

# Continued work employment and volunteerism and mental well-being of older adults: Singapore longitudinal ageing studies

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## Abstract

**Objective:** to examine the effect of late life engagement in continued work involvement or volunteer activities during retirement on mental well-being.

**Methods:** two waves of data from the Singapore Longitudinal Ageing Studies were analyzed for 2,716 Singaporeans aged 55 or above at baseline and 1,754 at 2-year follow-up. Trained research nurses interviewed participants (non-volunteering retiree, volunteering retiree, and working seniors) on mental health status (geriatric depression scale, Mini Mental State Examination, positive mental wellbeing and life satisfaction).

**Results:** about 88% of seniors were retired (78% non-volunteering, 10% volunteering) and 12% were still working in paid employment or business. At baseline and 2 year follow up, and regardless of physical health status, volunteering retirees and working seniors gave significantly better MMSE cognitive performance scores, fewer depressive symptoms, and better mental well-being and life satisfaction than non-volunteering retirees.

**Conclusion:** the results of this study suggest that continued work involvement or volunteerism provides opportunities for social interaction and engagement and may be associated with enhanced mental well-being. Future research should clarify which specific aspects of volunteerism are related to long-term mental well-being.

**Keywords:** *volunteerism, retirement, mental well-being, older adults, singapore, elderly*

## Introduction

Worldwide, population ageing is increasing at an unprecedented pace, and this is especially remarkable in newly developed countries in east and southeast Asia [1]. In Singapore, men can expect to live up to 78 years from birth, while women can expect to reach 83 years on the average [2]. Increased life expectancy may mean increased time spent in retirement, and most Singaporeans are likely to live 20–25 years past the current official retirement age of 62 (until recently this was 55 years).

The movement from work to retirement represents a significant transition or turning point in people's lives [3]. For some individuals, retirement may simply mean withdrawal from employment, a change into a role with new norms, duties and rights, or a transitional passage from late adulthood to old age. For others, retirement may translate into losing

the meaning of life. The current literature investigating mental well-being of older adults indicates a wide range of responses among retirees towards the cessation of working life. For example, findings of the Australian national survey indicated poorer mental health in men who retired early, and that the relationship between retirement and mental health varied with age [4]. The English Longitudinal Study on Ageing found a decline in life satisfaction around retirement age [5]. Another longitudinal study indicated that male Jewish retirees in Israel reported an increase in well-being 1 year after retirement [6].

A current model for successful ageing postulates social activity as a crucial component of healthy ageing [7, 8]. It is argued that frequent social interaction will increase older adults' chance of finding social support and contacts. Social gerontologists also refer to this activity theory to explain the positive impact of paid employment and volunteer service on older adults' psychological well-being [9], as both types of

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activities offer channels for acquiring self-confidence. Furthermore, the altruistic nature of volunteering offers a way of gaining social approval in addition to improving self-esteem [10, 11]. Participation in volunteer activities has been found to be associated with improved mental well-being, with volunteers reporting fewer anxiety and depression symptoms, higher life satisfaction and better personal control than non-volunteers in studies of older Western [12, 13] and Chinese samples [14].

The present cohort study aimed to understand the mental health implication of continued work involvement or post-retirement volunteerism in a Singapore context. In the present cohort study, data from the Singapore Longitudinal Ageing Studies (SLAS) were analysed to examine the mental health effects of the distinct paths that older Singaporeans take with respect to late life engagement (continued work involvement, retirement with and without volunteerism). We hypothesised that continued work involvement through paid employment or business and volunteer activities during retirement (compared to retirement without volunteering activities) are associated with better mental well-being.

