Health Determinants of Life Satisfaction Among Older Adults in Brunei: A Multivariate Analysis

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Abstract

Level of satisfaction is significantly influenced by health-related factors across human life course. Prior research shows that there are variations in the relationship between health factors and life-satisfaction between Western and Asian countries. This study aimed to explore health determinants of life satisfaction among older adults in Brunei Darussalam. Cross-sectional study using an interviewer-assisted questionnaire. Six hundred forty-five adults aged above 50 years were recruited nationally. Descriptive statistics and multivariate regression analysis were applied. A robust model ($R^2 = 49.3\%$, alpha > 0.7) suggested that life satisfaction in this population could largely be explained by musculoskeletal pain, difficulty to perform daily activities, psychological and emotional issues, and family support. Gender has significant moderating effects on this relationship. Impacts of life satisfaction from health, social, cultural, and related perspectives were discussed. These findings in this research may contribute to ongoing multi-sectorial efforts to design a comprehensive model of care of older people to achieve high quality of life.

Keywords Health determinants · Life Satisfaction · Elderly population: Multivariate analysis

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Introduction

Life satisfaction, a subjective feeling and attitude about one's life at a particular point of time that could range from positive to negative, is one of the most important component of healthy aging (Beutell, 2006). Life satisfaction elicits a U-shaped pattern with age, meaning as a person grow older their overall satisfaction in life rises after a nadir at 50 years (Steptoe et al., 2015 Feb). This corroborates with similar studies which demonstrated increasing life satisfaction with ageing (Blanchflower & Oswald, 2008; Blanchflower & Oswald, 2009; Blanchflower & Oswald, 2004) until it reaches a threshold at a certain point, which could differ by multitude of factors, and starts to decline (Baird et al., 2010 Nov; Puvill et al., 2016).

Health and health-related factors significantly influence level of satisfaction across life course, and have been consistently used as predictor of mortality and morbidity (Kuhn et al., 2006; Lee, 2000). As age increases human generally experiences decline in health and thus life satisfaction (Cheah, 2017; Fonta et al., 2017; Natividad, 2019). However, the multifactorial and dimensions of health as well as co-associated factors such as family dynamics and social support, cultural perspectives, physical environment for walking and mobilities, healthcare system, and so on, would suggest factors influencing life satisfaction vary greatly in different population (Meyer et al., 2014; Zavras et al., 2013). Many evidence have been found in Western countries in contrast to Asian population, particularly in Brunei where studies are still scarce.

Since the early twentieth century, life expectancy has increased substantially and along with the concomitant decline in fertility rate, an ageing population is on the rise around the world, and Brunei is no exception. A country is considered as an ageing population when 7 percent of the population are 65 years and above. According to the United Nation, Brunei's older population will account for 7.7 per cent of the total population by 2025 (United Nations, Department of Economic & Social Affairs PD. World Population Ageing, 2019). This means in no time Brunei will have relatively higher proportion of its inhabitants being older adults compared to children (United Nations, Department of Economic & Social Affairs PD. World Population Ageing, 2019). By 2050, global life expectancy was estimated to increase by 4.5 years, an approximate six percent rise since 2015, and was predicted to increase continuously thereafter (United Nations, Department of Economic & Social Affairs PD. World Population Ageing, 2019). Still, questions remain as to whether these added years are experienced in good health and life satisfaction.

To the best of the authors' knowledge, no prior study has been done in this aspect in Brunei. Hence, this study serves to fill the gap by exploring health determinants of life satisfactions among Brunei older adults. Therefore, an effective health policy could be implemented to raise the standard of living of its people – one of the vision of Brunei - and better address the approaching era of ageing population in the country.

Methods

Study Design

A cross-sectional national survey of the elderly people in Brunei.

