JAMDA 26 (2025) 105572

JAMDA

journal homepage: www.jamda.com

Original Study - Brief Report

Care Needs and Self-Sufficiency Assessment of Home Care Clients

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Keywords:
Home care services
self management
needs assessment
changes in care needs
aged

A B S T R A C T

Objectives: Assessing the changing care needs of home care clients is challenging due to the increasing multimorbidity and heterogeneity of geriatric syndromes, including frailty, functional decline, and cognitive impairment. We described the correlation between subjective judgment of changes in self-sufficiency and measured changes in health status.
Design: Retrospective cohort study.
Setting and Participants: A total of 70,369 home care clients aged ≥65 years dwelling in a private residence in Ontario, Canada, with 2 interRAI Home Care assessments conducted between July 2021 and December 2023 were included.
Methods: We compared assessor-judged changes to self-sufficiency with changes in functioning, personal support and health service needs, cognition, health instability, and pain between the first and second assessments using validated outcome scales and algorithms derived from the interRAI Home Care. We used contingency tables to assess whether any change in outcome scales was consistent with self-sufficiency. We used matched-pairs rank-biserial correlation to compute effect sizes of the magnitude of change in outcome scales within each assessor-judged stratum. We conducted a sensitivity analysis, stratifying the cohort into assessments completed within and after 6 months.
Results: A total of 50.6% of clients were judged by an assessor as having deteriorated in self-sufficiency over the last 90 days. Assessor-judged changes in self-sufficiency were associated with personal support and care needs, health instability, and activities of daily living performance. Worsened self-sufficiency was less associated with pain, whereas improved self-sufficiency was weakly associated with improved cognition.
Conclusions and Implications: Assessor-judged changes in self-sufficiency strongly correlate with changes in health status and care needs. Subjective clinician summaries of health changes show validity in modifying care plans.

Background

The growing aging population and health complexities have resulted in a growing demand for home care services for older adults in Ontario, Canada.[1,2] Allocating appropriate home care services to

Funding Sources: This research did not receive funding from public, commercial, or not-for-profit agencies.
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https://doi.org/10.1016/j.jamda.2025.105572
1525-8610/

clients is challenging given the complex and interacting nature of multimorbidity and geriatric syndromes, including impaired mobility, frailty, and cognitive impairment.[3,4] Proper allocation of home care services is instrumental in ensuring comorbid older adults can age in place and avoid unnecessary hospitalizations and emergency department visits.[2]

Variations in how health providers assess and interpret client needs have led to concerns that care provision is inequitable, with overuse and underuse of care.[5,6] Where there are changes in the health status of home care clients, they call for repeated assessments to determine service changes. Previous studies have raised concerns about variations in needs assessments attributed to environmental and organizational factors rather than the characteristics of clients.[6] However, the degree to which health providers can identify changes in needs aligned with health, cognitive, and functional changes is unclear.[6]

Our objective was to describe how self-sufficiency, judged subjectively by assessors, correlated with an objective change in health status. We hypothesize that assessors' judgment of self-sufficiency will align with health and social care changes.

Methods

Design and Participants

We conducted a retrospective cohort study examining interRAI Home Care (HC) assessments between July 2021 and December 2023 of home care clients aged $\geq$65 years at a private residence in Ontario, Canada. We only included clients with a second interRAI HC assessment. We selected the first assessment conducted between July 2021 and December 2023 as the baseline assessment for each participant.

Setting

From 2022 to 2023, home care provided supportive services to >540,563 older adults in Ontario, Canada, with varying complexities to support healthy aging in the community.[7-9] In Ontario, home care is funded and under the jurisdiction of the Ministry of Health.[1] These services range from nursing, personal care, physiotherapy, social work, and homemaking to assist older adults living independently.[9] A total of 206,783 home care clients in Ontario are assessed using the interRAI HC.[8] Clients are often referred by a physician or from a hospital.[8] Referrals are provided to a care coordinator who assesses the person's care needs, potential risks, and values and preferences to develop a care plan.[10] Clients with changes in health needs may receive additional personal support or be discharged to other health services, including hospitals, residential care facilities, community-based health services, and assisted-living settings.[8]

Data Source

The interRAI HC is a clinical instrument administered by assessors that captures clients' communication and vision, mood and behavior, psychosocial well-being, functional status, continuity, disease diagnoses, and social support. Several validated clinical scales can be derived from the interRAI HC, including the Activities of Daily Living (ADLs) Hierarchy Scale,[11] Cognitive Performance Scale (CPS),[12] and Changes in Health, End-stage disease, Symptoms and Signs (CHESS) scale.[13] Previous work has confirmed the interrater reliability and validity of the interRAI HC.[14-17] InterRAI HC assessments are completed at authorization and then every 6 months.

