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The Impact of Financial Pressure on the Association between Employment and Depressive Symptoms for Community-Dwelling Older Adults

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Abstract: Addressing how employment impacts older adults, including their psychological well-being, we contribute to the study of this topic by examining the association between paid work in community-dwelling older adults and their depressive mood, while considering the extent of their financial pressure. Methods: The data are from the Kashiwa longitudinal cohort study, with a 2014 baseline and a 2016 follow-up. Of the 1308 participants in the 2014 survey, 781 people were included. We conducted binary logistic regression analyses stratified by economic status with regard to the extent of the financial pressure experienced. The independent variable of interest was paid work in 2014, and the dependent variable was the extent of depressive mood (a score of 5 or more on the Geriatric Depression Scale 15) in 2016. Results: Paid work was associated with lower odds of depressive mood among those under financial pressure (odds ratio [OR] 0.46, 95% confidence interval [95%CI] 0.26, 0.81), whereas for those financially stable, we did not find an association between paid work and odds of depressive mood (OR 0.99, [95%CI] 0.26, 2.63). Discussion: We evidence that for older adults under financial pressure, employment supports the maintenance of their psychological well-being. We contribute to the literature by understanding when employment is beneficial for older adults, which is important in developing appropriate older adult employment social policies.

Keywords: paid work; employment; mental health; depressive symptoms; financial pressure

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1. Introduction

With the ageing of society, attention is growing toward the employment of older adults and the conditions under which this is beneficial or poses risks, in particular to their health and well-being. In Japan, as of 2020, 28.8% of adults are over the age of 65, and amongst those who are over 60, around 30% are in paid employment and around 40% wish to be so [1]. In part, this reflects the government policy to raise the retirement age to 65 years old in 2021 and to provide the option to work until the age of 70 [2]. Japan has the third highest employment rate of older people amongst the Organization for Economic Co-Operation and Development countries [3], and has an increasing number of older adults working due to the super-ageing population. Thus, a significant social issue, and an important reference case for other countries, is to achieve employment that is beneficial for older adults, with a key question pertaining to the impact of work on their health and well-being.

Evidence from systematic reviews across countries find that while retirement is associated with beneficial effects on mental health [4], older adult employment is associated with lower mortality risk [5]. Also, amongst older adults, depressive symptoms are not

associated with employment status [6], as seen through country-specific studies, including for the United States, Chile, China, Korea, and Singapore [7–12]. This evidences the heterogeneous effects across older adults of employment on mental health.

In Japan, evidence of work's positive impact on health for older adults is growing. Overall, employment is associated with lower mortality risks [13], lower incidence of disabilities [14], and better health [5] and happiness [15]. Indeed, public long-term care (LTC) insurance service costs are lower for employed older adults, even if not as low as for those participating in hobbies and sports [16]. The impact of employment on health includes physical capabilities, cognitive capabilities, and mental health. In terms of physical capabilities, employment is associated with faster gait speed [17], and participation in instrumental activities of daily living (IADL) deteriorates less for older adults in continued employment or those starting to work [18]. Employment has a positive impact on IADL for women working with infrequent participation, but not for women working full-time, nor for men [19], and it has a positive impact on basic activities of daily living (BADL) for men [20]. In terms of cognitive capabilities, employment is associated with a slower decline in cognitive abilities [18], and stopping work at retirement negatively impacts higher-level functional capacity (HLFC), whereas transitioning from full-time to part-time work has no negative impact [21].

In terms of mental health, older adult employment is associated with lower measures of depression [17]. Stopping work at retirement negatively impacts mental health, whereas transitioning from full-time to part-time work has no negative impact [21]. Continuing to work post-retirement reduces the risk of depressive symptoms, with a stronger effect for men [22], in particular in lower occupational classes [23]. Such men in lower occupational classes are more likely to have more modest pensions, so employment could also bring economic benefits. However, working solely for financial reasons (which includes to make money for living, pay off debts as well as to have extra income) attenuates the health benefits of employment and is not associated with mental health [24]. That said, older people's happiness is associated with better pensions [25], and their economic situation can be a key source of stress that increases the risk of depression [26]. This points to a gap in understanding the importance of how older adults feel about their financial situation, such as the extent to which they feel financial pressure, and how this links to employment and ultimately to their risk of depression and, more generally, their well-being.