Recruitment and Sample Size

A full description of the stud methods can be found here (Rahman et al., 2021). Essentially, this study targeted participants who were within the age range of 50 to 75 years; held Brunei citizenship or permanent residents; lived at home or resided in an institution; lived in a household; oriented to place and persons and able to communicate in English and Malay. Adults aged 50 years or below and those who were cognitively impaired were excluded.

The Ministry of Home Affairs via the District offices granted permission to access the current population census of the four districts in Brunei. All eligible participants (n = 63,900) were then sectioned out from the total study population (n = 76,000). Minimum sample size was calculated with precision of 5% (d = 0.05), expected proportion of 50% at 95% confidence interval. Accounting for attrition, non-responses and missing data, a minimum of 600 participants were expected (Naing et al., 2022). Proportionate random sampling by districts were then executed.

Data Collection Instrument

A self-designed, interviewer-assisted questionnaire was utilized with items extracted and adapted various internationally established surveys, namely English Longitudinal Survey on Aging (ELSA) (Banks et al., 2019); Survey on Health, Ageing and Retirement in Europe (SHARE) (Börsch-Supan et al., 2019); Irish Longitudinal Study on Ageing (TILDA) (Kenny et al., 2020); Korean Longitudinal Study of Ageing (KLoSA) (Boo & Chang, 2006); Japanese Study of Ageing and Retirement (JSTAR) (Ichimura et al., 2009); and Health and Retirement Study on Psychosocial and Lifestyle (Smith et al., 2017). A total of 49-items were extracted consisting of 15-items on difficulty to perform daily activities (such as shopping for daily needs, go out by yourself, prepare your own meal), 14-items of mental and emotional issues (such as stress, feeling depressed, felt lonely, felt frightened, felt like crying, felt like doing nothing), 6-items on family support (such as being concerned about or from spouse, children, grandchildren, relatives, friends), and 12-items on musculoskeletal pain/complaints (such as shoulder, arm, wrist, back, leg, ankle, toes).

Data Analysis

All analyses were computed using R and RStudio for Mac. Descriptive statistics were tabled and sub-group analysis using Chi-square test for independence and Independent t test was used to determine association of sociodemographic factors towards life satisfaction. Exploratory factor analysis (EFA) using maximum

likelihood technique with varimax rotation was applied to ascertain number of factor extraction with scree plot, eigenvalue value more than 1, and factor loadings of more than 0.30. Prior to this, KMO value (≥ 0.5) and Bartlett's sphericity test ($p < 0.001$) were computed (Dziuban & Shirkey, 1974). A structural equation diagram with standardized regression estimates was rendered to visualize the EFA model using IBM AMOS software. Corrected Item-total correlation coefficients and Cronbach's alpha coefficients where ≥ 0.60 is considered acceptable internal consistency reliability were also estimated (Streinmer, 1993).

Ethical Consideration

Ethical approval was received from the University Research Ethics Committee (UREC), Universiti Brunei Darussalam (UBD/OAVCR/UREC/Apr18-04). All procedures followed ethical standards in accordance to the Helsinki Declaration of 1964 and later versions. The questionnaires used were accessible in the public domain and do not require any permission for use. Written informed consent was obtained from participants prior to joining the study.

Results

A total sample of 645 elderly people participated in this study. Table 1 presents the demographic and other factors associated with life satisfaction among elderly people in Brunei. Among them, 50.7% were female and 49.3% were male. 51.7% were within the age group of 56–65 years, while those within the age of 50–55 years and 66–80 years were 30.7% and 17.6%, respectively. Majority (62.2%) received secondary-level education, and 25.5% had tertiary-level education. Univariate analysis revealed that life satisfaction of the older adults were significantly associated with increased age, female, better health status, experience lower difficulty to perform daily activities, lower mental and emotional issues, higher family support and fewer musculoskeletal complaints.

