well-normed psychometric instruments (designed to reveal and quantify early cognitive impairments) require complex administration and interpretation conditions [19]. The Mini Mental Status Exam (MMSE) [20], the most commonly used cognitive test in daily clinical activity (translated and validated in most languages and countries), is generally inadequate to assess complex capacities as it does not evaluate executive function [21]. Even if clinical symptomatology (like apathy and anxiety) are significant precursors of neurodegenerative diseases and may appear years in advance [22], unequivocal detection is difficult even for trained professionals [23] as patients can adopt compensatory behaviors [24]. The prevalence of incapacity in healthy older adults is estimated at 2.8% [25] but in reality, it is rarely detected outside of the formal boundaries of medico-legal assessment, as both clinicians or relatives overestimate patients' mental abilities [26]. Clinicians are reluctant to perform formal capacity assessments in geriatric patients [27] as simple but reliable instruments are not fully developed for medical practice [28]. Simple instruments (like measuring arithmetic calculation abilities) can detect moderate or advanced Alzheimer Disease (AD) [29] but do not correlate well with incipient neurocognitive changes (mild cognitive impairment - MCI) [30]. The use of over-structured capacity instruments may increase the risk of obtaining rigid, depersonalized, "capacito-meter" like results [31] that will not reflect the cultural and personal values which may influence personal decision, thus reporting reduced cognition/capacity [32].

Financial capacity (FC) is a medical–legal construct that represents one's ability to independently manage own financial affairs in a manner consistent with personal self-interest and values [33]. Initially the FC was part of the complex instrumental activity of daily living (IADL), as a core measure of individual autonomy [34]. Newly designed FC instruments are able to investigate decisional capacity in an independent manner. Understanding finance is a learned skill that varies in normal adults in relation to education, profession, and personal skills but always involves a broad range of conceptual, procedural, and judgmental skills. A decline in financial performance is considered part of normal cognitive aging [35] but significant changes of FC have been observed in early MCI development [36,37]. A decrease in financial capacity may expose seniors to an increase risk for financial exploitation, abuse and fraud [38]. Economic loss is notoriously associated with development of depression [39], functional disability and increased dependency, all factors that may affect cognition and competency [40] in an ascendent spiral [41].

FC instruments are time consuming tests and often need dedicated space and personnel for administration and results evaluation, facts that preclude their use in busy clinical settings. Most of the exams report only quantifying scores and no medical opinion concerning capacity is recorded. A simple test (easy to explain and simple and fast to execute) is needed for every-day use in clinical settings [42], alone or included in a "capacity evaluation" tool-kit. Physician's judgement concerning the capacity of subjects to understand and answer to instructions can increase the test's pertinence. The use of familiar images (coins and paper money) can help the gamification process, increasing its portability outside cultural boundaries.

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Our scoping review objective was to evaluate existing financial capacity instruments form the perspective of portability and simplicity using a scoping approach [43] focusing on portability and simplicity.

2. Methods

We reviewed published medical literature from one specific, English-speaking database (Medline accessed thru PubMed) with a focus on the following MeSH terms: "financial capacity" OR "competence", AND "assessment", AND "mild cognitive impairment", AND "inventory of activities of daily living", AND "dementia", AND "Alzheimer", AND "neuro-cognitive" AND "disease". Results were screened first by the title. Abstracts were then scored based on abstract content. Only articles that measured financial capacity as a reflection of age-related mental capacity reduction were selected (reviews, articles that evaluated cognitive impairment in psychiatric diseases or after trauma and those that evaluated financial exploitation or fraud detection were discarded). Validation of the instrument in a representative cohort that included normal cognitive (CN) and mild impaired subjects (not demented) was considered an important selection criterium.

In this study, the term portability is used to qualify an instrument as culturally transferrable, maintaining its validity without major structural changes (translation and adaptation) [44]. Simplicity was evaluated in terms of easiness to understand and execute questions, assessors training and testing time.

