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Original Study

Psychometric Properties, Feasibility, and Acceptability of the Self-Reported interRAI Check-Up Assessment

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A B S T R A C T

Objectives: To assess the feasibility, acceptability, and psychometric properties of the self-report version of the interRAI Check-Up (CUSR).
Design: Cross-sectional study of participant ratings of item content and difficulty completing the CUSR. Participants were also randomly assigned to complete the assessment by themselves or with help from a lay interviewer.
Settings and Participants: A total of 184 older adults from diverse backgrounds, served by 6 Canadian organizations in Ontario and Nova Scotia were recruited. Settings ranged from retirement communities for healthy older adults to assisted living facilities.
Measures/Methods: Time to complete the interRAI CUSR was tracked automatically. Participants self-reported on what items they wanted to have modified, added, or deleted. The also rated whether items were embarrassing or difficult to complete. Psychometric properties were examined between the 2 approaches to completion and were benchmarked against existing reports on psychometric properties of clinician-led home care assessments.
Results: The interRAI CUSR takes about 28 minutes to complete with both self-administered and lay interviewer approaches. The convergent validity and reliability of CUSR is comparable to those of clinician-based assessments like the Resident Assessment Instrument-Home Care. Most participants had no difficulty completing the assessment, and none rated the task as very difficult. Poor self-rated health and difficulty with phone use were predictive of any difficult in completing the assessment in a multivariate logistic regression. Most participants reported that CUSR adequately described their health needs, but arthritis, hypertension, and mental health issues were identified as items to be added by participants.
Conclusions and Implications: The CUSR is an appropriate, feasible assessment system with good psychometric properties for use with general populations, including primary care, community services, and patient-reported outcome measurement studies. Interoperability with other interRAI assessments makes it an ideal system to use to obtain a longitudinal view of the person's needs over time.

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The authors declare no conflicts of interest.

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Population aging is a global phenomenon that requires all nations to identify strategies to improve and protect the health status of older adults.[1,2] Like many high resource nations, Canada's population of older adults aged 65 years and older is projected to increase substantially beyond its current 17.5%.[3] Getting old comes with many health challenges, which typically follow a trajectory from robust health to frailty, chronic disease, and multimorbidity. Loss of function can continue to disability, institutionalization, and death.[4,5]

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A combination of monitoring through health assessment, early detection of health challenges, and timely medical intervention is needed to slow this trajectory of decline.[6]

Implementation and use of interoperable screening and assessment tools are important parts of strategies to deal with the health system challenges of population aging.[7–9] Clinician-administered assessment is mostly used for assessing health needs of frail older adults in community- and facility-based health care services. However, using clinicians to screen the general population would be impractical because of cost constraints and lack of human resources. This is particularly problematic in low-resource regions. Self-administered assessments that are interoperable with clinician-led systems may be useful as a low-cost, first-level alternative assessment to identify the subset of high-risk individuals who could benefit more from expensive clinician-administered assessments.[10] Self-report health assessment also encourages respondents to reflect on their health. This could prompt respondents to seek early medical attention on identification of health challenges, which could subsequently slow or reduce functional decline, emergency visits, and length of hospital stays.

Many self-administered assessment tools are developed to focus on one aspect of risk such as hospital admission[6,11] or risk of institutionalization.[12] These assessments are often done on an ad hoc basis when specific service transitions may occur.[6,13–15] Older adults often complete standalone surveys or health care forms that do not relate to other assessments used in the health system leading to increased assessment burden without gaining the advantage of longitudinally comparable data.[8]

interRAI assessment instruments represents a comprehensive, interoperable system that covers most major settings of health and social services responding to the strengths, preferences, and needs of vulnerable persons of all ages.[16,17] This includes instruments for nursing home,[18,19] home care,[20–22] acute care,[23,24] post-acute care,[25] palliative care,[26,27] and mental health services.[28,29] interRAI has an existing set of self-reported quality of life surveys to measure patient experience in health care,[30] but the lack of a fully self-reported assessment instrument has been an important gap in the interRAI clinical suite. The interRAI Check-Up Self-Report (CUSR) assessment tool is multidimensional, standardized, digitalized, and interoperable with interRAI's clinician-led assessments.[31] It deals with the broad well-being of the person, including demographics, mood, social issues, function, senses, medical needs, and health service use. This broad perspective is needed to detect the potential emergence of multimorbidity and frailty and to prevent or delay declines in health.