Exposure

We measured the assessor's judged self-sufficiency at the second HC assessment using item R2 of the interRAI HC: "Overall self-sufficiency has changed significantly as compared to the status of 90 days ago (or since last assessment if less than 90 days ago)." Assessors record self-sufficiency as follows: improved, no change, or deteriorated. The interRAI HC User Manual defines self-sufficiency as including self-care performance and support, continence patterns, involvement patterns, use of treatments, and so forth. This also includes (but is not limited to) cognition, mood, social health, and pain changes. The item intends to monitor the person's self-sufficiency in the community over time.[18]

Outcomes

We measured the change in health and functional capacity between the first and second interRAI HC assessments using validated and widely adopted interRAI scales and algorithms. We measured ADLs performance for all residents using the ADLs Hierarchy Scale, which includes dependence on personal hygiene, toilet use, locomotion, and eating, ranging from 0 (independent) to 6 (total dependence).[11,19] We measured cognition using the CPS, which assigns clients to levels of cognitive performance ranging from 0 (intact) to 6 (very severe impairment).[12] We assessed medical instability using the CHESS scale, which identifies persons at risk of significant health decline into categories ranging from 0 (no health instability) to 5 (very high health instability).[13,20] We measured pain using the Pain Scale, which categorizes the presence and severity of pain from 0 (no pain) to 4 (daily excruciating pain).[21] We identified clients in most need of services using the Method for Assigning Priority Levels, which uses a decision tree to prioritize care needs from 1 (low) to 5 (very high) using criteria obtained from the interRAI HC.[22,23] We assessed the need for personal support care using the personal support (PS) algorithm. Self-reliance measured using the PS algorithm ranges from 1 (very low need) to 6 (very high need).[10,24]

Statistical Analysis

We reported baseline cohort characteristics at the first assessment date using absolute (counts) and relative (frequencies) values for categorical variables and medians and interquartile ranges for continuous variables. We compared descriptive baseline characteristics by self-sufficiency using Kruskal-Wallis and Pearson χ^2 tests for continuous and categorical variables.

We used cross-tabulation to compare the distribution of self-sufficiency and a 1-point change in outcome scales and algorithms between the first and second assessments. We reported effect sizes and 95% CIs of the magnitude of change in outcome scales between the first and second assessments using matched-pairs rank biserial correlation coefficients and bootstrapping. The matched-pairs rank biserial correlation is a nonparametric test between an ordinal outcome and a binary predictor, which accounts for repeated measures. Effect sizes range from -1 (strong negative association, where outcome scales tend to be higher in the second assessment than the first) to 1 (strong positive association, where outcome scales tend to be higher in the first assessment than the second). We calculated the rank-biserial correlation coefficient within each assessor-judged stratum to compare how changes in outcome scales correspond with the assessed change in self-sufficiency.

We performed a sensitivity analysis stratified by follow-up assessments within or after 6 months to assess whether proximity between assessment dates resulted in differences in assessor judgment. All tests were 2-tailed, and we interpreted $P < .05$ as statistically significant.

Ethics Approval

Ethics approval for secondary data analysis was provided by the University of Waterloo Office of Research Ethics (File No. 30173).

Results

Participants

We included 70,369 home care clients with 2 interRAI HC assessments conducted between July 2021 and December 2023 (Figure 1).

The median number of days between the first and second assessments was 225 (interquartile range, 245) (Supplementary Figure 1). Assessors judged 50.6% of clients (n = 35,575) to have deteriorated, 46.3% (n = 32,584) to have not changed, and 3.1% (n = 2210) to have improved in self-sufficiency during 90 days before the second interRAI HC assessment (Table 1). Clients requiring extensive ADLs support with moderate to severe cognitive impairment, presentation of pain, and a recent fall were likely to have a subjective assessment of deteriorated self-sufficiency. Clients with a recent hospitalization were likely to have a subjective assessment of improved self-sufficiency.