3. Results

The initial Medline search yielded 144 articles. 129 articles were selected after the first, title screening. Based on abstract, 83 were considered of interest. Nine financial capacity review articles and eight reviews analyzing financial fraud schemes in seniors were discarded. Four articles that focused on acquired chronic encephalopathy detection and another four focused on neuro-imaging and financial capacity were not used. 58 articles were selected for content review. 31 of them evaluated independent activities of daily living and 5 tested financial instruments to quantify financial risk and were not included in our final analysis. Only 22 published studies investigated specific FC instruments in relation with primary capacity reduction in normal seniors, patients with MCI and with mild or moderate AD (Table 1).

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Table 1. Psychometric instruments evaluating FC.

Developed FC Instrument	Number of journal articles	Specifically focused on FC
Financial Capacity Instrument (FCI), Financial Capacity Instrument - Short Form & Semi-Structured Clinical Interview for Financial Capacity (SCIFC)	19	Yes/selected
Financial Competence Assessment Inventory	3	Yes/selected
Lichtenberg Decision Rate Scale and Decision Screening Rating Scaling	5	Yes/not selected as targeting financial exploitation, abuse risks
Independent Living Scales	16	No
Awareness of financial skills scales	3	No
Other (Cognitive competency test, Kohlman evaluation of living skills)	12	No

Our research yielded two independent psychometric instruments that were designed to evaluate capacity based on financial decision. The Financial Capacity Instrument (FCI) was developed by Marson and coworkers in 2000 [45]. It measures 112 tasks (9 domains of FC performance) grouped under 4 factor labels: Basic Monetary Knowledge and Calculation Skills, Financial Judgment, Financial Conceptual Knowledge, and Financial Procedural Knowledge [46]. Basic monetary knowledge included arithmetic calculation skills (like stating the number of quarters in an amount of money, calculating a tip and calculating the correct amount of change from a grocery store purchase) and semantic knowledge of coin values (e.g., arranging coins in order of their monetary value). FCI was designed to detect early cognitive impairment. Basic monetary knowledge proved to be reduced in 9% of patients with MCI at the initial evaluation. That percentage increased to 15% of patients as the MCI evolved into mild AD at 6 years follow-up. The most striking domain that was affected over time was the financial judgement. A reduction of financial judgement was observed in 13% of patients with MCI. It increased to 37% patients with AD at 6 years after the primary diagnostic [47]. FCI needs 40-50 minutes for administration and high-trained professionals for interpretation.

A short, simplified version of the FCI, the Financial Cognitive Index-Short Form, (FCI-SF) was developed by the same group. The aim of the test was to detect functional impairment in early phases of AD [48]. The FCI-SF test groups 37 items into 5 component performance domains and also evaluates the time necessary to finalize specific financial tasks. Trained psychometrists can finalize the test in 15-20 minutes. Based on published data, both FCI instruments were tested initially on more than 1500 subjects with different degrees of cognitive impairment.

Another short variant of FCI, the Semi-Structured Clinical Interview for Financial Capacity (SCIFC) [49] (table 2) is a clinician-oriented, semi-structured test. It measures 7 FC domains (plus one experimental). It does not need a trained technician or place for administration and takes 15 to 20 minutes to finish. A serious advantage of SCIFC is that it does not yield quantitative scores but ratings (capable, marginally capable or incapable)

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that will reflect a professional medical judgement concerning the patient's general financial capacity. As the final result is an opinion coming from a trained professional (witness), the final rating can be used in a formal medico-legal assessment, or, more important, can support advice to patients and families in terms of need for supplementary financial protection. This instrument was initially tested on 261 subjects with different degrees on cognitive impairment. Mean age in CN group was 66.1 years (75 subjects, 14.3 years of education, an average MMSE 29.3, 93% with a clinical dementia rate (CDR) scale of 0.0). In the MCI group, the mean age was of 68 years and the average education was of 13.7 years (58 subjects, MMSE of 28.2 and 83% with a CDR of 0.5).

95% of CN subjects received a medical judgement of "capable" with 2-8% of them being marginally capable. 82% of subjects with very early MCI were capable and 16% marginally capable. Only 26% of mild Alzheimer disease were considered capable by a group of untrained physicians. Test-retest variability was low. The final capacity diagnostic had a good correlation with other validated cognitive diagnostics instruments (MMSE, CDR, $p<0.001$).