A self-report assessment compatible with other assessments for older adults in different care settings will allow for integration of clients' information along the continuum of care.[17,32] However, given that such instruments place additional onus on the participant to respond to all items, it is important to understand the feasibility and acceptability of such a system for older adults. It is also necessary to evaluate the validity and reliability instruments like the CUSR to examine their psychometric performance compared with clinician-led assessments which include, but are not limited to, self-reported observations. Finally, the CUSR can be completed as a self-administered survey or it can be used with a lay interviewer, including family members. Therefore, it is worth considering whether the method of administration results in differences in measurement or completion time.

Methods

Study Setting

This study took place in Ontario and Nova Scotia, Canada. Five organizations providing a range of services to a heterogenous sample of community-dwelling older adults participated. These included community support services, an older adult activity/exercise center, and a retirement home. In addition, a retirement community for independent living was included to provide a sample of healthy older adults from the general population.

Data Collection

Ethical approval was obtained from University of Waterloo Ethics Committee before the study commenced (ORE 40181). The researchers worked with the initial contact person from each partner organization to identify a project lead. Each project lead was then trained via teleconference on the research protocol. The project leads then identified volunteer lay interviewers to work with from within their organizations.

The study included 184 community-based older adults aged 65 years and older. Participants were randomly assigned to one of 2 groups. Group 1 self-administered the assessment alone whereas group 2 had the self-report assessment administered to them by a lay interviewer.

The assessment was completed online with Android-based tablets set with a font size adequate for older adults. The CUSR was completed entirely by the older adult whose health status was assessed or by the lay interviewer depending on the study group. Interviewers were directed to record only the responses provided by the person for whom the assessment was done. In other words, the interviewers did not make inferences about what answers best represented the person's status. Rather, they recorded only the person's response, whether they believed it to be accurate or not.

Measures: interRAI Check-Up Self-Report (CUSR)

The self-reported interRAI Check-Up[31] instrument was developed by interRAI, a not-for-profit network of researchers, clinicians, and policy experts from more than 35 countries.[33,34] The CUSR includes 90 questions representing a subset of the function, cognition, mental health, social relationships, health symptoms, health behaviors, and service utilization items found in the clinician-administered version of the interRAI Home Care assessment. The reduced item set is focused on the domains most likely to show variance in a healthier population, while also allowing detection of those with more severe impairments. In addition, the items follow interRAI standards with respect to observational time frames, illustrative examples, inclusions and exclusions, and anchor phrases to define varying states of ability or impairment for each item. Therefore, these instruments are designed to be interoperable with the clinician instruments, allowing for a longitudinal health record.

Data Analysis

The interRAI CUSR can be used to calculate scales dealing with depressed mood, activities of daily living (ADL), instrumental activities of daily living (IADL), and cognition.[16,35] These were used together with individual items to determine whether the randomization to self-administered and interviewer groups was effective.

Convergent validity was tested for the CUSR by comparing the correlations of selected pairs of items used in previous data quality analyses for clinician-based assessments. Three groups of participants were considered: all participants assessed with CUSR, only participants that self-administered the CUSR, and participants who were interviewed by a layperson reading the CUSR. Indicators of convergent validity for the CUSR were benchmarked against performance of the interRAI Home Care (RAI-HC), a clinician-led assessment for older adults receiving community services.[35]

Reliability of the CUSR was tested using Cronbach alpha as a measure of internal consistency of parallel form scales. The Cronbach alpha scores of scales in the CUSR were benchmarked against the same values for scales derived from the interRAI Home Care.[35]

Feasibility and acceptability of the CUSR was evaluated in 3 ways: (1) length of time to complete the assessment, (2) level of difficulty experienced by users in completing the assessment, and (3) direct feedback from study participants. Finally, multivariable logistic regression was performed to identify significant predictors for assessment difficulty.