Outcomes

Most clients had no change across outcome scales, whereas a small portion had improved scores (Supplementary Figures 2-4). Supplementary Table 1 provides the distribution of self-sufficiency and outcome scales and algorithms. Assessor-judged self-sufficiency corresponded to changes in outcome scales, particularly in the PS algorithm, CHESS scale, and ADLs Hierarchy Scale. Assessors judged at least one-third of clients as having changed in self-sufficiency but no change in outcome scales.

Main Results

We observed clients judged as having deteriorated in self-sufficiency within the past 90 days required more personal support services (−0.91; 95% CI, −0.92 to −0.90) and had worsened ADLs performance (−0.86; 95% CI, −0.87 to −0.85) and cognition (−0.86; 95% CI, −0.87 to −0.85). The same stratum had increased medical instability (−0.65; 95% CI, −0.66 to −0.64) and health service needs (−0.57; 95% CI, −0.59 to −0.56). An increase in pain was less associated with assessor-judged deteriorated self-sufficiency (−0.18; 95% CI, −0.20 to −0.16).

Clients judged as having no change in self-sufficiency had no large changes in pain (0.05; 95% CI, 0.02–0.07) or health service needs (−0.08; 95% CI, −0.09 to −0.06). These clients required more personal support services (−0.47; 95% CI, −0.48 to −0.45), had worsened ADLs performance (−0.32; 95% CI, −0.34 to −0.30) and impaired cognition (−0.66; 95% CI, −0.68 to −0.65), but improved health stability (0.34; 95% CI, 0.33–0.36).

Clients judged as improved in self-sufficiency had large improvements in health stability (0.83; 95% CI, 0.81–0.85), moderate improvement in ADLs performance (0.66; 95% CI, 0.61–0.70), and lesser need for personal support services (0.62; 95% CI, 0.58–0.67). The same strata had lesser improvements in pain (0.38; 95% CI, 0.33–0.43) and health service needs (0.48; 95% CI, 0.43–0.53). The group did not show little to no improvement in cognition (0.07; 95% CI, 0.00–0.15) (Figure 2).

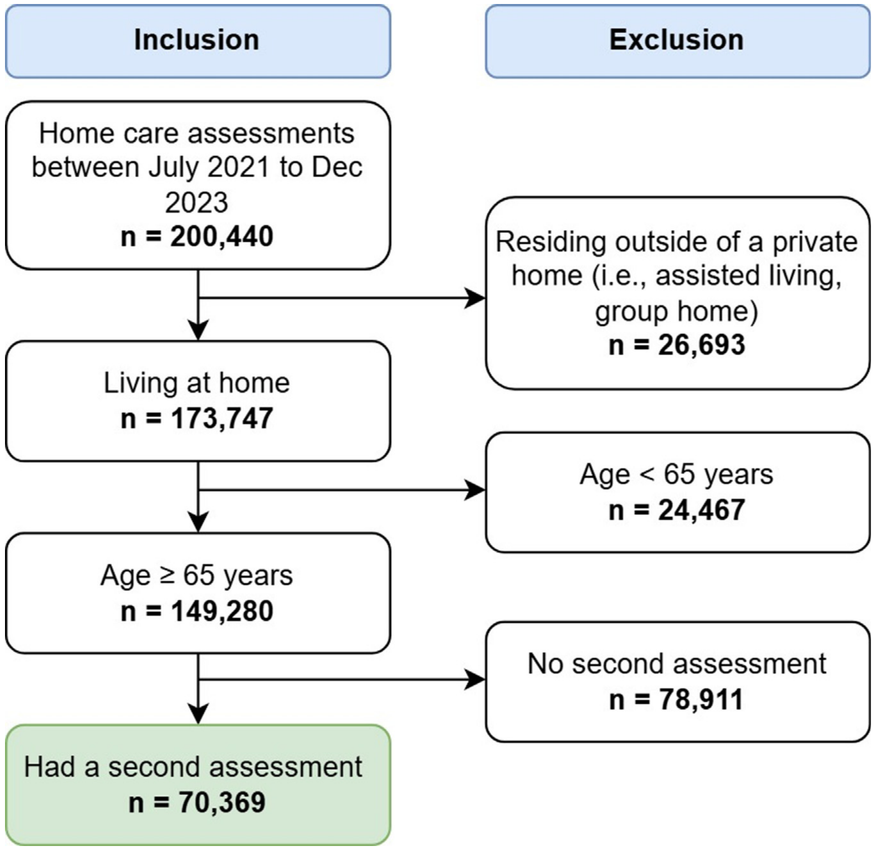

Fig. 1. Flow diagram of adults included in the analysis.