## Methods

### Participants

This study utilised two waves of data from the SLAS cohort, a nationally representative study of older adults aged 55 years or above living in Singapore. A total of 2,808 eligible residents participated, representing a response rate of 78.5%. However, only 2,716 participants provided complete information on productive and social activities and mental well-being at the baseline in 2004/2005. By the end of the 2-year observation period, 45 older adults had died and 917 provided no response (15 were unhealthy to be interviewed, 457 refused and 445 could not be contacted). Hence, the 2-year follow-up interviews were conducted with 1,754 older adults. Non-responders were more likely to be men than women (40% vs. 35%,  $P < 0.01$ ), have had lower scores on cognitive capacity (MMSE total score 26.5 vs. 27.1;  $P < 0.001$ ) and mental well-being (52.9 vs. 54.2;  $P < 0.001$ ) and the higher prevalence of depression (GDS  $\geq 5$ , 16.1% vs. 11.5%;  $P = 0.001$ ) than participants who were followed up. No significant differences in age (66.0 vs. 66.0;  $P = 0.81$ ), education level (53.2% vs. 51.7% with primary education or below;  $P = 0.42$ ), level of life satisfaction (16.3 vs. 16.4;  $P = 0.27$ ) and retirement status (12.7% vs. 11.4% still working;  $P = 0.24$ ) were observed between responders and non-responders.

In sum, a final cohort of 2,716 older adults was included in the baseline and 1,754 in the follow-up data for subsequent analyses. Participants in the study were mostly of Chinese descent (94%).

### Measurement of variables

The SLAS was approved by the National University of Singapore Institutional Review Board. A statement of informed consent was obtained from all participants prior

to data collection. Information was collected through extensive face-to-face interviews, assessments and tests that were performed by trained research nurses in the on-site study centre [15].

### Employment status

Employment status was determined by asking participants whether they were still engaged in paid employment or business ('still working'/'not retired'), and if they were retired, whether they were engaged in any volunteer work in the community. The participants were classified accordingly as 'Retired, non-volunteering', 'Retired and volunteering' and 'Still working'. Although no information about the specific nature of volunteering activities was available, Singapore society is organised around a large number of neighbourhoods and communities in which numerous opportunities to volunteer in social programmes are available, particularly through a network of community centres organised under the auspices of the People's Association.

### Confounding or moderating variables

Relevant correlates of mental well-being included age, gender, education, social network and support, general health status and physical functioning.

*Social network and support* was assessed by six items: marital status (being married versus single, divorced, widowed), living arrangements (living with others versus living alone), having someone to confide with, regular visits at least once a week by children/relatives/friends in the last year, and regular phone calls at least once a week by children/relatives/friends in the past year, and having someone to help when needed (to some or a great extent). Good social network and support was determined by three or more positive responses to the six items.

*Self-rated general health status* was assessed by a single question ('In general, would you say your health is excellent, very good, good, fair, poor?'), documented in many studies to have high predictive validity for many outcomes. The responses on 5-point Likert scale were divided into two categories ('poor and fair' vs. 'good, very good and excellent').

*Physical functional status* was based on participants' level of dependence in performing 10 tasks on the Basic Activities of Daily Living scale (BADL) [16] and 7 tasks on the Instrumental Activities of Daily Living scale (IADL) [17]. Functional disability was defined as needing at least some personal help in one task or more. Participants were classified as independent, IADL dependent and BADL dependent.

### Outcome variables

*Depression* was assessed by the 15-item Geriatric Depression Scale (GDS) [18]. Its Chinese version has been validated in Singapore [19]. Participants answered with a 'yes' or 'no' to each of the 15 depressive symptoms in the past week. The total scores ranged from 0 to 15, with scores of 5 or more indicating probable depression.

*Cognitive status* was assessed by the Mini-Mental State Examination (MMSE) to determine global cognitive functioning on domains of memory, attention, language, praxis and visual-spatial ability [20]. The summed scores of the MMSE ranged from 0 to 30, with higher scores denoting better cognitive capacity.

*Positive mental well-being* was assessed by the mental component score of the Medical Outcomes Study 12-item short form (MCS-SF12) [21]. Scores ranged from 1 to 100, with lower scores indicating poorer health status.

*Life satisfaction* was measured with a four-item self-reported Life Satisfaction Scale [22] that assessed participants' interest in life, happiness, loneliness and general ease of living. Life satisfaction total score ranged from 4 to 20, with higher scores denoting greater satisfaction with life.