Results

Descriptive Characteristics

The mean age of all participants was 76 years, and 25.9% were aged 85 years or older. Most participants were female (62.5%), 22.8% were still married, and 58.7% lived alone. The majority (76.4%) had at least high school level of education, and English was the primary language of communication at home for 87.8% of participants.

Rates of daily pain, cognitive impairment, IADL impairment, mood disturbances, and poor health ranged between 7.5% and 48.3% (see Table 1). However, except for self-report mood, there were no significant differences in health status between the self-administered and lay interviewer-administered groups.

Convergent Validity

Convergent validity is established through examination of patterns of association in the data (Table 2). Pearson correlation coefficient can be used to examine known relationships compared with parallel tests results reported in clinician-rated assessments. A positive, moderate correlation ($r = 0.45$) was seen between ADL and cognition when data from all study participants were considered. This is very similar to the r value of 0.44 reported for the same pair of variables in a study of clinician-led assessments done by home care professionals in Ontario.[35] A moderate correlation was also seen in the association between IADL and cognition, both in the CUSR study sample and as reported by Hogeveen et al[35] for RAI-HC (Table 3).

There was weak correlation between pain and indicators of depressed mood (measured with Depression Rating Scale in RAI-HC and Self-reported Mood Scale in CUSR with correlations of 0.18 and 0.16, respectively. The associations between self-reported mood and pain were comparable for both self-administered and interviewer administered approaches with the interRAI CUSR.

Internal Consistency

Reliability of the scales from the CUSR was measured using Cronbach alpha. The alpha scores for the mood scale, ADL scale, and IADL scale were 0.79, 0.89, and 0.87, respectively. These are comparable to alpha scores reported for clinician-led assessments[35] where the depression rating scale, ADL scale, and IADL scale had Cronbach alpha values of 0.73, 0.93, and 0.87, respectively.

Feasibility of Use

Time of completion

On the average, it took participants less than half an hour to complete the CUSR. The mean completion time for the CUSR assessment was 28 minutes (standard deviation = 13.3) with no significant difference between participants who self-administered the CUSR and those that were administered by a lay-interviewer, according to a t test.

Table 1
Comparison of Clinical Characteristics of Community-Dwelling Older Adults Using the Self-Reported Version of interRAI Check-Up by Mode of Administration, 2019 (N = 184)

	Self-Administered CUSR Sample, % (n) (n= 79)	Interviewer-Administered CUSR Sample, % (n) (n = 105)	*P* Value of χ^2 Test
Poor self-rated health	42.3 (33)	41.1 (43)	.72
Daily pain	35.7 (28)	32.3 (34)	.61
Self-Reported Mood Scale ≥3	26.6 (21)	42.8 (45)	.02
ADL Hierarchy Scale ≥3	7.2 (6)	24.1 (25)	.17
IADL Capacity Scale ≥3	31.4 (25)	48.3 (51)	.33
Cognitive Performance Scale ≥3	42.8 (34)	48.1 (50)	.20
Bladder incontinence	24.9 (20)	35.0 (37)	.29
Bowel incontinence	13.3 (11)	22.4 (37)	.16
Unstable health	38.3 (30)	41.2 (43)	.64

Multivariate logistic regression for assessment difficulty

Only about one-third of participants reported a little or moderate difficulty to complete the assessment. No participant reported that completing the CUSR assessment was "very difficult." Hence, a multivariate logistic regression model was developed to identify factors associated with *any* assessment difficulty. Phone use, poor self-rated health, IADL, and cognitive status were significant at a bivariate level. When these listed items were added to a model, only phone use and poor self-rated health remained significant. The most parsimonious model with only items that were significant at multivariate level included phone use capacity [odds ratio (OR) 3.40, 95% confidence interval (CI) 1.06, 10.86], poor self-rated health (OR 2.75, 95% CI 1.30, 5.80), and age (OR 1.04, 95% CI 1.00, 1.08, for 1-year increment). Age of participants was added to the model regardless of its significance level at the bivariate level (see Table 3). The C-statistic for this model was 0.67.

