

RAI-HC AS AN INNOVATIVE TOOL FOR FUTURE PRACTICE IN HOME CARE

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Abstract

This study aimed at examining the Resident Assessment Instrument-Home Care (RAI-HC) regarding its potential for a variety of researches as well as for improving quality of care. We searched Medline and PubMed database for peer-reviewed articles reporting primary data on the RAI-HC in English. Study site, objectives of the studies, and findings were abstracted. The search identified 34 articles that met the author's criteria. Nearly a half of the identified studies was conducted in Canada where the RAI-HC is officially used; therefore population based longitudinal survey is widely possible. Another nearly a half was based on a joint European study called ADHOC. There were broadly four types of studies. Firstly, the main focus was on a prevalence of particular conditions of home care clients across different care settings. Secondly, the focus was on predicting factors of either inappropriate events such as falls and nursing home admission or appropriate treatment regimen. Thirdly, the focus was on adverse consequences of clients' conditions, such as care giver burden as a possible consequence of depressed clients. Lastly, the focus was on development of algorithm or protocol to prioritize long-term care placement or rehabilitation planning. Substantial studies have been done using the RAI-HC and they have provided useful scientific insights in the area of home care. Official use of the RAI-HC in home care agencies throughout could contribute to help identify and respond to health promotion and disease prevention issues in this population.

Key words: home care; older people; RAI-HC; multidimensional instrument; assessment; quality of care; quality indicators

INTRODUCTION

Improving the quality of home care for frail older people plays a crucial role not only for maintaining the quality of life among older people, but also for achieving a sustainable health and social care system in rapid ageing societies. Resident Assessment Instrument-Home Care (RAI-HC), a multidimensional assessment instrument for home care clients, was

developed for this purpose. The tool provides a standardized assessment of clients' sociodemographic, physical and cognitive status, psychological and health conditions, receipt of formal services and informal (e.g., family, friends) care, and use of prescription and over-the-counter drugs. It is being used officially in 17 states in USA, Canada and New Zealand and with lesser degree in numerous other countries such as Switzerland, Italy, Finland, Hong

Kong, Japan and Australia among others, but is hardly known in the Central European countries.

There appears to be several distinctive advantages about the RAI-HC. First, the assessment processes is standardized, which means that once the RAI-HC is filled in an agency in any country, the clients characteristics and the agency profile can be compared across countries easily even through literature reviews. Second, since the RAI-HC is one module of RAI-suite that includes a variety of care settings such as long term care, acute care, and palliative care, it could contribute a continuity of care through sharing a common language across disciplines in different care settings. Third, there are many clinical applications to be linked with the information collected by the RAI-HC. Care planning guideline (CAPs), case-mix index, quality indicators, and various validated scales such as ADL hierarchy, cognitive performance scale are examples. What kind of scientific researches is possible using the RAI-HC, however, has never been explicitly summarised.

MATERIAL AND METHODS

To facilitate a future discussion to introduce the RAI-HC into home care agencies throughout in the Czech Republic, this study was aimed at summarising past scientific contributions of the RAI-HC in the areas of gerontology and geriatric medicine by literature review. The findings was expected to give the authors an insight regarding a new research project on impact of hearing aid on quality of life among older people.

We searched Medline and PubMed database for peer-reviewed articles reporting primary data on RAI-HC. As we recognize

that some studies based on a joint European studies on the RAI-HC (the “Aged in Home Care” – ADHOC) do not include RAI-HC in their text, medical subject heading terms used was home care together with RAIHC or RAI-HC or ADHOC or Ages in Home Care and yielded 50 articles. The search was limited to articles published in English, which resulted in 42 articles, after excluding two in German (Rappold 2007, Burla et al. 2010), two in Korean (June et al. 2009, Yoo 2011a), one in Icelandic (Jonsson et al. 2003), one in Spanish (Moya Martinez et al. 2009), one in Czech (Topinková et al. 2006) and one in Dutch (Frijters et al. 2008). Limitation to English literatures was needed due to language ability of the corresponding author who primary conducted the review.

