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FIRST-GENERATION VERSUS THIRD-GENERATION COMPREHENSIVE GERIATRIC ASSESSMENT INSTRUMENTS IN THE ACUTE HOSPITAL SETTING: A COMPARISON OF THE MINIMUM GERIATRIC SCREENING TOOLS (MGST) AND THE INTERRAI ACUTE CARE (INTERRAI AC)

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Abstract: *Objective:* Comparison of the first-generation Minimum Geriatric Screening Tools (MGST) and the third-generation interRAI Acute Care (interRAI AC). *Design:* Based on a qualitative multiphase exchange of expert opinion, published evidence was critically analyzed and translated into a consensus. *Results:* Both methods are intended for a multi-domain geriatric assessment in acute hospital settings, but each with a different scope and goal. MGST contains a collection of single-domain, internationally validated instruments. Assessment is usually triggered by care givers' clinical impression based on geriatric expertise. A limited selection of domains is usually assessed only once, by disciplines with domain-specific expertise. Clinical use results in improvement to screen geriatric problems. InterRAI AC, tailored for acute settings, intends to screen a large number of geriatric domains. Based on systematic observational data, risk domains are triggered and clinical guidelines are suggested. Multiple observation periods outline the evolution of patients' functioning over stay in comparison to the premorbid situation. The method is appropriate for application on geriatric and non-geriatric wards, filling geriatric knowledge gaps. The interRAI Suite contains a common set of standardized items across settings, facilitating data transfer in transitional care. *Conclusion:* The third-generation interRAI AC has advantages compared to the first-generation MGST. A cascade system is proposed to integrate both, complementary methods in practice. The systematic interRAI AC assessment detects risk domains. Subsequently, clinical protocols suggest components of the MGST as additional assessment. This cascade approach unites the strength of exhaustive assessment of the interRAI AC with domain-specific tools of the MGST.

Key words: Geriatric assessment, interRAI Acute Care, aged, frail.

Introduction

A variety of instruments and methods have been developed to map the complexity of an older patient's situation; each with different scope and profundity. Comprehensive geriatric assessment (CGA), one of the cornerstones of modern geriatric medicine (1, 2), is "a multidimensional, usually multidisciplinary, diagnostic process intended to determine an older person's medical, psychosocial and functional capacity and problems with the objective of developing an overall plan for treatment and long-term follow-up"(3). So CGA acts on different levels. On patient's level, the complexity of the older person's health, functioning, and environment is assessed. On team level, interaction between team members results in interdisciplinary care planning. After discharge, CGA transcends the organizational level aspiring continuity of care.

Since its introduction three decades ago, CGA has evolved (4). First-generation CGA is a collection of single-domain, individually validated, instruments (2). To get a holistic picture, each geriatric domain is evaluated separately. Assessment of a specific domain is usually triggered by caregivers' clinical impression based on geriatric expertise. Second-generation CGA introduced health setting-specific assessment with omni-comprehensive nature, meaning three main improvements. First, all geriatric topics are included and are one-by-one evaluated for all frail older persons. Second, assessment outcomes reveal associations between domains. This is in line with complexity theory, suggesting that relationships between domains may be more important than the domains themselves (5). Third, psychometric tests are setting-specific and are performed on the entity. Third-generation, finally, introduced data transfer based on a common set of standardized assessment items. Supported by information technology, the data can follow the patient's track across multiple care settings. Indeed, continuity of care becomes more and more vital due to the shortening length of stay and early discharge planning (6). Standardization lays the foundation of a common language, improves efficient communication, and implies evidence-based clinical outcome measures, quality indicators, and benchmarking (4). These features could assist staff of non-geriatric wards, who often focus on disease-specific care and lack geriatric knowledge and skills (7), to prevent medical complications, functional deterioration, and cognitive decline associated with hospitalization among older patients (8-10). So throughout the years, CGA has evolved from a selection of instruments to a standardized communication system in transitional care.