Direct feedback from users

When asked whether the survey adequately covered all of their health needs, 59.5% of the self-administered group agreed compared with 63.3% of the interviewer group ($P = .64$). Participants were also given the opportunity to provide written feedback on what questions should be deleted, reworded, or added to the instrument. Any question suggested by 5% or more of the participants was considered relevant; however, only 3 met that cutoff: arthritis (suggested by 7% of study participants), hypertension or blood pressure, and mental health (suggested by 5% of study participants each). No other suggested question in any category met the 5% cutoff point for deletion, rewording, or addition.

Discussion

This study suggests that the self-reported version of the interRAI Check-Up could be a useful and feasible tool to help reach populations not yet assessed through standard, clinician-led interRAI systems.

Descriptive Analysis

Because participants were mostly drawn from older adults receiving services from organizations that work to promote health and well-being of older adults, it is expected that these older adults may be

Table 2
Convergent Validity Among Pairs of Variables in the CUSR (Self-Administered and Interviewer-Administered) and RAI-HC Based on Pearson Correlation

Variables	Self-Reported Version of interRAI Check-Up			RAI-HC*, *r* Value (n=2,626,133)
	All CUSR Study Participants, *r* Value (N = 184)	Self-Administered CUSR, *r* Value (n = 79)	Interviewer-Administered CUSR, *r* Value (n=105)	
ADL Hierarchy Scale and CPS	0.45	0.44	0.45	0.44
IADL Capacity Hierarchy Scale and CPS	0.44	0.38	0.47	0.43
Pain and depressed mood†	0.18	0.22	0.17	0.16

CPS, Cognitive Performance Scale
*Based on results reported by Hogeveen et al.[35]
†Mood is measured with a self-reported mood scale in Check Up and the Depression Rating Scale in the RAI-HC.

less healthy compared to the healthiest older adults in the community (with the exception of the independent retirement community). Many participants rated their health as poor, and about one-third of the participants had daily pain, ranging from mild to severe in intensity. Also, mood disturbances were common. These 3 prevailing, interconnected concerns of older adults are important dimensions of health-related quality of life used in patient-reported outcome measures.[15,36]

Validity

The main goal of this study was to evaluate the validity, reliability, and feasibility of CUSR use among older adults from diverse clinical and socioeconomic backgrounds. The key consideration is whether the CUSR would yield associations of comparable direction and magnitude as those reported previously with clinician-led tools. When CUSR *r* values were benchmarked with *r* values for the same pairs of variables in the clinician-administered RAI-HC assessment, the values were very similar. This shows that in general, the CUSR yields comparable patterns of association as the RAI-HC, which indicates good convergent validity.

Table 3
Multivariate Logistic Regression Model for Factors Associated With Any Difficulty in Completing the Self-Reported Version of the interRAI Check-Up (N = 184)

Independent Variables	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Phone use	3.80 (1.30, 11.11)	3.40 (1.06, 10.86)*
Poor self-rated health	2.38 (1.21, 4.69)	2.75 (1.30, 5.80)*
Female	1.37 (0.69, 2.73)	—
Negative mood	1.09 (0.97, 1.23)	—
Age (1-y increments)	1.00 (0.97, 1.03)	1.04 (1.00, 1.08)*
ADL Hierarchy Scale	1.17 (0.93, 1.46)	—
IADL Capacity Hierarchy Scale	1.20 (1.02, 1.41)	—
Interviewer administered	0.96 (0.50, 1.86)	—
Less than high school educational level	1.98 (0.93, 4.22)	—
Presence of embarrassing questions	0.40 (0.05, 3.52)	—
Experienced major life stressor in 90 d	0.70 (0.31, 1.58)	—
Client made financial trade-off within last 30 d	2.57 (0.97, 6.81)	—
Cognitive Performance Scale	1.57 (1.15, 2.07)	—
Impaired vision	3.01 (0.91,10.00)	—
Primarily English speaker	1.50 (0.57, 4.00)	—
Lived in Canada since birth	1.65 (0.85, 3.22)	—

*$P < .05$.