After reviewing the titles and online abstracts, articles were retrieved for full examination if inclusion in our study was likely or could not be determined. Only studies that presented original, primary data on the RAI-HC were included in this study. For the purpose of describing what kind of studies is available using the RAI-HC clearly, “type” of each study was defined according to the main focus of the study. The number of the type was not predefined.

RESULTS

In our literature review, 34 studies met the eligibility criteria. Nearly a half (16 out of 34) was conducted in Canada where the RAI-HC is officially used; therefore population based survey is possible. Another 16 studies were based on the ADHOC study. One was from Hong Kong and one was from Korea.

There were broadly four types of studies identified (Table 1).

Table 1. Methodology and main focuses employed in 34 studies examining RAI-HC

Source	Setting	Data	Type	Main focus
Armstrong et al. (2012)	Canada	Longitudinal	D	Development of case mix index to predict rehabilitation service
Costa and Hirdes (2010)	Canada	Cross-sectional	A	Comparison of clients characteristics between care programs
Dalby et al. (2008)	Canada	Cross-sectional	B	Factors associated with potentially inappropriate medication among depressed people

Source	Setting	Data	Type	Main focus
Doran et al. (2009a)	Canada	Cross-sectional	A	Prevalence of adverse outcomes (fall, ER visits, hospital visits, unintended weight loss)
Doran et al. (2009b)	Canada	Longitudinal	B	Predictors of adverse outcomes
Fialová et al. (2005)	ADHOC	Cross-sectional	B	Factors associated with inappropriate medication
Finne-Soveri et al. (2008)	ADHOC	Cross-sectional	C	Association between caregiver burden and faecal incontinence
Foebel et al. (2011)	Canada	Cross-sectional	B	Prevalence and factors associated with management of heart failure
Foebel et al. (2012)	Canada	Cross-sectional	B	Association between caregiver status and medication adherence among heart failure clients
Grue et al. (2010)	ADHOC	Cross-sectional	C	Consequences of recent visual decline
Gruneir et al. (2013)	Canada	Longitudinal	A	Different factors associating with nursing home admission between genders
Henrard et al. (2006)	ADHOC	Cross-sectional	D	Development of home care service index
Hirdes et al. (2006)	Canada	Longitudinal	B	Factors associated with influenza immunization
Hirdes et al. (2008)	Canada	Longitudinal	D	Development of prioritize of LTC placement
Landi et al. (2005)	ADHOC	Cross-sectional	B	Factors associated with influenza immunization
Landi et al. (2007)	ADHOC	Longitudinal	B	Factors associated with functional decline
Leung et al. (2010)	Hong Kong	Cross-sectional	C	Psychosocial factors associated with recurrent falls
Maxwell et al. (2008)	Canada	Cross-sectional	B	Factors associated with pain management
Maxwell et al. (2013)	Canada	Cross-sectional	B	Factors associated with pharmacotherapy monitoring for dementia
Paddock et al. (2003)	Canada	Cross-sectional	B	Factors associated with acute care
Onder et al. (2005)	ADHOC	Cross-sectional	C	Association between pain and depression
Onder et al. (2007)	ADHOC	Cross-sectional	B	Effect of depression on the risk of nursing home admission
Onder et al. (2008)	ADHOC	Cross-sectional	C	Association between care management and preventive strategies/care giver burden
Soldato et al. (2007)	ADHOC	Longitudinal	B	Association between pain and functional decline
Soldato et al. (2008)	ADHOC	Cross-sectional	C	Association between untreated depression and caregiver stress
Sørbye et al. (2005)	ADHOC	Cross-sectional	A	Factors explaining indwelling catheter use accross countries
Sørbye et al. (2007)	ADHOC	Cross-sectional	A	Association between obesity and home care utilization
Sørbye et al. (2008)	ADHOC	Cross-sectional	B	Factors associating with unintended weight loss
Sørbye et al. (2009)	ADHOC	Cross-sectional	A	Prevalence and associating factors of urinary incontinence and use of pads accross countries

