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Financial difficulty and biopsychosocial predictors of loneliness: A cross-sectional study of community dwelling older adults

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ABSTRACT

Aim: To investigate the interplay of sociodemographic, health, functional and psychosocial factors in predicting loneliness in community dwelling older adults accessing home support services and long-term aged residential care.

Methods: Older New Zealanders (age 65+), who had their first interRAI Home Care assessment between July 2014 and June 2016, were included. The outcome variable was the binary interRAI item "Lonely". The predictor variables included sociodemographics, hearing, vision, self-reported health, activities of daily living, social interaction and support, and depression.

Results: Data from 51,239 assessments of older adults (mean age: 82.3 years; female: 61%; European: 87.3%) were analysed. Loneliness was reported in 21%. A stepwise logistic regression model explained 12.1% of the variance and was statistically significant (Chi^2 = 3501.0.8, df = 22; $p < 0.001$). The factors with the largest odds ratios (OR > 1.5) were depression, living alone, being Asian, financial difficulty and not in a relationship. Functional impairment was negatively associated with loneliness.

Conclusions: Determining the predictors of older adults' loneliness is complex, multi-factorial, with each factor having a small, additive effect on the development of loneliness. Depression, social factors and financial difficulty are the strongest predictors but much of the variance remains unexplained. These factors could be targeted as modifiable risk factors for addressing loneliness in older adults.

1. Introduction

Loneliness is a subjective, stressful and distressing feeling resulting from a perceived absence or loss of companionship (Routasalo, Tilvis, Kautiainen, & Pitkala, 2009). There are two types of loneliness: social and emotional loneliness. Social loneliness occurs when the amount and quality of relationships with others is smaller than one desires. It concerns the subjective experience of the quality of relationships. Emotional loneliness occurs where the perceived intimacy in relationships is not satisfactory. Individuals who suffer from chronic loneliness experience these unwelcome feelings, with proven health-damaging effects (Holwerda et al., 2016; Shiovitz-Ezra & Ayalon, 2010).

Loneliness has been identified as a significant international and local public health concern. The World Health Organization now lists "social support networks" as a "determinant of health" (Povall, Haigh, Abrahams, & Scott-Samuel, 2014). Loneliness, social isolation and living alone foretell an increased premature mortality odds and predict poor psychological and physical health outcomes (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015; Theeke et al., 2016). Loneliness is accompanied by cardiovascular and cerebrovascular disease as well as mortality (Valtorta, Kanaan, Gilbody, Ronzi, & Hanratty, 2016). A meta-analysis including 70 studies encompassing 3.4 million people established that loneliness, social isolation, and living alone all had a significant effect on the risk of premature deaths, with a range of 29%–32% increased likelihood of mortality (Holt-Lunstad et al., 2015).

Older adults are disproportionately affected in both the quality and quantity of personal or community relationships; and studies have shown that feelings of loneliness might be more prevalent in older adults (Cacioppo, Capitanio, & Cacioppo, 2014). In New Zealand, loneliness is relatively common among older adults with 19% of people aged above 75 reported feeling lonely all, most, or some of the time (Leitch, Glue, Gray, Greco, & Barak, 2018). More alarmingly, loneliness

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affects 21% of older New Zealanders with physical illness and/or functional impairment (Schluter et al., 2016).

A previous New Zealand integrative review concluded that loneliness in older adults was significantly related to social isolation, living alone, depression, suicidal ideation, being female, being Maori and having a visual impairment (Wright-St Clair, Neville, Forsyth, White, & Napier, 2017). Three main themes on the causes of loneliness in older adults: social network limitation, functional limitation and personal limitation are frequently studied (Wang et al., 2017).

Older adults with physical illness and functional impairment represent a group of people who are vulnerable to experience loneliness. The aim of this study was to investigate the interplay of sociodemographic, physical, functional and psychosocial factors in predicting loneliness in a complete nationwide sample of community dwelling older adults who were assessed for home support services; home help, personal care, respite care or long-term aged residential care; nursing home placement. Identifying these predictors could inform clinicians, health and social services managers, as well as policy makers who develop and implement public health strategies to support at risk individuals, prevent loneliness, and potentially improve health outcomes.