In acute clinical practice, first-generation CGA is still

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widespread used. The constitution of the test battery varies across organizations (e.g., cognitive functioning may be assessed by the Mini Mental State Examination (11) or by the Clock Drawing Test (12, 13)). To promote uniformity in first-generation CGA, studies (14, 15) have reported on the assembly of individual instruments (e.g., the Minimum Geriatric Screening Tools). The harmonization of CGA in different healthcare settings, the so called third-generation CGA, was initiated in 2005 when the interRAI Suite was introduced (4). The fact that CGA has evolved, raises the question: "Should first-generation CGA be replaced by third-generation?" This paper aimed to compare the scientific substructure and the use of two CGA methods: the Minimum Geriatric Screening Tools (MGST) as an example of first-generation and the third-generation interRAI Acute Care (interRAI AC).

Methods and materials

Based on a qualitative multiphase exchange of expert opinion, published evidence was critically analyzed and translated into a consensus. A search was conducted in MEDLINE, Cinahl, and Embase, for publications in English, Dutch, or French from inception to June 2008. The keywords 'interRAI Acute Care', 'Resident Assessment Instrument', 'Minimum Geriatric Screening Tools', were combined with 'geriatric assessment', 'aged', 'frail', and 'hospitals'. An initial critical comparative overview was obtained from an independent synthesis of the literature by four researchers. The purpose was to provide an overall summary of published evidence on the first and third generation CGA methods. This comparison was then distributed by email to eight academic geriatricians who were asked to review, criticize and modify the text. Comments from this initial discussion were incorporated into a revised document and resent to all participating geriatricians, to obtain a structured format for discussion. In a next phase of the process, a formal face-to-face meeting was organised. During a highly interactive panel discussion, outstanding issues were clarified and a common position was established. The starting point of the consensus was a theoretical comparison of both generations of CGA. Focus of the discussion was twofold: (i) address the question if the first generation CGA could be replaced by the third generation and if not, (ii) develop guidance as to how different generations of CGA can be incorporated in clinical practice. The resulting consensus was translated into a paper that was sent to all participating experts for formal, written approval. The conclusions drawn in this paper take into account both the expert input and the literature search.

Results

Eight aspects regarding the two instruments were compared: the development, aim, content and validation, frequency of data collection, information sources, geriatric expertise and teamwork, care planning; and data transfer (table 1).

The development

The MGST was composed by the Belgian College for Geriatrics, a body funded by the Belgian Government to set up quality improving initiatives in geriatric wards. The selection criteria were psychometric values and the feasibility of the instruments (15). Since its debut in 2005, MGST continues to be used in daily clinical practice in most of the geriatric wards in Belgian hospitals.

InterRAI, an international not-for-profit research network, develops assessment instruments for different target populations and care settings since 1980. In 2006, the interRAI AC was added to the interRAI Suite, intended for geriatric care including Palliative Care, Home Care (HC), Post Acute Care, and Long Term Care Facility (LTCF). The interRAI AC is tailored for the acute setting, enabling to record unstable functioning of hospitalized older patients. Special attention was paid to its usability in combination with other interRAI-instruments to facilitate data transfer in transitional care. Although the HC and LTCF versions are widely implemented and are part of daily documentation of health care for older persons in many countries (4), the scientific and clinical experience with the novel interRAI AC version is limited (16-18).

Aims

Although both methods for the acute hospital setting are developed in the same period, the type of CGA differs: MGST is a first-generation whilst interRAI AC is a third-generation tool.

The MGST aims to support geriatric teams and to enable them to assess in a more standardized way (15). In a future program, the Belgian College for Geriatrics plans to establish and disseminate outcome algorithms linking geriatric domains according to literature review in addition to the CGA (15).

The interRAI AC records standardized, holistic information about the care need, the person's capacity and the actual care (18, 19). It aims at risk identification in order to perform an individualized care plan. Therefore a large number of geriatric domains are systematically assessed in all frail hospitalized older persons. In addition, the RAI method provides evidence based clinical protocols, outcome measurements across domains, a follow-up and data transfer system, quality indicators, and case-mix funding (20).

Content and validation

Compared to the MGST, the interRAI AC is more comprehensive and covers more domains (table 2).