Source	Setting	Data	Type	Main focus
Sørbye et al. (2010)	ADHOC	Longitudinal	B	Factors associated with nursing home admission
Szczerbinska et al. (2012)	Canada	Cross-sectional	A	Prevalence of depression and antidepressants use across settings
Vik et al. (2007)	Canada	Cross-sectional	B	Factors associated with osteoporosis treatment among those with diagnosis and those with prevalent fracture
Yoo (2011b)	Korea	Cross-sectional	B	Factors associated with recurrent falls
Zhu et al. (2007)	Canada	Cross-sectional	D	Development of clinical protocols for rehabilitation planning

“A” – the main focus was on prevalence of particular clients’ condition, such as safety problems (Doran et al. 2009a), obesity (Sørbye et al. 2007), indwelling catheter and pad use (Sørbye et al. 2005, Sørbye et al. 2009). Some studies had more emphasise on a comparison across care settings (Costa and Hirdes 2010, Szczerbinska et al. 2012) and between genders (Gruneir et al. 2013).

“B” – the main focus was on investigating predictive clients characteristics of particular events. There are broadly two different events. The one is *adverse events*, such as emergency room visits (Doran et al. 2009b), functional decline (Landi et al. 2007, Soldato et al. 2007), nursing home admission (Onder et al. 2007, Sørbye et al. 2010), acute care use (Paddock and Hirdes 2003), recurrent falls (Yoo 2011b), unintended weight loss (Sørbye et al. 2008), inappropriate medication (Fialová et al. 2005, Dalby et al. 2008), and poor compliance (Foebel et al. 2012). Finding the related factors to these adverse events can contribute to develop a preventive strategy. The other is *appropriate treatment regimen* to address potential issue of an undertreatment in this elderly population. Clients characteristics were investigated regarding pain management (Maxwell et al. 2008), influenza immunization (Landi et al. 2005, Hirdes et al. 2006), preventive strategies (Onder et al. 2008), pharmacotherapy of dementia (Maxwell et al. 2013), heart failure treatment (Foebel et al. 2011), and osteoporosis treatment (Vik et al. 2007).

“C” – the focus was on consequences affected by particular conditions. Possible influences were investigated of untreated

depression (Soldato et al. 2008) or faecal incontinence (Finne-Soveri et al. 2008) on care giver burden, recent visual decline on social functioning (Grue et al. 2010), pain on depression (Onder et al. 2005), baseline pain on subsequent functional decline (Soldato et al. 2007), and falls on psychosocial factors (Leung et al. 2010).

“D” – the focus was on development of algorithm or protocol, such as prioritizing long-term care placement (Hirdes et al. 2008) and developing rehabilitation planning (Zhu et al. 2007, Armstrong et al. 2012) and home service index (Henrard et al. 2006).

DISCUSSION

The findings from these empirical literatures give some strikingly useful information for practice. For example, among clients with a poor social support system, those with nutrition problems were 6 times as likely to have used acute health care services (Paddock and Hirdes 2003), which gives nurses an idea that social support is in particular of importance when clients’ condition gets worse. Other examples include a study suggesting that recent visual decline should be more focused than long term stable decline because it has more negative consequences in social activity and functional states (Grue et al. 2010).

Further since the RAI-HC gives a possibility to examine an appropriateness of treatment regimen through detailed clients’ information, the RAI-HC could contribute not only to gerontological nursing, but also to geriatrics as well. For example a study

found that many older adults with presumed osteoporosis were not receiving drug therapy for this condition and the treatment coverage was significantly lower among clients with at least three chronic conditions, health instability, functional impairment, and depressive symptoms. This study clearly suggests that indicators of clinical instability and functional decline appear to represent influential factors in geriatric treatment decisions (Vik et al. 2007).