2. Methods

2.1. Setting

The study sample consisted of older adults (age 65+) who had received an International Resident Assessment Instrument (interRAI) Home Care Assessment version 9.1 (interRAI-HC 9.1) in New Zealand between 1st July 2014 and 30th June 2016. interRAI is a comprehensive geriatric assessment developed by a network of health researchers in over 30 countries. interRAI aims to provide a clinical assessment of medical, rehabilitation, and support needs and abilities. This information can support care planning, resource allocation, quality measurement and outcome evaluation (Mathias, Hirdes, & Pittman, 2010). New Zealand has implemented a mandated interRAI assessment for all older people who are being assessed for publically-funded home support services or long-term aged residential care since 2012. The New Zealand interRAI group at the Ministry of Health provided access to de-identified data from people who gave consent to have their records used for research purposes at the time of their interRAI assessment. A previous study using the New Zealand interRAI database showed that 93.1% of people provided consent for research (Schluter et al., 2016).

The interRAI data were collected by trained interRAI assessors using a face-to-face assessment. The individual items of the interRAI Home Care version have been shown to have good inter-rater reliability (Hirdes et al., 2008).

2.2. Participant records

Selection of assessment records focused older adults living in private homes, apartments and rental accommodations. Individuals living in other settings (e.g. assisted living, group homes, and long-term care facilities) were excluded from the analysis. Fig. 1 shows the flowchart of the participant records selection process. Where there was more than one assessment for an individual in the study period only the first assessment was included in the analysis.

2.3. Measures

2.3.1. Outcome variable: loneliness

The interRAI item “Lonely” was used to gauge loneliness expressed by older people. A binary outcome (Yes or No) is entered in the interRAI assessment when the person says or indicates that he or she feels lonely.

2.3.2. Predictor variables

The following variables and scales were chosen based on the existing literature on loneliness;

Sociodemographic variables: Age, gender, ethnicity, marital status and whether the person lived alone, and financial difficulty (that resulted in trade-offs among purchasing any of the following: adequate food, shelter, clothing; prescribed medications; sufficient home heat or cooling; necessary health care).

Health and functional status variables: hearing, vision, self-reported health and activities of daily living (ADL) measured by the ADL Hierarchy.

ADL Hierarchy is used to measure an individual's degree of dependence in ADLs. It measures four performance areas: personal hygiene, locomotion, toilet use, and eating. These items are assessed as a range into a hierarchical ranking scale providing scores from 0 to 6 (0 = no to minimal dependence; 1–2 = mild to moderate dependence; 3+ = severe dependence).

Psychosocial variables: participation in social activities of long-standing interest, visit with a long-standing social relation or family member, strong and supportive family relationship and depression measured by the Depression Rating Scale..

The *Depression Rating Scale (DRS)* consists of seven mood items with possible scores ranging from 0 to 14: (i) made negative statements, (ii) persistent anger with self or others, (iii) expression, including non-verbal, of what appear to be unrealistic fears, (iv) repetitive health complaints, (v) Repetitive anxious complaints and concerns, (vi) sad, pained worried facial expressions and (vii) crying, tearfulness (Burrows, Morris, Simon, Hirdes, & Phillips, 2000). A score of 0–2 = no to minimal depressive symptoms; 3–5 = moderate depressive symptoms; 6+ = high depressive symptoms. In the New Zealand version the scoring is based on the presence of symptoms in the last 3 days.