Table 2 demonstrates the measurement model of the relationship between health-related factors and life satisfaction. Good to very good factor loadings were expressed indicating that construct validity of both convergent and discriminant validity was established. Cronbach's alphas were good to excellent indicating internal consistency reliability was established. The model explains 43.3% of total variance extracted; the highest construct contributing to the model was musculoskeletal complaints (13.3%), followed by difficulty to perform daily activities (11.7%), mental and emotional issues (11.5%) and family support (6.8%). The model has moderating effects of gender ($p < 0.001$, DF = 101, CMIN = 554.0).

Figure 1 illustrates the structural relationship between health-related factors and life satisfaction while Table 3 summarizes the results. Consistent with R-square results, musculoskeletal pain or complaints had the highest regression weight that is significant for both health status and life satisfaction ($p < 0.001$). Difficulty to perform daily activities were also significantly associated with life satisfaction

Table 1 Factors associated with Life Satisfaction of Elderly People in Brunei (n = 645)

	Total	Satisfied		Not Satisfied		P-value[a]
	n (%)	n	(%)	n	(%)	
Age (years)						0.016
50–55 years	198 (30.7)	125	(63.1)	73	(36.8)	
56–65 years	334 (51.7)	249	(74.6)	85	(25.4)	
66–75 years	113 (17.6)	83	(73.5)	30	(26.5)	
Gender						0.013
Female	327 (50.7)	246	(75.2)	81	(24.8)	
Male	318 (49.3)	211	(66.4)	107	(33.6)	
Education						0.370
Primary and below	79 (12.3)	55	(69.6)	24	(30.4)	
Secondary	401 (62.2)	278	(69.3)	123	(30.7)	
Tertiary	165 (25.5)	124	(75.1)	41	(24.9)	
Monthly income						0.412
B$500 and below	206 (31.9)	151	(73.3)	55	(26.7)	
B$501- B$2000	246 (38.1)	167	(67.9)	79	(32.1)	
B$2001 and above	193 (30.0)	139	(72.0)	54	(28.0)	
Overall health status						< 0.001
Very good	218 (33.8)	180	(82.6)	38	(17.4)	
Good	274 (42.5)	197	(71.9)	77	(28.1)	
Fair/Poor	153 (23.7)	80	(52.3)	73	(47.7)	
Time spent walking daily						0.058
< 30 min/ day	143 (22.2)	90	(62.9)	53	(37.1)	
31 to 90 min/ day	287 (44.5)	208	(72.4)	79	(27.6)	
> 90 min/ day	215 (33.3)	159	(73.9)	56	(26.1)	
Frequency social interaction						0.328
Almost everyday	217 (33.6)	159	(73.3)	58	(26.7)	
2–3 times per week	162 (25.1)	118	(72.8)	44	(27.2)	
Once a week or less	266 (41.2)	180	(67.7)	86	(32.3)	
Difficulty to perform daily activity score (Range 0 to 15)[d]						
Mean (SD)	13.7 (3.5)	13.9	(3.3)	13.1	(4.0)	0.013[b]
Mental and emotional score (Range 0 to 14)[e]						
Mean (SD)	4.9 (4.2)	4.7	(4.5)	5.4	(3.4)	0.030[b]
Family support (Range 0 to 6)[f]						
Mean (SD)	3.8 (3.5)	8.2	(3.4)	6.7	(3.5)	< 0.001[c]

($p = 0.036$). Mental and emotional issues were positively regressed towards health status ($p = 0.017$), however, not significant towards life satisfaction ($p = 0.151$). Family support was not significantly associated with both health status ($p = 0.292$) and life satisfaction ($p = 0.140$) (see Table 3).