Thus, this study's purpose is to understand how the impact of older people's employment on health outcomes depends on older adults' degree of financial pressure. Older adults' financial pressure includes two aspects. One reflects life course and career, such as accumulation of savings and pension rights, as well as the opportunity for older adults to work, as compared to their expenses; this may be considered as their actual financial situation, such as how tight in actuality is their budget. Financial pressure also reflects the subjective sense of their financial situation, which could be grounded in, say, lifestyle expectations or day-to-day spending habits relative to resources; this may be considered as how tight they feel their budget is. This study aims to contrast those who have a comfortable budget and feel comfortable with their financial situation, versus those who experience financial pressure, from actual tight budget and/or a feeling of a tight budget.

Thus, the research question addressed by this study is whether, for older adults who differ in degree of financial pressure, there is a link between being employed and their experiencing symptoms of depression. To address this question, this study leverages longitudinal survey data from 2014 to 2016 for 781 older adults to identify the impact on older adults' depressive moods based on the employment status and extent of financial pressure.

2. Materials and Methods

2.1. Setting and Participants

The survey is drawn from the older adult population in Kashiwa City, Japan, based on the Kashiwa Cohort Study of community-dwelling older adults. The inclusion criteria were for individuals aged 65 or older, and the exclusion criteria were for those with long-term

care needs certification, which implied that they have disabilities or chronic conditions. The Kashiwa Study was initiated in 2012, with 2044 older adults participating. Status of paid work began to be collected with the 2014 data, and depression data were measured at each follow-up survey. The combination that yielded the largest sample size for the available combination of paid work status and subsequent depression data was the 2014 and 2016 data. In the 2014 survey, 1308 people participated, of whom we excluded 8 people with LTC care needs certification, resulting in 1300 participants included with follow-up in the 2016 survey. As a retrospective cohort study, we considered 2014 survey sample size when selecting covariates in regression models based on the formula by Peduzzi et al. [27]. This study was approved by the ethics committee of The University of Tokyo (#21-192). Participants' data were anonymized, containing only ID numbers for analysis, and with participants' confidential information excluded to protect their identities.

2.2. Measurements

2.2.1. Status of Paid Work

We used the question "Do you currently have paid work?" from the 2014 self-completed questionnaire, with those answering "Yes" defined as paid workers.

2.2.2. Economic Status

To assess economic status, we used the question "How do you feel about your current economic status?" in the 2014 self-completed questionnaire. For the stratified analysis by economic status, we defined participants answering "Enough room and never worried" as those financially stable, as this reflects both how "comfortable" is their actual budget and how they feel about such a budget. Those selecting other responses ("No room for budget, but not worried", "Poor and worried", or "Very poor and very worried") are defined as under financial pressure, which includes a combination of their budget being actually tight and/or the respondent's perception of a tight budget as they are worried.

2.2.3. Depressive Mood

As a measure of psychological well-being, we measured depressive mood in 2014 and 2106 using the Geriatric Depression Scale 15 (GDS-15) [28,29]. We defined a score of 5 or more on GDS-15 in 2016 as indicating those with depressive mood: we used this binary classification as the outcome measure. This cutoff value was verified in previous studies [30,31]. We also used the GDS-15 score in 2014 as a covariate.

2.2.4. Other Variables

We used the following data from the 2014 self-completed questionnaire: age, gender, living alone, Lubben Social Network Scale (LSNS) [32,33], Global Physical Activity Questionnaire (GPAQ) [34], and dietary variety score [35]. We used years of education collected in 2012, as this information was not collected in 2014. We also included data collected by test or measurement, specifically maximum gait speed, and Mini-Mental State Examination (MMSE) [36,37].

2.3. Statistical Analysis

We first cross-tabulated between financially stable in 2014, paid work in 2014, and extent of depressive mood in 2016, and checked the distributions of those with depressive mood in every layer (financially stable $\times$ paid work).

Second, we conducted binary logistic regression analyses to examine associations between paid work and depressive mood. The independent variable was paid work, and the dependent variable was depressive mood (that is, a score of 5 or more on GDS-15 in 2016). We analyzed all participants and stratified by extent of financial pressure. Adjusted variables are age, gender, living alone, years of education, and economic status (included only in the analysis of all participants), LSNS score, logarithmic-transformed GPAQ score, dietary variety score, normal gait speed, and MMSE score. We selected adjusted variables

based on the principle suggested by VanderWeele [38]. Specifically, we included factors assumed to be cause and proxy of cause of paid work status or depressive mood grounded on the authors' subject-matter knowledge [39].