### Statistical analysis

Univariate analyses were performed to examine associations between baseline characteristics and employment status, using an independent *t*-test for continuous variables (mean/SD) and chi-squared trend tests for categorical variables (%). Next, multivariate analyses of the cross-sectional and longitudinal associations between employment–volunteer status and mental well-being (depression, cognitive status, positive mental well-being and life satisfaction) were conducted using analysis of variance of the general linear model adjusting for relevant confounding and moderating variables, namely age, gender, education, social network and support, general health status and physical functioning. Since gender and social economic factors are potential moderating influences, we also performed preliminary tests of statistical interactions and examination of possible effects stratified for gender and other social economic status. Because preliminary analyses showed no significant interactions with these social dimensions, only the results of pooled analyses are presented.

For the longitudinal analyses, the saturated models of specific outcomes were further adjusted for the respective baseline scores (controlling for 'floor effect'). Crude and adjusted means of different categories of retirement status and their corresponding 95% confidence intervals (95% CI) were computed. The level of statistical significance for between and within groups comparisons was set at  $P < 0.05$  with two-tailed distribution. The modification effect of age in the association between employment–volunteer status and outcome variables was also tested. All analyses were performed using the SPSS statistical software version 15.0 (SPSS, Inc., Chicago, IL, USA).

### Results

The baseline analyses revealed that 88% of the cohort had retired, and only 12% of retirees were still working. Table 1 shows that compared to working seniors, retirees were more likely to be women, single, divorced or widowed. Volunteering retirees or working seniors tended to be younger and more

educated than non-volunteering retirees. Variables on social networking and support did not vary significantly across groups, with the exception that non-volunteering retirees had fewer people to confide with than the other two groups. About 65–77% of the entire baseline cohort reported a good to excellent health status, with non-volunteering retirees at the lower end of this range. Compared to working seniors and volunteering retirees, non-volunteering retirees were more dependent in their basic and instrumental activities of daily living, reported more depressive symptoms and had lower cognitive and mental well-being scores. Among the three groups, volunteering retirees had the highest life satisfaction scores.

Table 2 presents the cross-sectional pairwise comparisons between employment and volunteer status on mental well-being outcomes, controlling for a number of confounding and moderating variables. Overall, associations between groups at the baseline demonstrated better mental well-being among volunteering retirees as compared to non-volunteering retirees and working seniors. In particular, associations were found with regard to GDS scores, indicating that non-volunteering retirees (GDS = 3.2) had higher depression scores compared to volunteering retirees (GDS = 2.7;  $P = 0.004$ ) and working seniors (GDS = 2.8;  $P = 0.012$ ). The cognitive status of volunteering retirees was also higher (MMSE = 26.2) than that of non-volunteering retirees (MMSE = 25.4;  $P < 0.001$ ) and working seniors (MMSE = 25.4;  $P = 0.003$ ). In addition, an association between volunteerism and mental well-being (MCS-SF12) was also observed, with more positive outcomes for those involved in volunteer activities. Higher life satisfaction scores were also noted among volunteering retirees (15.6) when compared to non-volunteering retirees (14.9;  $P < 0.001$ ) and working seniors (15.4;  $P = 0.001$ ). As for statistical interactions between employment–volunteer status and age, significant associations were found only for cognitive status (MMSE scores). Subsequent analyses showed that when MMSE scores were compared within older adults aged 62 or less, there was no statistically significant association across groups. However, when the same comparison was conducted with those aged 62 and above, volunteering retirees (MMSE = 25.9) showed better cognitive functioning than non-volunteering retirees (MMSE = 24.7;  $P < 0.001$ ) and working seniors (MMSE = 24.9;  $P = 0.02$ ).

At the end of the 2-year observation period, employment and volunteer status of participants was similar to that observed at baseline, i.e. 88% of the follow-up cohort had retired and only 12% of retirees were still working. The follow-up status in mental well-being after controlling for confounding variables is shown in Table 3. Pairwise comparisons among groups showed statistically significant differences between non-volunteering retirees and working seniors on depression (GSD = 1.91 vs. 1.39;  $P = 0.03$ ), cognitive status (MMSE = 26.7 vs. 28.1;  $P = 0.04$ ) and for positive mental health (MCS-SF12 = 53.8 vs. 55.0;  $P = 0.03$ ). Similar differences were observed for pairwise comparison between non-volunteering retirees and volunteering retirees, although