Table 1 (continued)

	Total	Satisfied		Not Satisfied		P-value[a]
	n (%)	n	(%)	n	(%)	
Musculoskeletal pain score (Range 0 to 12)[g]						
Mean (SD)	4.2 (2.9)	3.5	(3.7)	5.9	(4.2)	**< 0.001[b]**

Bold p-values indicate statistical significance at the 0.05 level

n Frequency, % percentage, *SD* Standard deviation

[a]Chi-square test

[b]Independent *t* test (Equal variance not assumed)

[c]Independent *t* test (Equal variance assumed)

[d]Higher score = increased difficulty

[e]Higher score = increased mental and emotional problems

[f]Higher score = more family and relative support

[g]Higher score = more musculoskeletal pain sites

Discussion

The current study revealed several important discoveries. First of all, multivariate results detected that life satisfaction was significantly and negatively related to musculoskeletal pain. This corroborates findings with previous studies where life satisfaction was significantly reduced due to musculoskeletal pain (Aboderin & Nanyonjo, 2017; Boonstra et al., 2013; Dong et al., 2020). According to studies on pain, the experience itself has negative impact on life satisfaction regardless of the origin of the pain or age group (McNamee & Mendolia, 2014; Silvemark et al., 2008; Stalnacke, 2011) and is commonly associated with adverse repercussions such as pain-related disability, distress, depression, sleep problems, mental and physical comorbidities, poor physical functioning, reduced cognitive performance, greater risk of falling and lower quality of life (Chen et al., 2011; Chou, 2007; Cimas et al., 2018; Denkinger et al., 2014; Dragioti et al., 2017; Eccleston et al., 2019; McNamee & Mendolia, 2014; Wang et al., 2018). In addition, musculoskeletal discomfort limits locomotion, self-care difficulties and physical inactivity, which also lead to social isolation and depression (Blyth & Noguchi, 2017; Keenan et al., 2006). This has greater impact on elderly where maintaining a good social relationship with friends; having easy access to health and economic services and not being isolated from the society and meaningful activities play substantial role in their life satisfaction. Furthermore, the present study also demonstrated that life satisfaction was significantly related to difficulty to perform daily activities, which could be due to musculoskeletal discomforts. In the same vein with previous study, participating in more daily physical activities induced pleasant affect, increase feelings of energy and reduces sense of fatigue (Maher et al., 2015). The elderly whom were more physically active also feel more competent and have sense of identity (Berg et al., 2006; Borg et al., 2006). Absence of social belonging would decrease the ability of a person to avoid negative effects (Simone & Haas, 2013) and subsequently affect their quality of life.

Table 2 Measurement model

Construct	Item	Item loadings	CITC	Alpha	Variance Extracted
Daily activities	DA1	0.42	0.66	0.895	11.7
	DA2	0.69	0.71		
	DA3	0.79	0.65		
	DA4	0.56	0.73		
	DA5	0.49	0.65		
	DA6	0.34	0.50		
	DA7	0.54	0.54		
	DA8	0.58	0.48		
	DA9	0.69	0.40		
	DA10	0.76	0.49		
	DA11	0.62	0.61		
	DA12	0.68	0.47		
	DA13	0.59	0.63		
	DA14	0.40	0.59		
	DA15	0.76	0.63		
Mental-Emotional	ME1	0.66	0.59	0.879	11.5
	ME2	0.53	0.46		
	ME3	0.57	0.51		
	ME4	0.32	0.34		
	ME5	0.68	0.62		
	ME6	0.66	0.59		
	ME7	0.48	0.42		
	ME8	0.56	0.50		
	ME9	0.57	0.51		
	ME10	0.74	0.67		
	ME11	0.76	0.68		
	ME12	0.72	0.65		
	ME13	0.75	0.68		
	ME14	0.59	0.50		
Family support	FRS1	0.58	0.46	0.78	6.8
	FRS2	0.80	0.65		
	FRS3	0.80	0.64		
	FRS4	0.56	0.42		
	FRS5	0.83	0.67		
	FRS6	0.81	0.68		
Musculoskeletal	MS1	0.64	0.58	0.904	13.3
	MS2	0.68	0.61		
	MS3	0.81	0.75		
	MS4	0.80	0.74		
	MS5	0.77	0.71		

Table 2 (continued)