Reliability

Cronbach alpha was used to measure the internal consistency of selected scales generated from the CUSR. Judging from established cutoffs of Cronbach alpha value[37] where 0.70 to 0.79 is considered acceptable scale reliability, and greater or equal to 0.80 is considered excellent scale reliability, the 3 scales examined had acceptable to excellent scale reliability. This is a comparable level of performance as found in clinician-led assessments.[35]

Feasibility of Use

Any new tool must be usable by the intended audience. The mean time to completion was 28 minutes (ie, less than half an hour for about 90 questions), irrespective of whether the assessment was self-administered or interviewer administered. An assessment tool that assesses both health and well-being of an older adult in half an hour or less is optimal for use in general population screening.

In addition, only one-third of participants had little to only moderate difficulty with doing the assessment. Multivariate modeling showed that poor phone use capacity (OR 3.40) and poor overall health (OR 2.75) were the 2 major factors associated with participants having difficulty with the assessment. This suggests that in the general population (eg, in primary care) the CUSR should be possible to complete with little difficulty, even though it is a more complex set of items than are found in most surveys.

There was also a slight effect of greater difficulty with older age, which may be a function of cohort differences in experience with computer use. Hence, for an assessment like the CUSR that is done online through phone, tablets, or desktop computers, it is reasonable that some older adults will experience some minor challenges if they are uncomfortable with that type of technology.

Many CUSR questions require participants to remember past events, and this may be stressful for anyone in poor health or with mild cognitive impairment. Therefore, some members of this group of older adults might benefit from clinician led assessments. This is especially true where the trained health professional could fill the assessment with more information from other sources, like the client's health record, client's caregivers, or from assessor's judgment.

The interRAI CUSR could be used in a variety of contexts where there is a need to screen or monitor large populations and clinician resources to complete assessments may be limited. This could include primary care settings, population health surveys, presurgical screening, and patient-reported outcome measurement studies. The key advantage of the interRAI CUSR over other existing self-report tools is that it is fully interoperable with and has comparable psychometric properties to the interRAI Home Care and other clinician-led assessments. Therefore, the CUSR can contribute to a longitudinal view of the person's health, functional status, and well-being over time when linked with other interRAI assessment results.

Strength and Limitations

This is the first study to test the CUSR in Canada (Ontario and Nova Scotia). This provided bases for comparing the results of this study with results from studies that used data collected with other interRAI assessment tools in Canada. Second, researchers engaged older adults as cocreators of CUSR by collecting written feedback to closed- and open-ended questions whose answers will help the researchers to refine the tool. Study participants who are also the intended users of the final CUSR had the opportunity to make suggestions for improvement of CUSR that the researchers may not have considered.

The study has some limitations. Sample size for this study is modest with 184 participants from six organizations (5 from Ontario and 1 from Nova Scotia). The sample was intended to be heterogenous rather than representative of older adults in Ontario, Nova Scotia, or Canada at large. Hence, this study has limited external validity, but it allowed for the examination of associations of interest. However, as the participants were drawn from populations with existing health challenges, our findings, particularly in relation to acceptability and feasibility, support its use in a broader community or primary care population of older adults. In addition, the use of the CUSR has been validated previously in low resource communities in South Africa,[31] suggesting its applicability to a wide variety of settings.

Conclusions and Implications

interRAI Check-Up is a feasible, valid, and reliable self-report instrument for collecting data on the health and well-being of older adults residing in the community. The convergent validity of the scales in the instrument are satisfactory and comparable to those from RAI-HC whose data are collected by trained health professionals.

However, results from this study also show that an older adult in poor health would find it somewhat more difficult to complete his or her self-administered assessment. In cases of very poor health, an immediate assessment by a clinician would be preferred and therefore the full interRAI Home Care should be used instead. This study sets the stage for the self-report Check-Up implementation as a screening level assessment for community-dwelling older adults in a variety of contexts.

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