In these regression analyses, missing values were complemented with multiple imputation based on a fully conditional specification algorithm (with 50 datasets and 50 iterations). After imputations, we calculated the integrated result based on Rubin's rule. We did not perform sensitivity analysis with the complete data because those with successfully imputed data were very small (see the details in the Section 3).

All statistical analyses were performed in R version 4.2.0, using the packages {tableone} for creating the tables; {mice} for multiple imputation. The statistical significance level was defined as $\alpha = 0.05$.

3. Results

The flowchart of included participants is in Figure 1. The participants with successfully imputed data were very few, as 93.4% of participants had complete data, so the bias of missing values at baseline might be small. Of the baseline participants, 781 people (60.1% of those included in baseline) reported their depressive mood in the 2016 survey, and they were included in the regression analyses.

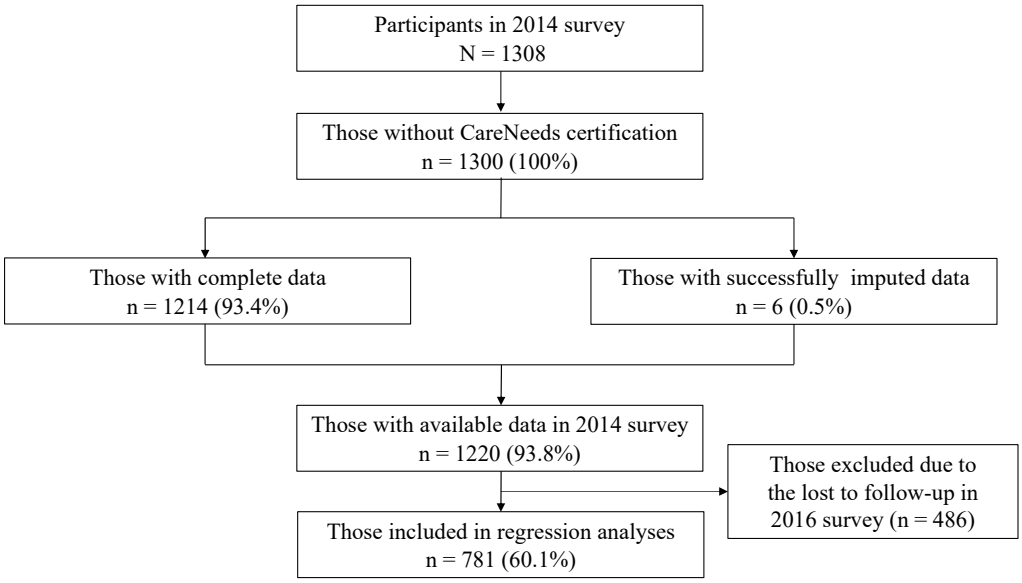

Figure 1. Flowchart of included participants.

In terms of the characteristics of participants included at baseline (see Table 1), we found statistically significant differences between paid worker versus others in terms of age, gender, dietary variety score, and maximum gait speed, as well as GDS-15 score in 2016 (at 0.08 significance level). The proportion of those lost to follow-up was not different between those with and without paid work.

Among the whole set of participants and for those under financial pressure, the cross-tabulation between financial stability, paid work, and depressive mood in 2016 is presented in Table 2. On the contrary, while the sample size of those financially stable was small, among those financially stable, the proportion was not different.

Table 1. Background characteristics of participants.

	Not Paid Worker n = 1046	Paid Worker n = 254	*p* Value
Complete data in 2014, n (%)	980 (93.7)	234 (92.1)	0.33
Loss to follow-up in 2016, n (%)	397 (38.0)	89 (35.0)	0.43
Age [years], mean (SD)	**75.1 (5.5)**	**72.8 (5.0)**	<0.01
Gender, n (%)			<0.01
Male	**514 (49.1)**	**165 (65.0)**	
Female	**532 (50.9)**	**89 (35.0)**	
Living alone, n (%)	139 (13.3)	32 (12.6)	0.85
Economic status, n (%)			0.39
Very poor and very worried	13 (1.2)	3 (1.2)	
Poor and worried	86 (8.3)	25 (9.9)	
No room for budget, but not worried	652 (62.6)	143 (56.7)	
Enough room and never worried	291 (27.9)	81 (32.1)	
Years of education [years], mean (SD)	12.9 (2.7)	13.0 (3.0)	0.64
LSNS score, mean (SD)	13.9 (5.9)	14.6 (6.4)	0.10
Log-GPAQ score, mean (SD)	7.5 (1.9)	7.4 (2.2)	0.40
Dietary variety score, mean (SD)	**4.2 (2.1)**	**3.65 (2.2)**	<0.01
Normal gait speed [m/sec], mean (SD)	**1.4 (0.2)**	**1.5 (0.2)**	0.00
MMSE score, median [IQR]	29 [28, 30]	29 [28, 30]	0.22
GDS-15 score in 2016, median [IQR]	3 [2, 5]	3 [2, 4]	0.08