Construct	Item	Item loadings	CITC	Alpha	Variance Extracted
	MS6	0.69	0.64		
	MS7	0.63	0.59		
	MS8	0.67	0.62		
	MS9	0.76	0.72		
	MS10	0.61	0.55		
	MS11	0.75	0.70		
	MS12	0.72	0.66		
Health status	-	0.38	-	-	6.0
Life satisfaction	-	0.31	-	-	6.9

Alpha Cronbach's alpha, *CITC* Corrected Item Total Correlation

Another important findings was that mental health and health status towards life satisfaction was significantly related. The relationship between psychological health and life satisfaction amongst aged population are well documented where adverse mental health can significantly affects the elderly's life satisfaction (Ghimire et al., 2018; Lombardo et al., 2018). Our elderly population remained satisfied with their living, despite small extend of mental and emotional problems, such as felt depressed and felt like crying, which corroborates with recent study in China where elderly Chinese population enjoyed higher evaluative well-being despite
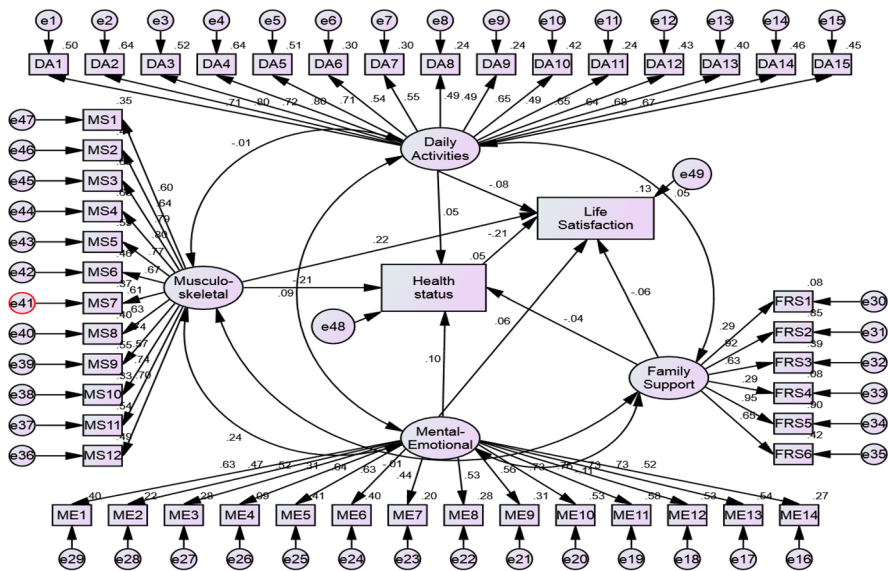
Fig. 1 Path regression estimates (standardized) of Structural Equation Model

Table 3 Path analysis results (standardized)

Paths	Path coefficient	P Values
Health status → Life satisfaction	-0.21	**< 0.001**
Family support → Life satisfaction	-0.06	0.140
Mental-Emotional → Life satisfaction	0.06	0.151
Daily activities → Life satisfaction	-0.09	**0.036**
Musculoskeletal → Life satisfaction	0.22	**< 0.001**
Musculoskeletal → Health status	-0.21	**< 0.001**
Mental-Emotional → Health status	0.10	**0.017**
Daily activities → Health status	0.05	0.253
Family support → Health status	-0.04	0.292