**Table 1.** Participant characteristics at baseline by employment status ( $N = 2,716$ )

	Non-volunteering retirees	Volunteering retirees	Still working	<i>P</i> -value
Total sample size (%)	2,111 (77.7)	283 (10.4)	322 (11.9)	
Age (year), mean (SD)	66.9 (7.8)	64.0 (6.3)	62.1 (5.7)	<0.001
Female	66.1	63.6	42.9	<0.001
Education				
Primary and below ( $\leq 6$ years)	58.4	32.5	32.3	<0.001
Secondary and above ( $> 6$ years)	41.6	67.5	67.7	
Social network and support				
Being married (vs. single, divorced, widowed)	72.7	74.9	81.0	0.006
Living with others (vs. living alone)	93.1	89.4	93.8	0.06
Having someone to confide with	94.5	97.5	97.2	0.02
Frequent visits by children/relatives/friends	73.2	68.3	70.5	0.17
Having regular phone calls by children/relatives/friends	81.4	82.9	85.3	0.24
Having someone to help when needed	91.3	92.9	91.5	0.66
Having three or more of the factors above	91.3	92.6	92.8	0.55
General health status				
Fair, poor	34.8	22.6	23.9	<0.001
Good to excellent	65.2	77.4	76.1	
Physical functioning				
IADL dependent	20.7	14.2	9.1	<0.001
BADL dependent	7.1	4.6	4.4	
Depression (GDS) scores, mean (SD) <sup>a</sup>	2.1 (2.9)	1.3 (2.2)	1.4 (2.0)	<0.001
Cognitive (MMSE) scores, mean (SD)	26.5 (3.8)	28.3 (1.9)	27.9 (2.7)	<0.001
Mental well-being (SF12 MCS) scores, mean (SD)	53.4 (8.4)	54.9 (6.8)	54.7 (7.5)	0.001
Life satisfaction score, mean (SD)	16.2 (2.4)	17.0 (2.1)	16.7 (2.1)	<0.001

Values are in % unless otherwise stated.

<sup>a</sup>Lower scores denote better status.

Life satisfaction total score ('reverse scoring') ranged from 4 to 20 with higher scores denoting more satisfaction with life.

**Table 2.** Cross-sectional associations of volunteer status with mental well-being ( $N = 2,716$ )

	Sample	Adjusted mean (SE) <sup>a</sup>	ANOVA <i>P</i> -values	
			Between volunteer status groups (pairwise)	Interaction: age*volunteer status
Depression (GDS score) <sup>b</sup>				
Retired, non-volunteering	2,111	3.17 (0.11)	0.004 <sup>c</sup> ; 0.012 <sup>d</sup> ; 0.71 <sup>c</sup>	<i>P</i> = 0.84
Retired and volunteering	283	2.68 (0.18)		
Still working	322	2.76 (0.18)		
Cognitive status (MMSE score)				
Retired, non-volunteering	2,111	25.4 (0.14)	<0.001 <sup>c</sup> ; 0.76 <sup>d</sup> ; 0.003 <sup>c</sup>	<i>P</i> = 0.005
Retired and volunteering	283	26.2 (0.23)		
Still working	322	25.4 (0.21)		
Positive mental well-being (MCS-SF12 score)				
Retired, non-volunteering	2,111	51.4 (0.35)	0.03 <sup>c</sup> ; 0.10 <sup>d</sup> ; 0.66 <sup>c</sup>	<i>P</i> = 0.95
Retired and volunteering	283	52.5 (0.57)		
Still working	322	52.2 (0.55)		
Life satisfaction score				
Retired, non-volunteering	2,111	14.9 (0.10)	<0.001 <sup>c</sup> ; 0.001 <sup>d</sup> ; 0.24 <sup>c</sup>	<i>P</i> = 0.61
Retired and volunteering	283	15.6 (0.16)		
Still working	322	15.4 (0.15)		

<sup>a</sup>Variables in a general linear model: age (<62 or  $\geq 62$ ), education, gender, social network and support, general health status and physical functioning.

<sup>b</sup>Lower scores denote better status.

<sup>c</sup>Retired without volunteer activities versus Retired with volunteer activities.

<sup>d</sup>Retired without volunteer activities versus Still working.