2.4. Statistical analysis

Data were analysed using IBM Statistical Package for the Social Sciences (SPSS) Version 25. Descriptive statistics for demographic variables were obtained. Bivariate analysis with Chi-squared tests was used to investigate the significance of the relationships between the predictor variables and the presence of subjective loneliness. Next, a stepwise multivariate logistic regression analysis was performed with loneliness as the dependent variable and all 13 predictor variables as independent variables using the SPSS’s forward selection (conditional) function. We have chosen an entry probability of 0.05 and a removal probability of 0.1 for this stepwise selection method. Results are presented as odds ratios (OR, with 95% confidence intervals, CI) which should be interpreted as the effect that a predictor variable has on the odds of presenting with loneliness.

3. Results

A total of 51,239 older adults aged between 65 and 108 received their first interRAI assessment during the study period. Mean age was 82.3 years (SD = 7.5) and the majority (60.8%) were female. New Zealand Europeans comprised the great majority of the sample (87.3%); while the remainder were 5.8% Maori, 3.4% Pacific, 2.6% Asian, and 0.9% other. The sample was representative of the 2013 New Zealand 65+ population (83.8% European, 5.3% Maori, 4.5% Asians, 2.3% Pacific Islanders, 4.1% others) (Stats New Zealand, 2013). Nearly 40% of the sample were married or in civil union and de facto relationships.

Loneliness was reported as present in 21.3% of the sample. Table 1 shows how the sociodemographic, health, functional, and psychosocial factors influence the presence of loneliness. Table 2 illustrates the results of the stepwise logistic regression analysis. Gender was the only variable that was not included in the model. This model explained 12.1% of the variance (Nagelkerke R^2) in the presence or absence of loneliness and was statistically significant (Chi^2 = 3501.0; df = 22;