In this literature review, we found that a variety of researches was possible using the RAI-HC and its contribution to the area of home care as well as of gerontological nursing and geriatric medicine was substantial. We have to note that our literature review covered only 'RAI-HC' or 'ADHOC'. There are a plenty of other empirical literatures using the former version of RAI-HC (i.e. MDS-HC) or other modules of RAI, such as long term care or palliative care.

CONCLUSION

Substantial studies have been done using the RAI-HC and they have provided useful scientific insights in the area of home care. Official use of the RAI-HC in home care agencies throughout country could contribute to help identify and respond to health promotion and disease prevention issues in this population.

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REFERENCES

1. Armstrong J, Zhu M, Hirdes J.P, Stolee P (2012). K-means cluster analysis of rehabilitation service users in the Home Health Care System of Ontario: examining the heterogeneity of a complex geriatric population. *Arch Phys Med Rehabil.* 93/12: 2198–2205.
2. Burla L, Schaffert R, Mylaeus M, Ruesch P (2010). [Developing and testing quality indicators of home care in Switzerland]. *Gesundheitswesen.* 72/2: 106–113.
3. Costa AP, Hirdes JP (2010). Clinical Characteristics and Service Needs of Alternate-Level-of-Care Patients Waiting for Long-Term Care in Ontario Hospitals. *Healthc Policy.* 6/1: 32–46.
4. Dalby DM, Hirdes JP, Hogan DB, Patten SB, Beck CA., Rabinowitz T, Maxwell CJ (2008). Potentially inappropriate management of depressive symptoms among Ontario home care clients. *Int J Geriatr Psychiatry.* 23/6: 650–659.
5. Doran, DM, Hirdes J, Blais R, Ross Baker G, Pickard J, Jantzi M (2009a). The nature of safety problems among Canadian homecare clients: evidence from the RAI-HC reporting system. *J Nurs Manag.* 17/2: 165–174.
6. Doran DM, Hirdes J, Poss J, Jantzi M, Blais R, Baker GR, Pickard J (2009b). Identification of safety outcomes for Canadian home care clients: evidence from the resident assessment instrument-home care reporting system concerning emergency room visits. *Healthc Q.* 12/Spec No Patient: 40–48.
7. Fialová D, Topinková E, Gambassi G, Finne-Soveri H, Jonsson PV, Carpenter I et al. (2005). Potentially inappropriate medication use among elderly home care patients in Europe. *JAMA.* 293/11: 1348–1358.
8. Finne-Soveri H, Sørbye LW, Jonsson PV, Carpenter GI, Bernabei R (2008). Increased work-load associated with faecal incontinence among home care patients in 11 European countries. *Eur J Public Health.* 18/3: 323–328.
9. Foebel AD, Heckman GA, Hirdes JP, Tyas SL, Tjam EY, McKelvie RS, Maxwell CJ (2011). Clinical, demographic and functional characteristics associated with pharmacotherapy for heart failure in older home care clients: a retrospective, population-level, cross-sectional study. *Drugs Aging.* 28/7: 561–573.
10. Foebel AD, Hirdes JP, Heckman GA (2012). Caregiver status affects medication adherence among older home care clients with heart failure. *Aging Clin Exp Res.* 24/6: 718–721.