<sup>e</sup>Retired with volunteer activities versus Still working.

For cognitive status: + vascular risk factors/events and depression.

Test for interaction: age (<62 or  $\geq 62$ )\*volunteer status.

**Table 3.** Longitudinal analysis of mental well-being at 2-year follow-up by working and retiree volunteer status ( $N = 1,754$ )

	Sample	Unadjusted mean (SD) at baseline <sup>a</sup>	Unadjusted mean (SD) at follow-up	ANOVA <i>P</i> -values	
				Between groups: volunteer status (pairwise)	Within groups: baseline vs. follow-up assessment
Depression (GDS score) <sup>b</sup>					
Retired, non-volunteering	1,360	1.91 (2.72)	1.16 (2.09)	0.15 <sup>c</sup> ; 0.03 <sup>d</sup> ; 0.58 <sup>e</sup>	0.38
Retired and volunteering	193	1.27 (2.07)	0.65 (1.37)		
Still working	201	1.39 (2.04)	0.58 (0.99)		
Cognitive status (MMSE score)					
Retired, non-volunteering	1,360	26.7 (3.46)	27.3 (3.05)	0.15 <sup>c</sup> ; 0.04 <sup>d</sup> ; 0.86 <sup>e</sup>	0.23
Retired and volunteering	193	28.4 (1.63)	28.4 (1.89)		
Still working	201	28.1 (2.38)	28.7 (1.81)		
Positive mental well-being (MCS-SF12 score) scores					
Retired, non-volunteering	1360	53.8 (8.13)	56.5 (6.31)	0.09 <sup>c</sup> ; 0.03 <sup>d</sup> ; 0.71 <sup>e</sup>	0.45
Retired and volunteering	193	55.5 (6.56)	57.8 (4.72)		
Still working	201	55.0 (7.32)	57.8 (3.67)		

<sup>a</sup>Repeat measures general linear models include baseline age (<62 or ≥62), education, gender, social network and support, general health status and physical functioning, interval between baseline and follow-up.

For GDS: + number of depressive symptoms at baseline; <sup>b</sup>lower scores denote better status.

For MMSE: + vascular risk factors/events, depression, and MMSE score at baseline.

For MCS-SF12: + MCS-SF12 score at baseline.

<sup>c</sup>Retired without volunteer activities versus Retired with volunteer activities.

<sup>d</sup>Retired without volunteer activities versus Still working.

<sup>e</sup>Retired with volunteer activities versus Still working.

No significant interactions were detected for: volunteer status\*between assessment; volunteer status\*between assessment\*age; volunteer status\*between assessment\*gender.

with borderline statistical significance. Volunteering retirees and working seniors were very similar in all aspects of mental well-being. There were no significant statistical interactions between employment–volunteer status and age on mental well-being at follow-up.

## Discussion

The present study suggests that continued work employment and volunteerism during retirement may be associated with mental well-being among older adults. The longitudinal analysis further supports a consistent and robust relationship between positive mental well-being and active work engagement or volunteerism on retirees. In particular, the contrast between ‘active’ retirement with volunteer service and retirement without active service is worth noting for its practical and public policy relevance. The findings add to a substantial body of evidence indicating that cohorts of older adults that engage in post-retirement volunteering report more positive levels of mental well-being than cohorts that do not participate in volunteer activities [11, 12–14]. The social engagement theory suggests that volunteer experience can compensate for the loss of roles due to retirement with socially meaningful activities and service, which will in turn enhance retirees’ psychological and social resources to foster positive post-retirement adjustment [11]. However, an alternate explanation, the healthy worker hypothesis, argues that retirees with poor physical and psychological health are

less likely to consider volunteering, and are less likely to be selected for volunteer work. Hence, retirees who engage in volunteer activities may possess better cognitive and mental health status to begin with. Regardless of whether healthier individuals are more prone to volunteer, or whether volunteering helps to postpone or reduce age-related changes in cognitive status and well-being, or some combination of the two explanations, our data suggest that volunteer cohorts may differ from non-volunteers on a variety of measures that are related to quality of life. From a public policy perspective, the possibility of differences in mental well-being between socially engaged and disengaged older adults suggest that Singapore’s national ageing strategy should continue to explore the promotion of volunteerism and prolonged social participation beyond the traditional retirement age.