Bold p-values indicate statistical significance at 0.05 level

*p < 0.10; **p < 0.05; ***p < 0.01

experiencing depression (Ng et al., 2017). High level of life satisfaction in our elderly participants, perhaps, could be explained by the government's generous welfare support for the elderlies, such as free medical and health care services, heavily subsidised foods process, housing scheme and monthly BND$250 Old Age Pension allowance for every citizens once they reach aged of 60 (Attorney General & Chamber's, 2014). Moreover, the Brunei national philosophy: the Malay Islamic Monarchy (Melayu Islam Beraja (MIB)), could influenced our elderlies' perceived life satisfaction. This cultural-religious practices have been inculcated in the Bruneian way of life for generations (Talib, 2002). Every Muslims believed that being ill, suffering from disease and dying were part of life and a test set by God (Allah), thus embracing these hardships with patience, meditation and prayer was regarded as an act of faith (Rassool, 2000). This religious affiliation, therefore, provides barriers for our elderlies from the negative effects of mental or emotional issue, in concordance with study undertaken in Malaysia—a country with the same religion and almost identical cultural and ethnic setup—where religiosity was found to positively associated with older adults' life satisfaction (Achour et al., 2019). However, it could be argued that our elderlies' feeling of life satisfaction may not be sustainable throughout their life span. The WHO recognises that the older adults can be vulnerable for mental health disorders which negatively affects their overall health (World Health Organization. Mental health action plan, 2013). Therefore, continuous surveillance of psychological and emotional issues are warranted.

Finally, our univariate results demonstrated that family support played significant role in influencing the life satisfaction for our elderly population. Numerous studies have found that existing support from family is integral for life satisfaction among the older adults (Pan et al., 2019; Prakash & Srivastava, 2020; Şahin et al., 2019). Children and relatives form strong support structure for the Malays, and the Chinese community frequently sought support from friends and neighbours (Evans et al., 2018). Family institution in Brunei is an extended family orientation. Within this family, parents, children, grandparents, uncles and aunties commonly live together and assume roles and responsibilities towards helping and supporting each other's

needs (Chen et al., 2012). Furthermore, the fundamental features of MIB emphasise care for older adults which underpins the Islamic code of behaviours and the modesty of the Malay culture of Brunei (Evans et al., 2018). However, our multivariate results revealed that family support was no longer significant after accounting for other factors. One plausible explanation could be that our older adults eventually become less reliant on their family to continue living satisfactorily, perhaps, due to the growing necessity for them to live independently. Present family support for frail elderly and carers in Brunei has been declining and this downward trajectory could be attributed to increasing numbers of Bruneian who were married at later age, high proportions of female being singlehood and preferences for smaller family size (Ahmad, 2018). Furthermore, as elderly appears to be moving away from traditional family support system, and the availability and legalisation of residential home for elderly, such as nursing home in Brunei, we need to shift our discussion towards integration of community-based support and even technological-based support, as the way forward.

Limitations

The present study provided comprehensive picture of health domains and life satisfaction of a representative sample of older adults in Brunei. However, questionnaire-based study is prone to recall and reporting bias. Cross-sectional study would not capture trending and prospective issues. It is strongly encouraged that future researcher investigate this topic from multi-level perspective (individual, community and organisational) and include multi-sectorial public and private actors whose roles increasingly intersects with life of elderly population prospectively, to provide holistic view of older adults' life, continuous monitoring and rapid intervention effectively.

Conclusion

In conclusion, our findings showed that life satisfaction of elderly population in Brunei could be explained largely due to musculoskeletal pain, difficulty to perform daily activities, psychological and emotional issues, and family support. The present results contributes to ongoing multi-sectorial efforts to design a comprehensive model of care of older adults that provides accurate assessments, monitoring of health and life satisfaction, and rapid and effective intervention to achieve high quality of life.

Data Availability The datasets generated and/or analysed during the current study are not publicly available due to institutional data sharing clause but are available from the corresponding author on reasonable request.

Declarations

Conflict of Interest The authors declare no conflict of interest.

Informed Consent Written informed consent was obtained from participants prior to joining the study.

Ethical Treatment of Experimental Subjects (Animal and Human) Ethical approval was received from the University Research Ethics Committee (UREC), Universiti Brunei Darussalam (UBD/OAVCR/UREC/Apr18-04). All procedures followed ethical standards in accordance to the Declaration of Helsinki in 1964 and later versions (World Medical Association, 2013). The questionnaires used were accessible in the public domain and do not require any permission for use.

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