Table 1
Baseline Sample Characteristics

Baseline Characteristics	Overall (N = 70,369)	Assessor-Judged Self-Sufficiency (R2)			*P* Value*
		Deteriorated (n = 35,575)	No Change (n = 32,584)	Improved (n = 2210)	
Age, years	83 (77-88)	83 (77-88)	83 (77-88)	81 (75-87)	<.001
Gender, female	58 (40,955)	59 (20,829)	58 (18,880)	56 (1246)	
Living alone	34 (24,043)	34 (12,000)	35 (11,249)	36 (794)	
Hospitalization in last 90 days	40 (27,985)	48 (17,181)	29 (9322)	67 (1482)	<.001
Extensive ADLs support (ADLH ≥3)	26 (18,273)	34 (11,989)	18 (5942)	15 (342)	<.001
Moderate to severe cognitive impairment (CPS ≥3)	19 (13,019)	21 (7493)	17 (5417)	5 (109)	<.001
Depressive symptoms present (DRS ≥3)	19 (13,344)	22 (7943)	16 (5112)	10 (223)	
Pain present	66 (46,468)	70 (24,767)	62 (20,306)	63 (1395)	<.001
Falls in last 30 days	36 (25,043)	42 (15,110)	29 (9394)	24 (539)	<.001

ADLH, activities of daily living hierarchy scale; DRS, depression rating scale.
Values are % (n), median (interquartile range), or as otherwise indicated.
*Kruskal-Wallis rank sum test; Pearson χ^2 test.

Sensitivity Analysis

We found no considerable difference in the distribution of outcomes (Supplementary Tables 2 and 3) or effect sizes (Supplementary Figures 5 and 6) between assessments occurring within and after 6 months.

Discussion

Our retrospective cohort study of home care clients found that 50.6% of clients were judged by an assessor as having deteriorated in self-sufficiency. Assessors' judgment of deteriorated self-sufficiency was consistent with increased personal support needs