Legend. SD: Standard deviation, IQR: interquartile range, LSNS: Lubben Social Network Scale, log-GPAQ: logarithmic-transformed Global Physical Activity Questionnaire, MMSE: Mini-Mental State Examination, GDS-15: Geriatric Depression Scale 15. We used chi-squared test, Mann–Whitney U test, and *t* test for comparisons among categorical variables (listed by number and % in table), continuous variables not normally distributing (listed by median and IQR), and continuous variables normally distributing (listed by mean and SD), respectively.

Table 2. Cross-tabulation between financially stable in 2014, paid work in 2014, and depressive mood in 2016.

Analyzed Group	Number of Paid Workers in 2014 (%) †	Number of People with Depressive Mood in 2016 (%) ‡	
		Not Paid Worker	Paid Worker
All participants (n = 810)	165 (20.4)	163 (25.3)	28 (17.0)
Those financially stable (n = 236)	54 (22.9)	26 (14.3)	7 (13.0)
Those under financial pressure (n = 574)	110 (19.2)	135 (29.1)	21 (19.1)

Legend. † The numerators are the sample sizes of the analyzed group. ‡ The numerators are the sample sizes of the not paid worker or paid worker. The sample sizes in this cross-tabulation were not the same as the number of participants included in regression analyses. We made this tabulation using data before multiple imputation, so some participants included in making this cross-tabulation were excluded in the regression analysis because of unsuccessful imputations for adjusted variables.

The regression analyses comprise a crude model without adjusted variables and other models with adjusted variables, with regression results that are shown in Table 3. Among the whole set of participants, Model 1 shows an association between paid work and lower odds of depressive mood (odds ratio [OR] 0.60, 95% confidence interval [95%CI] 0.37, 0.98). Among those financially stable, we did not find any association between paid work and depressive mood (OR 0.99, 95%CI 0.38, 2.63). On the contrary, paid work was associated with lower odds of depressive mood among those under financial pressure (OR 0.46, 95%CI 0.26, 0.81).

Table 3. Results of binary logistic regression analyses: association between paid work and depressive mood.

Analyzed Group	Crude		Adjusted	
	OR (95%CI)	*p* Value	OR (95%CI)	*p* Value
All participants	0.61 (0.39, 0.95)	0.029	0.60 (0.37, 0.98)	0.043
Those financially stable	0.89 (0.36, 2.19)	0.806	0.99 (0.38, 2.63)	0.991
Those under financial pressure	0.58 (0.34, 0.96)	0.036	0.46 (0.26, 0.81)	0.008

Legend. OR: Odds ratio, 95%CI: 95% confidence interval, LL: lower limit, UL: upper limit. Explanatory variable was paid work (1: paid worker, 0: not paid worker). Outcome variable was depressive mood (1: with depressive mood, 0: without depressive mood). Model 1 was a crude model without adjusted variables. Model 2 was an adjusted model with age, gender, living alone, years of education, and economic status (economic status was included only in the analysis of the whole set of participants). Model 3 was an adjusted model with social network, physical activity, dietary variety, normal gait speed, and cognitive function.

4. Discussion

The results provide evidence of an association between work and maintaining psychological well-being for older adults under financial pressure, over the subsequent two years. For such older people, work provides income to support their financial needs and has longer-term health benefits. In contrast, we did not find such an association, positive or negative, for older adults who are financially more comfortable. Thus, this study contributes to understanding the potential positive effects of work on older adults' psychological well-being, through a lower risk of depression, for those who work and are under financial pressure.