Table 2. FCI / SCIFC comparative structure.

Domain	Number of tasks in initial FCI	Number of tasks in SCIFC (Capable/incapable)	Task description	Perceived difficulty in FCI	Max performance score in FCI
Basic monetary skills	3	1	Identify coins /relationship/ operate currency	simple	34
Financial conceptual knowledge	2	1	Define simple financial concepts	Simple- complex	32
Cash transactions	3	1	Identify costs of grocery store transaction (1-3 items)	Complex	24
Checkbook management	2	1	Simulate a transaction paid by check	Complex	50
Bank statement management	2	1	Identify transactions on a bank statement	Complex	39
Financial judgement	6	1	Detect and explain fraud risk	Simple	16
Bill payment	2	1	Explain meaning and purpose of bills	Simple	46
Knowledge of personal assets	1	Experimental	Explain estate and investments	Simple	NA
Investment decisions	3	No	Understand options, returns, make decisions	Complex	17

Although not designed to directly detect fraud or risk of abuse, all FCI instruments evaluate the patient's ability to understand financial fraud (evaluated under domain 6, Financial Judgement).

The three variants of FCI were tested on more than 970 normal cognitive aged persons, on 900 patients with mild cognitive impairment, 460 patients with mild AD and 85 patients with moderate AD.

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The Financial Competence Assessment Inventory (FCAI) was developed as an individually administered test. It measures six components of FC (38 items). It was designed to detect and measure financial abilities in dementia, acquired brain injury, schizophrenia and intellectual disability [50]. In FCAI, financial competence is evaluated as a process where financial information is first understood, then consequences are evaluated in terms of costs and benefits, and finally the person expresses a choice. FCAI is a complex test, it has to be administered by PhD trained researchers and was not validated in large populations (179 impaired subjects, 59 normal subjects).

4. Discussion

The overall modern population is ageing and seniors are, now more than ever, requested to make complex decisions that can be subject of legal, ethical or medical debate. Evaluating decision capacity in elderly subjects became a subject of salient importance from both medical ("on request" evaluation) and juridical ("court ordered" medico-legal assessment) perspectives but establishing capacity is not an easy task.

There is a clear need for an early detection of capacity reduction in geriatric subjects [51] but capacity psychometric tests are complex and usually cannot be administered in every-day clinics [52]. A simple, portable test that will generate an accurate capacity evaluation is required for the every-day clinical use.

FC, a medical-legal construct that reflects a subject's ability to manage personal life based on values and interests, is an important reflection of decisional capacity [53]. FCI are independent tests that measure the decisional capacity of subjects based on financial decisions taken in normal living circumstances (buy or not an object, arrange a number of coins, calculate a tip, evaluate a bank record, recognize financial fraud). Tests were validated in large cohorts of subjects with normal cognition to advanced cognitive impairment. FC tests showed a good correlation with specific neuro-anatomic changes associated with cognitive impairment: combined FC-MRIs studies reported neuro-imagistic changes in white matter [54] and angular gyri volumes [55] in subjects with reduced FC. Associations between volumetric changes of in the limbic structures and alteration of individual FC were also reported in subjects with mild cognitive impairment [56]. A good correlation between arithmetic capacity and FCI reduction was observed in subjects with advanced cognitive impairment [Triebel, 42]. Serial testing showed that only normal subjects maintained their FC performance over time [57].

The objective of our scoping research was to investigate if a dedicated financial capacity instrument can be used in everyday clinical activity to detect early capacity conversion in geriatric, non-demented subjects. Main research criteria were independence, simplicity, portability and validation.

We evaluated a single knowledge database (Medline) using a specific MeSH terminology. 22 articles that discussed financial capacity instruments as tests for primary cognitive impairment were selected for a content evaluation. Non-specific, multi-domain IADL batteries (that are using some financial items for detecting MCI: the Direct Assessment of Functional Status uses 21 financial items [58] and the Independent Living Scales uses 17 financial items [59]) as well as instruments designed to test financial capacity in specific neuro-psychiatric diseases or discover financial exploitation and fraud risks [60.61] were not selected for this review.