The MGST is a composition of 11 internationally validated tools. The MGST components are triage instruments to identify risk. The trigger is the clinicians' judgment of the necessity to evaluate a specific geriatric domain. This method focuses on a limited number of geriatric dimensions. In clinical practice, usually only a selection of the MGST components is used,

Table 1
Comparison of the MGST and the interRAI AC

Instrument	Minimum Geriatric Screening Tools	interRAI Acute Care
Development	1st generation CGA Belgian College for Geriatrics www.geriatrie.be	3rd generation CGA interRAI www.interrai.org
Aims	1. Comprehensive geriatric assessment - Acute clinical setting - Standardized - Focus on limited number of domains - High risk patients: CGA is triggered by clinical impression	1. Comprehensive geriatric assessment - Acute clinical setting - Standardized - Systematic evaluation of large number of domains - All geriatric patients 2. Clinical Assessment Protocols 3. Outcome measurements 4. Follow-up and data transfer system 5. Case-mix funding 6. Quality indicators
Content and validation	- Internationally validated instruments - Selection based on psychometric value - Each instrument validated in its entirety - MGST not validated as an entity	- Set of items organized per domain - Validity tests of interRAI AC are limited - interRAI HC and LTCF extensively validated - Convergent validity e.g. CPS versus MMSE
Frequency of data collection	- No strict guidelines - Repeated evaluation is advisable	- Multiple observation periods: premorbid – admission – reassessment (e.g., day 14) – discharge
Information sources	- Participation of patient - Patient interview: dichotomous questions - Alternatives suggested for non-communicative patients	- Mainly observation - Additional information by patient interview, interview with informal helpers, and chart review
Geriatric expertise and teamwork	- Clinicians with domain-specific expertise - Training in individual instruments is essential - Inter- or multidisciplinary use	- 1 or more team members - 1 or more disciplines - Specific training in interRAI AC is essential - Inter- or multidisciplinary use
Care planning	- Distinct instruments with individual cut-off - Care planning based on geriatric expertise ↓ Familiarity with geriatric care required	1. Data collection 2. Alert clinical risk 3. Clinical protocols 4. Scales of functional evolution ↓ Supports teams (un)familiar with geriatric care
Data transfer	- Possibility to transfer all components of the MGST - In routine clinical practice however: - Transfer of individual scores per tool - A one-way communication tool: (e.g., from hospital to primary care)	- Integrated Health System - Longitudinal follow-up - Follow-up across care settings - interRAI AC by analogy with HC, LTCF, PAC, PC - Common language; systematic data transfer in two ways (e.g., from primary care to hospital and vice versa) - Reduction of administration if data are transferred at admission

CPS: Cognitive Performance Scale; MMSE: Mini Mental State Examination; interRAI HC: interRAI Home Care; interRAI LTCF: interRAI Long Term Care Facility; interRAI PAC: interRAI Post Acute Care; interRAI PC: interRAI Palliative Care

based on the problems the team clinically detected. According to the experts, it's the team's responsibility to administer all necessary components of the MGST method. Each tool is kept in its original form, except for translational changes (e.g. Stratify (21)), and is added in its entirety. The MGST as an entity has not been validated yet. Although most of separate components of the MGST are frequently used in geriatric research and clinical practice internationally, the MGST in its entire constellation is, to the experts' knowledge and literature search, not in use in other nations except for Belgium.

The current version of the interRAI AC consists of a set of 98 administrative and clinical items, jointly screening a large number of geriatric domains. Furthermore outcome measures are calculated based on a composition of items across domains (e.g., Cognitive Performance Scale). The majority of items are identical to the interRAI LTCF and interRAI HC, which have been validated extensively (22-26). Initial psychometric studies of the interRAI AC have reported acceptable validity (15-18). Validity tests of the outcome measures (CAP triggers, scales), however, are scarce (16).

Frequency of data collection

The MGST is defined as the first step to identify geriatric problems at admission (15). In real terms, the MGST is administered once-only, within 48 hours of admission. Experts emphasize that patients should be repeatedly assessed in case of prolonged hospitalizations.