11. Frijters DH, Carpenter GI, Bos JT, Bernabei R (2008). [The calculation of quality indicators for Home Care agencies in 11 European countries]. *Tijdschr Gerontol Geriatr.* 39/2: 44–54.
12. Grue EV, Finne-Soveri H, Stolee P, Poss J, Sørbye LW, Noro A, Hirdes JP, Ranhoff AH (2010). Recent visual decline-a health hazard with consequences for social life: a study of home care clients in 12 countries. *Curr Gerontol Geriatr Res.* 503817/10: 4.
13. Gruneir A, Forrester J, Camacho X, Gill S, Bronskill SE (2013). Gender differences in home care clients and admission to long-term care in Ontario, Canada: a population-based retrospective cohort study. *BMC Geriatr.* 13/48. [online] [cit. 2014-03-14]. Available from: <http://www.biomedcentral.com/1471-2318/13/48>.
14. Henrard JC, Ankri J, Frijters D, Carpenter I, Topinková E, Garms-Homolova V, Finne-Soveri H, Sørbye LV, Jónsson PV, Ljunggren G, Schroll M, Wagner C, Bernabei R (2006). Proposal of a service delivery integration index of home care for older persons: application in several European cities. *Int J Integr Care.* 6/e11.
15. Hirdes JP, Dalby DM, Steel RK, Carpenter GI, Bernabei R, Morris JN, Fries BE (2006). Predictors of influenza immunization among home care clients in Ontario. *Can J Public Health.* 97/4: 335–339.
16. Hirdes JP, Poss JW, Curtin-Telegd N (2008). The Method for Assigning Priority Levels (MAPLe): a new decision-support system for allocating home care resources. *BMC Med.* 6/9: 1741–7015.
17. Jónsson PV, Guðmundsdóttir H, Friðbjörnsdóttir F, Haraldsdóttir M, Olafsdóttir T, Jensdóttir AB, Hjaltadóttir I, Harðarson O, Pálsson H. (2003). [Health care needs and quality of life of elderly in home care in Reykjavik, 1997]. *Laeknabladid.* 89/4: 313–318.
18. June KJ, Lee JY, Yoon JL (2009). [Effects of case management using Resident Assessment Instrument-Home Care (RAI-HC) in home health services for older people]. *J Korean Acad Nurs.* 39/3: 366–375.
19. Landi F, Onder G, Carpenter I, Garms-Homolova V, Bernabei R (2005). Prevalence and predictors of influenza vaccination among frail, community-living elderly patients: an international observational study. *Vaccine.* 23/30: 3896–3901.
20. Landi F, Onder G, Carpenter I, Cesari M, Soldato M, Bernabei R (2007). Physical activity prevented functional decline among frail community-living elderly subjects in an international observational study. *J Clin Epidemiol.* 60/5: 518–524.
21. Leung A, Chi I, Lou V, Chan KS (2010). Psychosocial risk factors associated with falls among Chinese community-dwelling older adults in Hong Kong. *Health soc care community.* 18/3: 272–281.
22. Maxwell CJ, Dalby DM, Slater M, Patten SB, Hogan DB, Eliasziw M, Hirdes JP (2008). The prevalence and management of current daily pain among older home care clients. *Pain.* 138/1: 208–216.
23. Maxwell CJ, Vu M, Hogan DB, Patten SB, Jantz M, Kergoat MJ et al. (2013). Patterns and Determinants of Dementia Pharmacotherapy in a Population-Based Cohort of Home Care Clients. *Drugs Aging.* 30/7: 569–585.
24. Moya Martinez P, Escribano Sotos F, Pardo Garcia I, Notario Pacheco B, Alfaro Orozco C, Martinez Vizcaino V (2009). [Costs associated to informal caregiving hours for older people living in rural communities [Spain]]. *Gac Sanit.* 23/2: 109–114.
25. Onder G, Landi F, Gambassi G, Liperoti R, Soldato M, Catananti C et al. (2005). Association between pain and depression among older adults in Europe: results from the Aged in Home Care (AdHOC) project: a cross-sectional study. *J Clin Psychiatry.* 66/8: 982–988.
26. Onder G, Liperoti R, Soldato M, Cipriani MC, Bernabei R, Landi F (2007). Depression and risk of nursing home admission among older adults in home care in Europe: results from the Aged in Home Care (AdHOC) study. *J Clin Psychiatry.* 68/9: 1392-1398.
27. Onder G, Liperoti R, Bernabei R, Landi F (2008). Case management, preventive strategies, and caregiver attitudes among older adults in home care: results of the ADHOC study. *J Am Med Dir Asso.* 9/5: 337–341.
28. Paddock K, Hirdes JP (2003). Acute health care service use among elderly home care clients. *Home Health Care Serv Q.* 22/1: 75–85.
29. Rappold E (2007). [SMAF, RAI and ICF-nursing assessment tools for home based care]. *Pflege.* 20/4: 205–210.
30. Soldato M, Liperoti R, Landi F, Finne-Soveri H, Carpenter I, Fialová D, Bernabei R, Onder G (2007). Non malignant daily pain and risk of disability among older adults in home care in Europe. *Pain.* 129/3: 304–310.