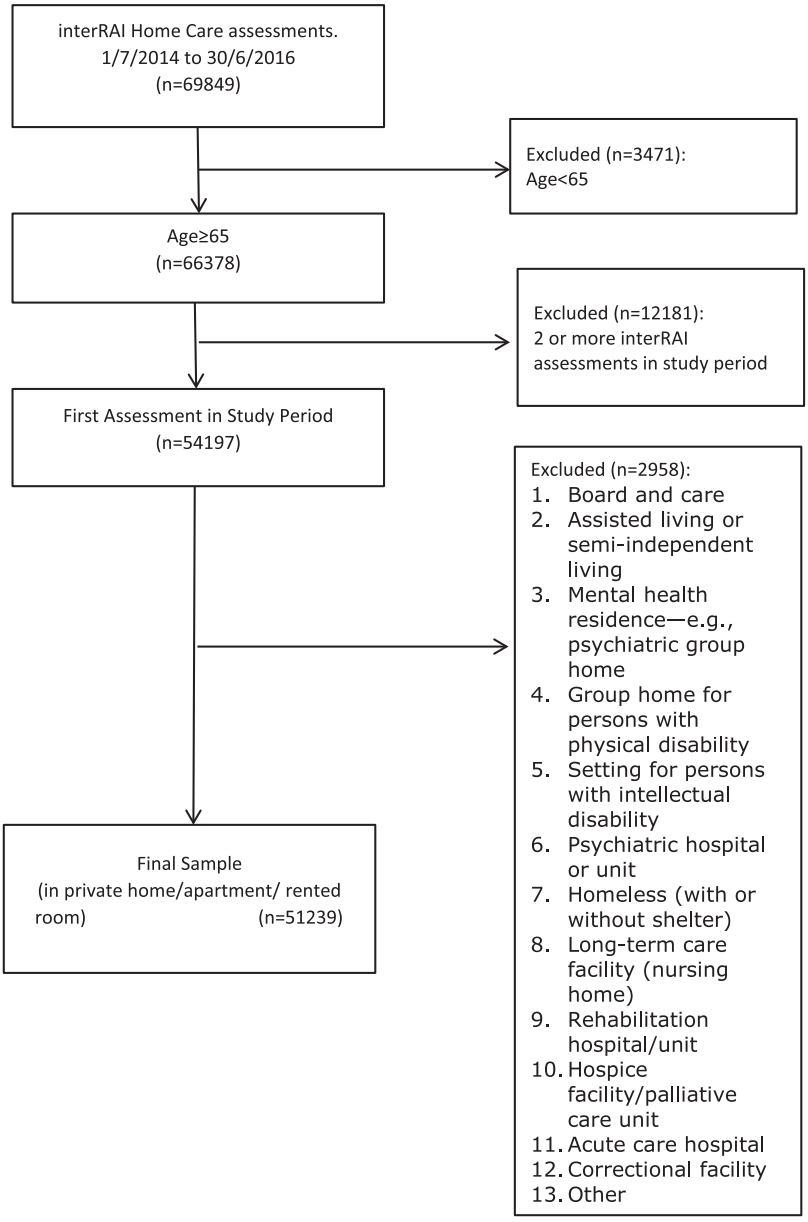

Fig. 1. Flow-chart of participant records selection.

$p < 0.001$). The factors with the largest odds ratios (OR > 1.5) were depression (moderate depression: OR = 2.9; 95% CI = 2.7–3.1; high depression: OR = 4.2; 95% CI = 3.7–4.7), living alone (OR = 2.1; 95% CI = 1.99–2.3), Asian ethnicity (OR = 1.6; 95% CI = 1.3–1.8), financial difficulty (OR = 1.5; 95% CI = 1.3–1.8) and not married nor in a civil union nor defacto relationship (OR = 1.5; 95% CI = 1.4–1.6).

Having functional impairment (higher score on the ADL Hierarchy) reduced the likelihood of experiencing loneliness.

Although there were a number of factors (hearing difficulty; visual difficulty; fair or poor self-reported health as compared to excellent self-reported health; not participated in social activities of long standing interest or visit with a long standing social relation/family for more than 30 days; no strong and supportive family relationship) that were positively and statistically associated with loneliness, the magnitude of their odd ratios was small (ranging from 1.1 to 1.4).

4. Discussion

This New Zealand study found that 21.3% of community dwelling older adults who were assessed for receiving home support services or entering aged residential care reported loneliness. Previous New Zealand and international literature suggest both physical health and psychosocial factors are associated with loneliness in older adults (Leitch et al., 2018; Schluter et al., 2016); however, we found the strongest predictors are related to depression, social factors and financial difficulty. The multivariate analysis we used in this study has the advantage of examining the interplay of these physical health and psychosocial factors in predicting loneliness in older adults. Although the regression model is statistically significant, only 12.1% of the variance in presentation of loneliness is explained. This suggests that determining the predictors of loneliness in older adults is complex and multiple factors are likely to be involved; and each factor has a potentially small, additive effect on the development of loneliness. Furthermore, the rate of ageing between people varies, and is faster among those with a low socioeconomic position. The finding in the present study that financial difficulty is associated with loneliness has the potential to increase the understanding of the reasons behind these social inequalities (Virtanen & Kivimäki, 2018).

Table 1
Results of the bivariate analysis of the presence of loneliness versus sociodemographic, health, functional, and psychosocial factors.