4.1. Implications and Future Directions

Our data show a correlation between personal economic circumstances, employment, and mental health among older adults. The findings are a distinct contribution relative to prior findings on the benefits of employment to older people [15,17,22,23], as shown by the subset of older people who benefit from work, and show a distinction from the persistent characteristics associated with the beneficial effects of work for older adults, such as those in a lower occupational class [23] or with a larger pension [25]. Also, the findings are distinct from financial motivations for employment [24], as this may not indicate being under financial pressure. Indeed, amongst those under financial pressure, some feel worried about their situation. Importantly, most of those under financial pressure believe their budget is tight but not a source of worry; however, importantly, for them, employment is associated with a lower occurrence of depressive symptoms. One interpretation is that for older people, tight budgets can rapidly deteriorate and thus also become a source of anxiety, thereby aggravating the risk to such older adults. Therefore, this study suggests the importance of financial pressure, which includes a temporal aspect, such as conditionality on needs and resources, and a subjective element, such as relative to one's own expectations of desired spending. Future research may investigate the relationship between financial pressure and the decision to seek employment.

From a broader social and policymaking perspective, the findings raise two considerations. One relates to enabling employment for those who would benefit. This could entail communicating the broader benefits of working, beyond income generation, to those under financial pressure in older age. This supports a policy approach that is adapted to individuals [40] and which recognizes the fact that older adults' stresses are often a composite of different factors, not just economic [26]. Also, this highlights the importance of understanding and mitigating barriers to older adult's employment, so as to make work an opportunity for more older people; for instance, in the study sample, the proportion of older women working is lower than for men, as the proportion of women working decreases with age.

Indeed, a second consideration relates to the duration of employment, as continued participation in work for older adults is important for economic and health benefits. Further, given the prevalence of being financially under pressure amongst older adults, enabling a

broader appropriate participation of older adults in employment is likely a broad-based community effort. In turn, this would also bring health benefits that may be viewed as part of care provided by the community to such older people. This is a broad notion of care, not limited to a binary care receiver-and-provider context, but rather encompassing the consideration of social and behavioral determinants of health. The corresponding policies and community involvement would be consistent with the broader thrust to make society more inclusive of older adults, in line with the United Nations "Decade of Healthy Aging", running from 2021 to 2030 [41].

Notwithstanding employment's beneficial health effects, as time progresses, older adults have an increased likelihood of stopping work such as due to evolving physical and health conditions. Thus, for individuals benefitting from employment, such as those under financial pressure, an important issue for further study is to understand how to anticipate the implications of eventually needing to transition out of employment. In turn, this would be an important area for policy development, such as through appropriate communications to raise awareness, and means to mitigate potential adverse consequences.

4.2. Limitations

In considering the results, certain limitations should be noted. First, we used data from the Kashiwa Cohort Study, which started in 2012 with randomly selected participants so as to obtain an unbiased sample from the population. From the 2012 base of participants came the 2014 participants, and in turn, those in 2016, who were also participants included in the regression. The comparison of variables in 2012 between those included versus not included in the 2014 survey did not demonstrate a serious bias (Appendix Table A1). In addition, paid work in 2014 was not associated with loss to follow-up in 2016 (OR 1.00, 95%CI 0.68, 1.47). Thus, while recognizing a potential bias from the participant selection, the possibility of serious sampling bias and selection bias due to loss to follow-up is limited. Also, as is typical for such survey data, we can identify associations between financial pressures, employment, and depressive systems but not infer causal relationships, which merits follow-on research. The sample size of those financially stable was relatively small (Appendix Table A2), which limited the accuracy of analysis for this group, and we did not exclude those with depressive mood in 2014 as this would greatly decrease the sample size. This was a trade-off between sample size and precision in our results regarding the benefit of employment. Also, the indicator of paid work stems from a relevant survey question, though without additional information on employment. The association between the cessation of work status and mood is complex and more research is required to better understand this relationship. Bearing in mind these limitations, the results point to an important link for older adults under financial pressure between employment and subsequent depressive symptoms.

5. Conclusions

The employment of older adults is increasingly important due to the ageing of society and the potential impact on older adults' psychological health and well-being. We provide evidence that for older adults under financial pressure, there is an association between employment and subsequent reduced odds of depressive mood; thus, employment supports psychological well-being. This study contributes to understanding the conditions under which employment is beneficial for older adults, which is important in developing social policies that enable appropriate older adult employment.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of The University of Tokyo (The study protocol: #21-192).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data in this study are restricted because the ethical approval was not sought for public data sharing from the Ethics Committee at The University of Tokyo and the participants were not informed of possible public data sharing when they provided informed consent. However, data can be made available from a non-author contact at Institute of Gerontology (contact via info.frail@iog.u-tokyo.ac.jp) for researchers who meet the criteria for access to confidential data.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Table A1. Comparison of characteristics in the 2012 survey.