The concept of cognitive reserve in successful ageing posits that the more ‘developed’ the brain is on entering older age, the longer it will take to cross the threshold of impairment. In addition, the healthy ageing brain is capable of continued learning [8]. One key way to attain cognitive reserve is to engage in mentally stimulating activities. Continued work involvement and volunteerism in older age not only fill the void in working roles but also have the potential to promote cognitive health by providing opportunities for mental training and new learning. The SLAS suggests that regardless of physical health status, active employment and volunteerism may be associated with enhanced mental well-being and cognitive functioning. Furthermore, the cognitive benefit of active work engagement appeared to be more

pronounced in older (>62 years) than in younger retirees (≤62 years). This age interaction effect may be related to motivational factors. A recent study found that for older Chinese retirees (mean age of 72 years), a significant factor in maintaining volunteer activities was the fulfilment of self-oriented motives such as having opportunities for new learning [23]. In other words, older retirees may be more motivated to engage in mental training activities in their volunteer work to enhance their cognitive capacity.

The present study has several limitations, and its results should be interpreted with caution. The study relied solely on self-reports of participants with respect to information on their work or volunteer service engagement and mental health status. There was no information on the type of volunteer activities and the level of commitment and engagement among participants who reported a history of volunteer service, which are factors that may influence the mental health of volunteers. Furthermore, no data were available regarding the duration of volunteer service. Some research has indicated that mental well-being does not necessarily correlate with years of volunteer service in a sample of retired Chinese [14]. In order to facilitate the contribution of older volunteers in ways that benefit both themselves and those who receive their service, it is important to further identify specific aspects of volunteerism that are related to more long-term benefit on mental well-being. Information about volunteer activities was used to classify retired participants on their volunteer status, but participants who were still working on paid employment or business also include those who were volunteering at the same time.

The evidence in this study suggests that continued work involvement or volunteerism among retired seniors may be a factor in successful ageing. The segment of the Singaporean population aged 60 or older is projected to triple over the next few decades, rising from 13% in 2006 to an estimated 38% by 2050. Because the design of the present study does not permit inferences about causality, additional randomised controlled trials should be conducted to clarify the effects of continued work employment and volunteer services on mental well-being in older adults.

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### Key points

- Late life engagement in continued work employment and post-retirement volunteerism are associated with better mental well-being.
  - Volunteering retirees report better mental well-being than non-volunteering retirees.
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### Conflicts of interest

There are neither financial nor dual commitments that represent potential conflict of interest.

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# A comparison of four tests of cognition as predictors of inability to perform spirometry in old age

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## Abstract

**Background:** previous studies have shown that a Mini Mental State Examination (MMSE) score of <24/30 and inability to copy intersecting pentagons (IP) predicts inability to perform spirometry. We hypothesised that clock drawing tests (CLOX 1 and 2), being validated tests of cognitive executive function, might predict spirometry performance with a higher sensitivity and specificity than the MMSE or IP.

**Methods:** we studied 113 (84 females) spirometry-naïve inpatients, mean age of 84 years (range 74–97). All performed the MMSE, IP, CLOX 1 and 2 and then attempted to perform assisted spirometry to the American Thoracic Society/European Respiratory Society standard.

**Results:** of 113, 49 met the criteria for adequate spirometry. Using normative thresholds for probable impairment, inability to perform spirometry was predicted by MMSE <24/30 with a sensitivity of 81% and specificity of 90% ( $P < 0.0000$ ); by inability to copy IP with a sensitivity of 92% and specificity of 100% ( $P < 0.0000$ ); by CLOX1 <10/15 with a sensitivity of 81% and specificity of 49% ( $P < 0.001$ ); and by CLOX2 <12/15 with a sensitivity of 63% and specificity of 65% ( $P < 0.001$ ).

**Conclusion:** CLOX tests did not perform better than MMSE and IP to identify subjects unlikely to be able to perform spirometry. Achieving assisted spirometry from the naïve state in old age might be more determined by global cognitive function and ideomotor praxis than by executive control function.

**Keywords:** *spirometry, elderly, cognitive function tests, MMSE, CLOX*