Table 2
Content of the MGST and the interRAI AC

	MGST		inter RAI AC
GERIATRIC DOMAIN	**N**	**Instrument**	**N £**
INTAKE AND INITIAL HISTORY			6
COGNITION			
Decision making	0		1
Delirium	0		4
Memory	0		3
Overall cognition	1	Clock Drawing Test (12, 13)	0
COMMUNICATION, VISION AND HEARING			
Communication	0		2
Hearing	0		1
Vision	0		1
CONTINENCE	1	Katz (33)	4
DISEASE DIAGNOSIS	20	Greenfield (34)	2
DISCHARGE POTENTIAL			4
HEALTH CONDITIONS			
Balance	0		
Dyspnea	0		
Falls	5	Stratify (35)	
Fatigue	0		
Nausea	0		
Pain	1 or 6	Pain thermometer (36) or Checklist for Non-verbal Pain Indicators (37)	3
MEDICATION	1		2
MOOD AND BEHAVIOR	4 or 19	GDS (38) or CSDD (39)	4
NUTRITIONAL STATUS	3	Must (40)	4
PHYSICAL FUNCTIONING			
Activity level	0		2
ADL	5	Katz (33)	7
Confined to bed	0		1
IADL	8	Lawton (41)	8
Locomotion	0		4
INFORMAL HELPER	4	Socios (42)	[13]*
SKIN CONDITION	0		2
RESPONSIBILITY AND DIRECTIVES	0		7*
TREATMENTS AND PROCEDURES	0		19*

N: Number of items; GDS: Geriatric Depression Scale; CSDD: Cornell Scale for Depression; Must: Malnutrition Universal Screening Tool; *: The number of items is country specific; £: Additional scales are calculated based on a composition of items across domains (e.g., Cognitive Performance Scale, Depression Rating Scale, Pain Scale, Pressure Ulcer Risk Scale, ADL Hierarchy Scale, IADL Scale)

The interRAI AC records patient's functioning on multiple periods in time: premorbid, at admission and at discharge. If the patients' functioning has significantly changed, a reassessment can be carried out. In the experts' opinion, recording of premorbid functioning is unique and a major advantage. Based on the premorbid data and the evolution of the functioning during the hospital stay, the potential for rehabilitation can be estimated (19).

Information sources

The MGST assessment demands patients' participation. The majority of items are dichotomous questions. For patients with communicative, cognitive and/or behavioral problems, alternative tools are proposed to assess pain and depression. One item, the Clock Drawing Test, demands active performance of the patient.

Except for the premorbid assessment, the majority of the interRAI items can be completed based on systematic observation during regular care. Additional information can be obtained consulting medical files, (informal) caregivers, and family (19). Only six items are based on patient's interview asking explicitly the opinion about pain and mood. Only one item demands a "test-setting", when measuring the gait speed.

Geriatric expertise and teamwork

The experts advise to assign the various components of the MGST to clinicians with domain-specific expertise. Each of these disciplines is best qualified to assess accurately and reliably the domain within the scope of his expertise (e.g., cognition is best assessed by an occupational therapist or psychologist; mobility by a physiotherapist). It is necessary to train the assessors for each component of the MGST.

The RAI-assessment can be done by a single or by multiple disciplines. In the experts' opinion, interdisciplinary use is highly desirable. Geriatric expertise is not a prerequisite; however training in the use of the interRAI AC is necessary.

In the experts' opinion, both CGA methods can be used multidisciplinary or interdisciplinary. The extent to which disciplines consult each other and execute the care plan interdisciplinary depends on the ward culture, not on the instrument type.

Care planning

Experts emphasize that the MGST demands acquaintance with geriatric care, to detect and evaluate geriatric syndromes. After performing the assessment phase, the team relies on its own expertise to interpret the cut-off scores and to set up care plans. For wards with limited geriatric know-how, the MGST does not offer standardized interventions or clinical-pathways.