	Says or indicates that he/she feels lonely				Chi^2 or F	p-value
	Yes		No			
	N = 10,915	% or SD	N = 40,314	% or SD		
Age (mean)	82.4	7.6	82.3	7.5	0.315	0.575
Gender						
Female	7163	23.0	23,964	77.0	138.1	0.000
Male	3750	18.7	16,349	81.3		
Ethnicity						
European	9585	21.4	35,135	78.6	21.8	0.000
Māori	631	21.1	2362	78.9		
Pacific	295	17.1	1427	82.9		
Asian	286	21.7	1030	78.3		
Other	118	24.7	360	75.3		
Marital Status						
Married/civil union/defacto	2703	13.3	17,632	86.7	1292.1	0.000
Not married/civil union/defacto	8206	26.6	22,660	73.4		
Living alone						
Yes	7302	29.2	17,740	70.8	1801.7	0.000
No	3613	13.8	22,574	86.2		
Financial difficulty						
Yes	369	35.2	678	64.8	123.8	0.000
No	105454	21.0	39,630	79.0		
Hearing						
Adequate	5065	19.7	20,696	80.3	83.6	0.000
Difficulty	5850	23.0	19,618	77		
Vision						
Adequate	7630	20.7	29,256	79.3	30.3	0.000
Difficulty	3285	22.9	11,058	77.1		
Self-reported health						
Excellent	288	19.2	1213	80.8	150.6	0.000
Good	4183	20.0	16,711	80.0		
Fair	4212	23.7	13,588	76.3		
Poor	1554	26.5	4308	73.5		
ADL Hierarchy						
0 (No to minimal)	6828	62.6	22,567	56.0	234.7	0.000
1-2 (mild to moderate)	2701	24.7	10,282	25.5		
3+ (severe)	1386	12.7	7462	18.5		
Participation in social activities of long-standing interest						
Within last 30 days	5798	20.5	22,468	79.5	57.7	0.000
More than 30 days ago	2902	23.9	9263	76.1		
Never	1442	20.9	5453	79.1		
Visit with a long-standing social relation or family member						
Within last 30 days	9959	21.1	37,320	78.9	27.2	0.000
More than 30 days ago	540	25.8	1552	74.2		
Never	210	21.9	748	78.1		
Strong and supportive family relationship						
Yes	9444	20.4	36,747	79.6	208.3	0.000
No	1470	29.2	3561	70.8		
Depression Rating Scale						
0–2 (no to minimal)	8000	73.3	35,793	88.8	1728.0	0.000
3–5 (moderate)	2137	19.6	3613	9.0		
6+ (high)	778	7.1	904	2.2		

The association of depression and loneliness is well-reported in previous international and New Zealand studies (Erzen & Cikrikci, 2018; Wright-St Clair et al., 2017). However, the association of financial difficulty and loneliness in older adults has not been identified as a significant risk factor in previous New Zealand studies but there is already a body of international literature on this issue. Macdonald and colleagues conducted a survey in the North East of England and found that older adults from a lower socio-economic group had high levels of social isolation and emotional loneliness when compared with other socio-economic groups (Macdonald, Nixon, & Deacon, 2018). In another UK study, Burholt and Scharf reported financial difficulties and area deprivation, along with widowhood, self-reported impairments in physical and mental health predicted loneliness in rural-living older adults (Burholt & Scharf, 2014). Loneliness was greater among a group of US older adults who subjectively felt that their economic condition was inadequate; in addition, poverty status had an indirect influence on loneliness (Mullins, Elston, & Gutkowski, 1996).

Our study found Asian ethnicity had a higher risk of experiencing loneliness. 77.6% of Asians living in New Zealand were born overseas. Language barrier is not uncommon in older ethnic minority immigrants and this could lead to social and cultural isolation. Older Asians are also more likely to be retired and have less opportunity to integrate fully in New Zealand society. Similar reasons may also explain the higher risk of loneliness in Pacific people and other ethnicities observed in our study. Our study found being Māori is not associated with loneliness, which is not consistent with the conclusion made in the integrative review of New Zealand literature that older Maori are more likely to experience loneliness (Wright-St Clair et al., 2017). Our finding can be explained by the observation that other risk factors (marital status and financial difficulty) are affecting older Māori elders more often than non-Māori. Māori elders usually have a valued status and revered role in their society. This connection with their society could protect them

Table 2
Stepwise logistic regression analysis of predictors of loneliness.