	Loss to Follow-Up Survey in 2014 (n = 736)	**Included in 2014 Survey (n = 1308)**	***p* Value**
Age [years], mean (SD)	**73.6 (5.7)**	**72.8 (5.5)**	<0.01
Gender, n (%)			<0.01
Male	**333 (45.2)**	**682 (52.1)**	
Female	**403 (54.8)**	**626 (47.9)**	
Living alone, n (%)	81 (11.0)	145 (11.1)	1.00
Years of education [years], mean (SD)	12.2 (2.8)	12.9 (2.8)	<0.01
Rank of total net income, median [IQR]	**6 [5, 9]**	**7 [5, 10]**	<0.01
LSNS score, mean (SD)	**15.7 (5.9)**	**16.4 (5.9)**	<0.01
Log-GPAQ score, mean (SD)	**7.5 (1.9)**	**7.7 (1.5)**	<0.01
Dietary variety score, mean (SD)	3.7 (2.1)	3.8 (2.0)	0.68
Normal gait speed [m/sec], mean (SD)	**1.4 (0.3)**	**1.5 (0.3)**	<0.01
MMSE score, median [IQR]	**28 [27, 29]**	**29 [27, 30]**	<0.01
GDS-15 score, median [IQR]	**3 [2, 5]**	**2 [1, 4]**	<0.01
Skeletal muscle mass [kg], mean (SD)	**21.6 (4.6)**	**22.3 (4.6)**	<0.01
Grip strength [kg], mean (SD)	**27.6 (8.2)**	**29.0 (7.9)**	<0.01
5 chair stand test [times], mean (SD)	**8.6 (3.0)**	**8.1 (2.3)**	<0.01
TUG [sec], mean (SD)	**6.3 (1.9)**	**6.0 (1.4)**	<0.01

Legend of Table A1. SD: Standard deviation, IQR: interquartile range, LSNS: Lubben Social Network Scale, log-GPAQ: logarithmic-transformed Global Physical Activity Questionnaire, MMSE: Mini-Mental State Examination, GDS-15: Geriatric Depression Scale 15, TUG: timed up and go test. Note: We interpreted the above table by clinical significance, not statistical significance because a large sample size leads to a small p value. In this respect, we concluded that although there were statistical differences in gender, rank of total net income, and GDS-15 score, there were no meaningful differences found among the variables in the 2012 survey between people included and those lost to follow-up in the 2014 survey, which meant no serious bias from the population.

Table A2. Comparison of characteristics in the 2014 survey stratified by financial stability.

	Those Feeling under Financial Pressure n = 1046	**Those with Financial Stability n = 254**	***p* Value**
Complete data in 2014, n (%)	869 (94.3)	345 (92.7)	0.37
Loss to follow-up in 2016, n (%)	348 (37.7)	136 (36.6)	0.74
Paid worker, n (%)	171 (18.5)	81 (21.8)	0.21
Age [years], mean (SD)	**74.2 (5.1)**	**75.7 (6.1)**	<0.01
Gender, n (%)			0.02
Male	**500 (54.2)**	**175 (47.0)**	
Female	**422 (45.8)**	**197 (53.0)**	

Table A2. *Cont.*

	Those Feeling under Financial Pressure n = 1046	Those with Financial Stability n = 254	*p* Value
Living alone, n (%)	139 (13.3)	32 (12.6)	0.85
Years of education [years], mean (SD)	12.9 (2.7)	12.9 (2.9)	0.99
LSNS score, mean (SD)	**13.7 (6.1)**	**14.8 (5.9)**	<0.01
Log-GPAQ score, mean (SD)	7.5 (1.9)	7.5 (2.1)	0.87
Dietary variety score, mean (SD)	**3.9 (2.1)**	**4.5 (2.0)**	<0.01
Normal gait speed [m/sec], mean (SD)	1.5 (0.2)	1.4 (0.2)	0.34
MMSE score, median [IQR]	29 [28, 30]	29 [28, 30]	0.13
GDS-15 score in 2016, median [IQR]	**3 [2, 5]**	**2 [2, 3]**	<0.01

Legend of Table A2. SD: Standard deviation, IQR: interquartile range, LSNS: Lubben Social Network Scale, log-GPAQ: logarithmic-transformed Global Physical Activity Questionnaire, MMSE: Mini-Mental State Examination, GDS-15: Geriatric Depression Scale 15.

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