CGA is only one phase of the RAI-method. After the assessment, Clinical Assessment Protocols (CAP's) are triggered. They serve two purposes: on one hand, various items are clustered in algorithms. Predefined cut-offs indicate the level of risk within (e.g., malnutrition) as well as across geriatric domains (e.g., risk for falls is triggered by fall incidence, vision, balance and/or cognition). On the other hand, it supplies guidelines for further in-depth clinical examination, treatment, and follow-up. The algorithms have been developed by interRAI based on large international databases (4, 27, 28). The protocols include the latest evidence based medicine and evidence based nursing. Furthermore, the RAI method provides scales that enable clinicians to visualize the evolution of the patients' functioning (e.g. cognition, ADL) longitudinally, even across care settings. These two features, CAP's and scales,

assist care teams -both with or without geriatric knowledge and skills- in choosing priorities in individualized care plans based on systematic observation.

Data transfer

Data transfer of the MGST as an entity is theoretically possible. However, experts comment that, in reality, usually the scores of single components are transferred. Moreover, it is generally a one-way communication, e.g. clinical findings are transferred from hospital setting to the primary care setting. Data transfer is not a goal itself; the MGST mainly focuses on mapping the actual situation at admission and if needed, it can help to adjust the inpatient care planning.

The RAI method is an "Integrated Health System". Patient's functioning can be monitored longitudinally and across care settings. The items are not only standardized within a specific setting, common geriatric topics across various care settings are analogous in all instruments (e.g., continence is recorded identical in the interRAI HC, LTCF, and AC). Each instrument has its accents (e.g., the housing conditions in the interRAI HC), but the common basis ensures a common language across disciplines, organizations, and care settings. Based on this principle, data transfer can be organized. In the specific case of the hospital setting, this means that this uniformity can facilitate the premorbid assessment. For example, when interRAI LTCF assessment is performed in the nursing home, the hospital team can estimate patient's premorbid functioning based on this information.

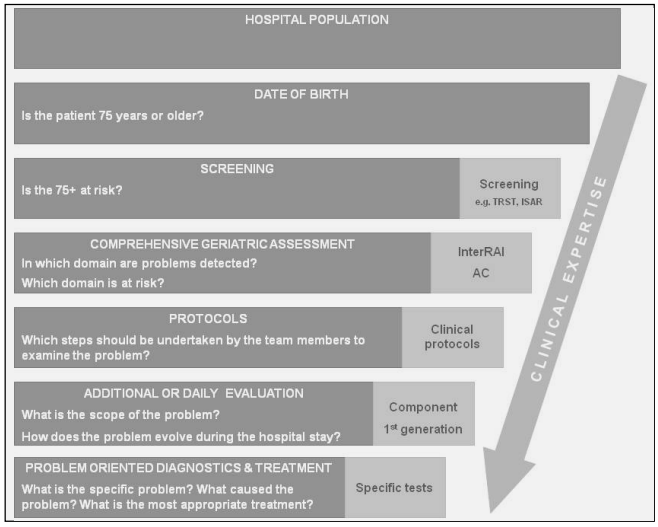
Discussion

Based on literature review and expert opinion, this paper compared the interRAI AC and the MGST. Both methods aim at multi-domain geriatric assessment, but each with a different scope and goal. For instance, MGST seeks for uniformity across acute care settings. It is a selection of well-known internationally validated instruments, and it successfully identifies geriatric domains at risk (15). On the other hand, some domains are not represented in the MGST (e.g., communication, skin condition), assessment requires patient's active participation, individual cut-off scores fail to link findings across geriatric domains, it acquires geriatric know-how for interpretation, and it does not facilitate data transfer. The interRAI AC obviates these weaknesses by systematic observation of more geriatric domains as a basis for outcome measurements. The strength of standardization lies within the possibilities of intramural and extramural data transfer, enabling efficient communication and long term follow-up. So far, the interRAI Suite is the first type of CGA that acts beyond the organizational level. It also has unique features such as linking premorbid and actual functioning; multiple assessment periods following patient's functional evolution; CAPs, scales and evidence based clinical protocols supporting clinical decision making for those familiar or unfamiliar with geriatric care. In addition to the advantages in clinical use, third-generation CGA meets the growing need in geriatric research of transparency and uniformity (29) of data collection systems. The international use of interRAI tools in non-acute settings proved the strength as representative database for clinical research (4).