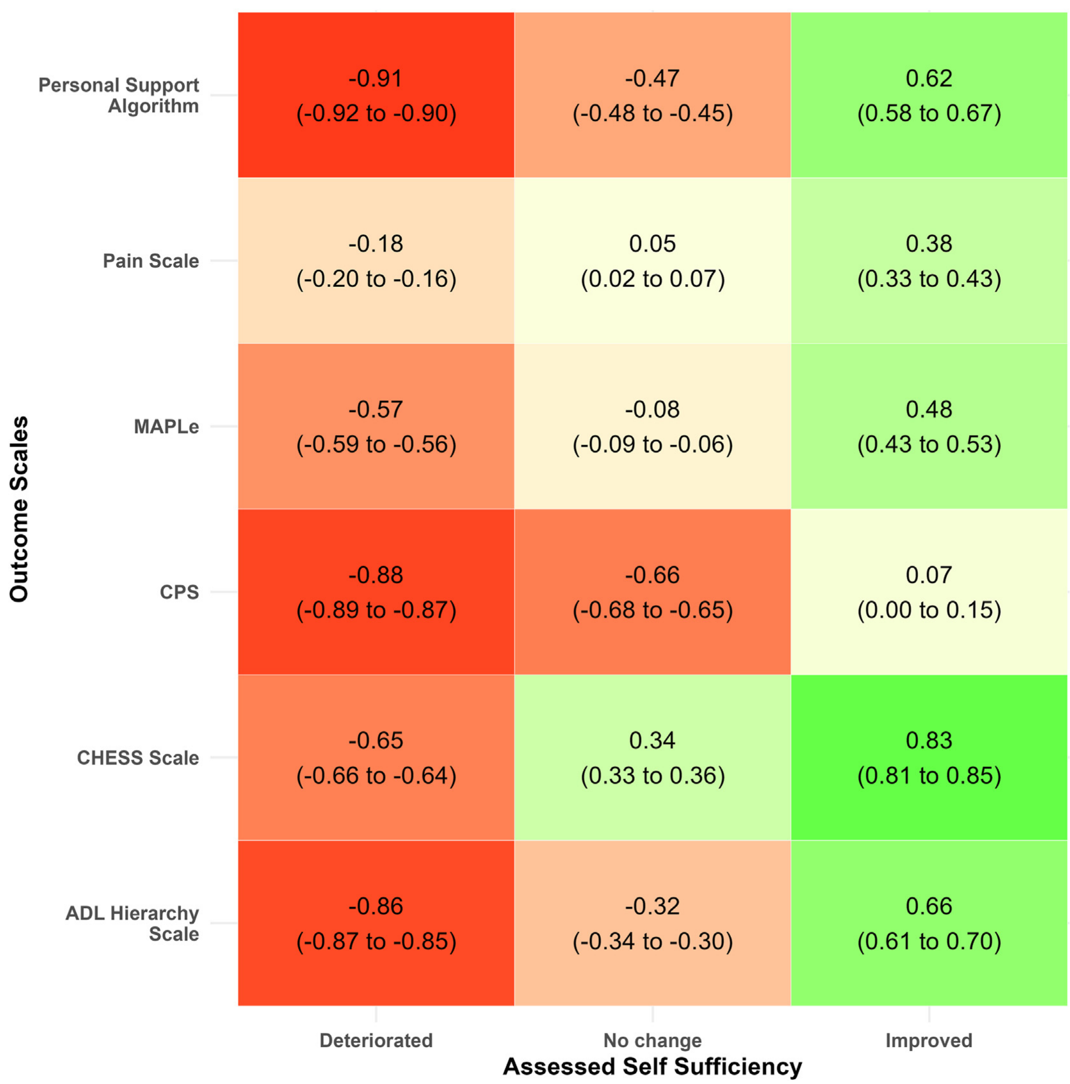

Fig. 2. Effect sizes (95% CI) of scales in clients assessed for self-sufficiency. MAPle, Method for Assigning Priority Levels.

and impaired cognition and ADL sperformance. Relative to other outcome scales, deteriorated self-sufficiency was less correlated with health instability and care needs. Although a subjective decline in self-sufficiency was indicated, it was not associated with changes in pain. Improvements in self-sufficiency were strongly correlated with lesser health instability, personal and care needs, and improved ADLs performance.

Unlike earlier literature, the assessors' judgment did not correspond with improvements in cognition and, at times, worsened while assessors judged no change.[25] However, research has primarily focused on patient opinion in worsening cognition rather than an assessor's ability to assess an improvement.[25] Although few clients had any improvement in CPS, cognition may be challenging to assess subjectively. Identifying these invisible subgroups is essential to ensure timely assessment and, consequentially, timely and appropriate reallocation of care services and transfers to meet new care needs.

Limitations

Clients included in the sample were often reassessed after 90 days, with nearly two-thirds (62.8%) of assessments occurring >6 months after the first assessment, resulting in gaps between outcome scales. However, outcome scale changes reflect long-standing health issues that likely persist before and within the 90-day time frame. The sensitivity analysis did not indicate considerable differences in effect sizes between recent and distant subsequent assessments. Floor and ceiling effects existed across all outcome scales. We observed floor effects mainly in the Pain Scale and ADLs Hierarchy Scale, where many home care clients had no pain or were fully independent, potentially weakening effect sizes among those who improved in outcome scales (Supplementary Table 4).

Conclusions and Implications

Poor transitions in care and inconsistencies in needs assessments put older adults at higher risk of adverse events, inadequate care planning, and avoidable emergency department visits and hospitalizations.[26,27] Our research suggests that subjective summary judgments of care needs correlate with objective changes in care needs and show validity to modify care plans. Repeated assessments of self-sufficiency can trigger a significant health needs assessment, enabling appropriate and timely care planning and transitions in care. The high prevalence of decline and its strong associations with major outcome scales underpin this importance.

Although the current study suggests outcome scales support the assessor's judgment in changing self-sufficiency, other personal, social, and organizational factors may also influence judgment. These factors include patient values and preferences, varying caregiver presence, and lack of access to health care services (ie, long-term care, in-home services). Furthermore, future studies should examine the effect of other health and social characteristics, including mood and depression, on the assessment of self-sufficiency and consider clinical presentations difficult to assess subjectively.

Disclosure

The authors declare no conflicts of interest.

Acknowledgments

This work was informed by mentors attending the interRAI Summer Program for International Research (inSPIRe), including Drs Brant Fries, Gary Cheung, Gilbert Tremblay, Chi-Ling Joanna Sinn, George Heckman, and Fabrice Mowbray. Additional analytical support was provided by Micaela Jantzi, Jonathan Chen, and Ahmad Rahim. The authors acknowledge the Amsterdam Public Health Institute for providing a travel grant that made attending inSPIRe possible.

Supplementary Data

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.jamda.2025.105572.

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