Characteristics	OR (95% CI)
Age	0.99 (0.99–1.00)
Not married/civil union/defacto	1.53 (1.43–1.65)
Ethnicity (European)	REF
Māori	1.04 (0.93–1.15)
Pacific	1.24 (1.06–1.44)
Asian	1.57 (1.33–1.84)
Other	1.35 (1.06–1.72)
Living alone	2.13 (1.99–2.28)
Financial difficulty	1.53 (1.31–1.78)
Hearing difficulty	1.22 (1.16–1.29)
Vision difficulty	1.10 (1.04–1.16)
Self-reported health (Excellent)	REF
Good	1.07 (0.93–1.24)
Fair	1.27 (1.10–1.46)
Poor	1.36 (1.17–1.59)
ADL Hierarchy (0, No-minimal)	REF
1–2 (mild-moderate)	0.89 (0.84–0.94)
3+ (severe)	0.69 (0.64–0.75)
Participation in social activities of long-standing interest (within last 30 days)	REF
More than 30 days ago	1.26 (1.19–1.34)
Never	1.06 (0.99–1.15)
Visit with a long standing social relation or family (Within last 30 days)	REF
More than 30 days	1.28 (1.14–1.43)
Never	1.04 (0.87–1.24)
No strong and supportive family relationship	1.23 (1.13–1.33)
Depression Rating Scale (0–2, no to minimal)	REF
3–5 (moderate)	2.90 (2.71–3.11)
6+ (high)	4.21 (3.73–4.76)

from loneliness as their role becomes increasingly important with age.

In line with the findings of international studies we have shown other health factors (self-reported health, hearing and visual difficulty) are associated with loneliness in older adults (Luo, Hawkley, Waite, & Cacioppo, 2012; Theeke, 2010). Our finding that functional impairment has a protective effect on experiencing loneliness was unexpected. Previous longitudinal studies have found loneliness was a predictor of functional decline and associated with an increase in difficulties with activities of daily living in older adults (Perissinotto, Stijacic Cenzer, & Covinsky, 2012; Shankar, McMunn, Demakakos, Hamer, & Steptoe, 2017). However, a recent cross-sectional study also found a negative association between loneliness and functional impairment (Susheela, Valsaraj, & Savitha, 2018). Our finding should be confirmed in a future longitudinal New Zealand study, which is feasible by using the interRAI system because older adults receiving home support services are required to have a reassessment every 12 months.

A recent review concluded that interventions aimed to increase social contact (e.g. befriending, peer visiting) are likely to be cost-effectiveness for older adults with loneliness (Mihalopoulos et al., 2019). Our findings could have significant implication on addressing loneliness in older adults. In addition to addressing the well-known factors of depression and improving community engagement of people who live alone and ethnic monitory groups, financial difficulty could be targeted by improving social policy, which could in turn benefit the psychological well-being and health outcomes of older adults who are at risk of experiencing loneliness.

There are several limitations that must be acknowledged. Firstly, due to the cross-sectional nature of this study, our results can only be interpreted as predictors of loneliness, and not to be used to infer causality. For example, previous studies have suggested loneliness had a moderately significant effect on depression (Erzen & Cikrikci, 2018); while loneliness can lead to functional impairment (Perissinotto et al., 2012; Shankar et al., 2017). Secondly, interRAI assessment is used to assess older adults who require a comprehensive geriatric assessment to access home support services or long-term aged residential care; therefore, the results of this study cannot be generalized to the overall older population in New Zealand. Thirdly, details on some risk factors such as low education level and reduced skills to establish and maintain interpersonal relationship, identified in previous studies are not as part of the interRAI assessment and we were not able to include them in our analysis.

Loneliness is a concerning issue affecting a significant proportion of the New Zealand older people population. There appear to be multiple underlying factors associated with it that likely interact in complex ways. This study has shown that it is social factors such as living alone, not being in a relationship and financial difficulty that are the strongest predictors, with the identified potential for financial difficulties to be a future target as a modifiable risk factor.

Previous research found poverty to be associated with adverse health outcomes among older adults but the factors that translate low economic resources into poor physical health are not well understood (Stolz, Mayerl, Waxenegger, & Freidl, 2017). We need future trials to design interventions based on the accumulating knowledge about loneliness with a special focus on poverty (Siette, Cassidy, & Priebe, 2017).

Declaration of Competing Interest

Nil.

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Access to data and data analysis

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Originality of content

All information and materials in this manuscript are original.

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