Some limitations regarding the interRAI AC remain. Psychometric tests and clinical experience of the interRAI AC are scarce. Reliable use requires extensive training (4) and computerization. A Belgian pilot study described pitfalls and incentives of the use of interRAI AC (30). Broader research should give insight in the time and persons needed to realize the extensive geriatric assessment and the CGA based care planning and follow-up. The time investment of the comprehensive assessment versus the time gain of the transferred data at admission is not clear yet. Theoretically, the interRAI Suite is designed to easily transfer data but this has not yet been put into practice. In order to link up the various instruments perfectly, further harmonization across the instruments is needed because some items and outputs are not yet compatible across instruments. Currently, a nation-wide study in Belgium will be the first to test the practical implications.

The experts concluded that, as a CGA tool, the interRAI AC can substitute first-generation MGST. However, during follow-up, components of the first-generation can be complementary to the interRAI method. Both methods can be integrated and used in a cascade-system (figure 1), as suggested by the expert panel. InterRAI AC detects actual deficits and risks and suggests subsequent interventions in the form of CAPs. Then, specific components of the MGST can further unravel the detected deficits. For example, if the interRAI AC assessment identified pain, the Pain thermometer – a MGST component – could be applied for daily examination and follow-up of the pain treatment.

Figure 1
Cascade System integrating the First- and Third-generation CGA



Because CGA is time consuming, the experts underlined the importance of brief screening (e.g. TRST, ISAR (31,32)) to target older patients whom might benefit most from CGA (step 1). Geriatric and non-geriatric wards should then be encouraged to perform a CGA with the interRAI AC for each older patient at risk (step 2). If domains at risk are detected by the CAP algorithms (step 3), experts (e.g., psychologist, dietician) can be consulted for further in-depth evaluation, daily follow-up and interdisciplinary care planning (step 4). CAPs can suggest if a specific component of the MGST (or tools of other first-generation CGA instruments) can serve further examination. Then, further problem oriented diagnostics and testing (step 5) can reveal the causes and finally, an individualized treatment or counseling can be started (step 6).

The question "Could first-generation CGA be replaced by third-generation?", was responded equivocally by the experts. In this script, we summarized the perspective of the experts as a result of various rounds and a face-to-face meeting. Probably this consensus must be seen within the light of the current context: an intermediate stage between the first-generation assessment currently used and the novel interRAI AC. It must be mentioned that in this stage, the CAP protocols for the interRAI AC have not yet been released by interRAI. This may explain the proposed cascade system: some of the domain-specific first generation instruments may give additional information when problem domains are triggered after interRAI AC assessment. Meanwhile, the cascade -based on widespread, extensively tested international instruments- can help clinical decision making. In the future, it should evolve to one uniform transfer system rather than two parallel systems. This would imply that healthcare organisations might replace their (often home-made) first-generation CGA method by a third-generation CGA. Although the RAI method currently seems the preferred system to meet the criteria of CGA across settings, it clearly is still work in progress. To the best of our knowledge, no studies have been done so far to evaluate the transfer of patient data between the nursing home, home care and acute care system based on the interRAI portfolio. Furthermore, validity and reliability testing of the interRAI AC is still scarce. In the mean time, the cascade system discussed in this paper may be not a final but a reasonable interim solution.

Conclusion

In clinical use, the third-generation interRAI AC has advantages compared to the first-generation MGST, including the observational nature of standardized items, feasibility to non-geriatric wards, more exhaustive content, frequent monitoring over hospital stay, use in data transfer, and uniformity across care settings. However, the interRAI AC process may be time-consuming, may demand extra staff, and computerization is a condition sine qua non. Furthermore, an important feature of the interRAI AC -like with other RAI instruments- is the triggering process: when a combination of items triggers a clinical problem, the team is guided by CAP's to perform in-depth assessment or daily follow-up. A cascade-system is proposed (as an interim solution) to integrate this new CGA method in conventional practice. First, the systematic interRAI AC assessment detects risk domains. Then, outcome measures suggest care tracks and clinical protocols. In a next stage, classic tools and/or techniques examine care needs. Based on this process, an individual care plan can be started. The proposed cascade can be generalized to various ward-types, including those less familiar with holistic geriatric care.

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