31. Soldato M, Liperoti R, Landi F, Carpenter IG, Bernabei R, Onder G (2008). Patient depression and caregiver attitudes: results from The AgeD in HHome Care study. *J Affect Disord.* 106/1–2: 107–115.
32. Sørbye LW, Finne-Soveri H, Ljunggren G, Topinková E, Bernabei R (2005). Indwelling catheter use in home care: elderly, aged 65+, in 11 different countries in Europe. *Age and ageing.* 34/4: 377–381.
33. Sørbye LW, Schroll M, Finne-Soveri H, Jonnson PV, Ljunggren G, Topinková E, Bernabei R (2007). Home care needs of extremely obese elderly European women. *Menopause Int.* 13/2: 84–87.
34. Sørbye LW, Schroll M, Finne Soveri H, Jonsson PV, Topinková E, Ljunggren G, Bernabei R (2008). Unintended weight loss in the elderly living at home: the aged in Home Care Project (AdHOC). *J Nutr Health Aging.* 12/1: 10–16.
35. Sørbye LW, Finne-Soveri H, Ljunggren G, Topinková E, Garms-Homolova V, Jensdottir AB, Bernabei R (2009). Urinary incontinence and use of pads-clinical features and need for help in home care at 11 sites in Europe. *Scand J Caring Sci.* 23/1: 33–44.
36. Sørbye LW, Hamran T, Henriksen N, Norberg A (2010). Home care patients in four Nordic capitals – predictors of nursing home admission during one-year followup. *J Multidiscip Healthc.* 3/:11–18.
37. Szczerbinska K, Hirdes JP, Zyczkowska J (2012). Good news and bad news: depressive symptoms decline and undertreatment increases with age in home care and institutional settings. *Am J Geriatr Psychiatry.* 20/12: 1045–1056.
38. Topinková E, Fialová D, Carpenter GI, Bernabei R (2006). [Cross-national comparison of drug compliance and non-compliance associated factors in the elderly with polypharmacotherapy]. *Cas Lek Cesk.* 145/9: 726–732.
39. Vik SA, Jantzi M, Poss J, Hirdes J, Hanley DA, Hogan DB, Maxwell CJ (2007). Factors associated with pharmacologic treatment of osteoporosis in an older home care population. *J Gerontol A Biol Sci Med Sci.* 62/8: 872–878.
40. Yoo IY (2011a). [Analysis of multi-variate recurrent fall risk factors in elderly people using Residential Assessment Instrument-Home Care: comparisons between single and recurrent fallers]. *J Korean Acad Nurs.* 41/1: 119–128.
41. Yoo IY (2011b). Recurrent falls among community-dwelling older Koreans: prevalence and multivariate risk factors. *J Gerontol Nurs.* 37/9: 28–40.
42. Zhu M, Zhang Z, Hirdes JP, Stolee P (2007). Using machine learning algorithms to guide rehabilitation planning for home care clients. *BMC Med Inform Decis Mak.* 7/41. [online] [cit. 2014-03-14]. Available from: <http://www.biomedcentral.com/1472-6947/7/41>

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