Two financial stand-alone instruments were designed to detect early cognitive impairment (FCI and FCAI) and were tested on large population cohorts. Both showed similar specificity and reliability measures [62]. The most validated test, FCI, focused on financial skills, knowledge and judgement. FCI was able to detect early cognitive changes in cross sectional studies [63], in longitudinal studies at one year [64] and at two years after the initial assessment [65]. A good correlation was observed between FCI and other psychometric tests used for cognitive impairment diagnostic (MMSE/CDR Scale) [66]. Even is considered accurate and precise, FCI is time-consuming and needs highly trained interviewers for obtaining reliable results. Within FCI, both Financial Conceptual and

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Procedural knowledge are concepts difficult to explain to aged subjects not previously exposed to complex economic/financial transactions. FCAI was build on understanding financial information and taking decisions. It needs well-structured environment and trained personnel for administration, is time consuming and was not extensively validated yet.

One variant of FCI, SCIFC was considered both simple and portable. SCIFC is a the short, clinician oriented, semi-structured interview that contains verbally administered items (7 items each with 3 sets of interchangeably financial based questions/answers). All items are designed based on an every-day living scenario (coin identification, cash transactions, financial statement understanding, bill payment, fraud detection). A clinician is judging the subject's performance to understand the question and to provide an answer. Across study groups, >80%+ judgement agreements concerning capacity was observed in 97% of cognitive normal and 92% of mild cognitive impairment groups. From the portability perspective, most of the questions are easy to understand by lay subjects without high financial exposure (except the concept of "check" transactions may create difficulties to aged subjects, that never used this form of financial transaction). As items involve financial transactions, icon images instead of questions can make the test even easier to understand and fast to execute. Gamification of the test [67] may increase both simplicity and portability. A financial capacity game will allow serial administration, increasing the ability to detect early or fluctuating cognitive changes. As tests results are an interpretation of individual's decisional capacity that was evaluated by a medical expert, serial results may be used as support in formal assessments (for medico-legal purposes) or "on-request" evaluations (for medical decisions).

5. Limitations.

Our review has several limitations. A serious one comes from the reality that any financial instrument will detect advanced cognitive impairment and not the fluctuation of cognition or incipient changes. The serial administration of the test or the association with other cognitive tests (in a decision capacity tool-kit) may help in early cognitive conversion detection. The use of only one English-Speaking knowledge database (Medline) for financial capacity instruments detection is a serious weakness but both financial capacity as a reflection of decision-making capacity and the FC instruments were initially designed and validated in English-speaking populations, reality that justify our research decision. The individual financial understanding is strongly influenced by personal financial experience [68]. This "contamination" can be detected [69] but the aim of all financial capacity instruments is not to evaluate financial results but rather the cognitive process associated with simple financial decisions. Physician involvement in capacity evaluation reduce the risk of depersonalization ("capacitometer-like") results.

6. Conclusion.

Our review yielded a simple psychometric instrument (SCIFC) that may be useful in the elderly capacity diagnostic in everyday clinics as a stand-alone instrument or in association with other cognitive tests. Even not as precise as more detailed financial capacity instruments, SCIFC may generate objective results that reflect a physician appreciation of subject capability to make sound (simple) financial decisions. Serial use can provide results that may help patients and families to engage in financial and legal advanced planning and may protect elderly at risk against financial fraud. Images (icons) can replace questions making the test easy to execute and more portable. Further studies are needed to better understand if simple financial instruments are culturally sensitive or if these tests can be used in the context of preventive, artificial intelligence assisted, diagnostics.

Ethical Statement: This scoping review evaluates the existing depth of knowledge concerning financial capacity psychometric instruments based on simplicity and portability criteria. No ethical approval was necessary. It was conducted according to the Preferred Reporting Items for Systematic Reviews (PRISMA-2020 - available @ http://www.prisma-statement.org/).

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