Original Article

Determinants of Health-Related Quality of Life Among Community Dwelling Elderly

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Abstract

Introduction: This study determines the associations between self-reported chronic conditions, limitations in activities of daily living and health-related quality of life (HRQoL) among community dwelling elderly in Singapore. Materials and Methods: A population-based cross-sectional survey was conducted among a random sample of 4200 residents from 58 blocks of dwellings in Marine Parade housing estate between April and May 2011. A structured questionnaire was used to collect data on demographic characteristics; chronic disease profile, health screenings, healthcare utilisation, physical activity, activities of daily living (ADL) and functional ability and health related quality of life. Quality of life was assessed using European Quality of life 5 Domain (EQ-5D). Ordinary least squares (OLS) regression was used to identify independent predictors of health related quality of life. Results: A total of 2454 respondents for included for analysis. Most of the respondents were females (57.2%) and aged between 65 and 74 years (48.5%). Among them, 79.1% of the respondents were Chinese. Approximately three-fourth (77.5%) of the survey respondents reported having at least one of the 13 chronic medical conditions; high blood pressure (57.7%), high blood cholesterol (51.6%), diabetes (22.9%) were the most commonly reported conditions. Independent predictors of HRQoL with greatest decrements in EQ-5D index and visual analog scores (VAS) were unemployment, self-reported depression, arthritis and osteoporosis and ADL limitations for activities such as "unable to shower", "unable to do housework" and elderly with depressive symptoms (GDS score ≥ 5). Conclusion: The study had identified predictors of HRQoL in elderly Singapore residents and also provides community-based EQ-5D index and VAS scores associated with a wide variety of chronic conditions and ADL limitations.

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Key words: Activities of daily living, Chronic conditions, EQ-5D, Health-related quality of life, elderly, Predictive factors, Singapore, Utility values

Introduction

Singapore is experiencing an unprecedented age shift as the post-war baby boomers turn 65 years in 2012. Currently there are 378,700 people aged 65 and above, and these numbers are estimated to go up to 600,000 by 2020.[1] These growing elderly population have multiple coexisting medical conditions which are often associated with functional decline, disability, higher hospital admissions[2] and emergency department attendances.[3] Health is the most important determinant of the elderly person's quality of life. It affects all other areas of their life, including their willingness to seek and accept help.[4] Hence, addressing elderly's healthcare needs is vital to improve their health-related quality of life (HRQoL).[5]

Clinicians, researchers, and policy makers are increasingly recognising the importance of measuring HRQoL in informing patient management, policy decisions[6] and resource allocation.[7] Health utilities (HU) are commonly used for assessing HRQoL in evaluation of healthcare interventions such as the cost-utility analyses (CUA).[8,9] In CUA, a utility score is assigned to the health state on the cardinal scale in which dead = 0 and perfect health = 1 which indicates respondent's preferences for different outcomes. This utility score is incorporated into quality-adjusted life-year (QALYs) which combines life expectancy and quality of life (HU) into a single index. The European quality of life scale (EQ-5D) is the frequently used HU instrument for calculating QALYs based on actual measurements of patients HRQoL.[10]

The EQ-5D instrument consists of a 5-item descriptive

system of health states and a visual analog scale (VAS). Scores for the 5 health states can be converted into a utility index score by using scores from value sets (preference weights) elicited from a general population. The best-known preference weights were derived from samples of the United Kingdom (UK).[11] These preference weights are applied to other populations when country-specific weights are not available with certain limitations.[12-15] Unfortunately, preference weights of EQ-5D for Singapore is not yet available, so applying other existing preference weight from UK was essential to obtain EQ-5D index values for Singapore. In this study, we report associations between self-reported chronic conditions, limitations in activities of daily living and health-related quality of life (HRQoL) in a community living elderly population in Singapore.

Materials and Methods

Study Design

The data used in this paper were derived from a larger cross-sectional survey carried out to assess health status, health and social care resource needs and utilisation profile of individuals aged 60 years and above in the Marine Parade housing estate of Singapore. The study sample size was calculated to estimate the proportion of functional disability in the community. Using an estimated proportion of 2% of older people who need support for at least one activity of daily living, an estimation error of 0.5%, and non-response rate of 40%, a sample size of 4200 older people were required.

A random sample of 4200 elderly residents from 58 housing development blocks (HDBs) in Marine Parade housing estate between April and May 2011 were surveyed. A team of trained interviewers administered the survey through face-to-face interviews with residents in their homes. Singapore Citizens or Permanent Residents aged 60 years and above living in 2- to 5-room housing in Marine Parade were included in the survey. The survey questionnaire elicited information on respondent's demographic characteristics; physical health (chronic disease profile, health screenings, healthcare utilisation, physical activity, 12-item activities of daily living (ADL),[16] Instrumental Activities of Daily Living (IADL)[17] and health related quality of life (Questionnaire - Appendix). Locally validated 15-item Geriatric Depression Scale (GDS-15)[18] and the Abbreviated Mental Test (AMT)[19] were used as screening tools for depressive symptoms and cognitive impairment. Health related quality of life was measured using EQ-5D. Validated Mandarin and Malay versions of EQ-5D was used for Chinese and Malay respondents respectively.[20-22] The questions in the survey were subjected to cognitive testing, and were translated and back-translated from English to Mandarin and Malay. Residents residing in institutions or who were out of the country during the period of data collection were excluded. Similarly, residents who refused to participate, and who were not contactable after 3 household visits were considered non-responders.

Statistical Analysis

All data are presented as means (SD) or as proportions (weighted). All estimates were weighted; sampling weights were incorporated into the analyses to adjust for planned oversampling of selected age groups to reflect the general Marine Parade population. Responses to the EQ-5D items were transformed into an EQ-5D index score using UK preference weights. Direct valuation of the respondent's current state of health was obtained from EQ-5D VAS. Associations between HRQoL and its potential determinants were examined by univariate analysis and then by ordinary least squares (OLS) regression model using the STATA SVY REGRESS procedure. This procedure enabled us to incorporate the sampling weights in the model. Nine socio-demographic co-variates (i.e. gender, ethnicity, education, work status, income, ownership status, housing status, self-reported chronic conditions and activities of daily living) were included in the model as categorical variables, except the continuous variable for age, GDS-15 and AMT scores. All 13 chronic conditions were defined by dummy variables and served as independent predictors in the models. For parsimony, no interaction terms were included in the models. All the responses coded as refused, unknown, or missing were treated as missing data. All analyses were conducted with the Stata Statistical Software, version 12.0 (Stata Corp., College Station, Texas). The findings were considered statistically significant at the 5% level ($P < 0.05$). Approval for this study was obtained from the Institutional Review Board of the National Healthcare Group, Singapore.

Results

A total of 3752 residents were eligible for inclusion in the study of which 2558 residents were interviewed, giving an overall response rate of 68.2%. Of these, only 2454 respondents were included in the analysis, after excluding 104 proxy responses. The socio-demographic characteristics of the survey respondents and estimates of EQ-5D index and VAS are summarised in Table 1. After applying sampling weights, the mean age of the sample was 69.2 years (SD = 6.9), with a maximum of 99 years. Mean EQ-5D index and VAS were 0.94 (SD 0.14) and 79.17 (SD 13.71) respectively. Of the sample, 48.5% were 65 to 74 years of age, 57.2% were females, 79.1% were Chinese, 36% had secondary education, 80% were flat owners, 34% lived in a 3 room HDB, 40% were retirees and 25.8% had an average monthly income of $500 to <$1000 SGD.

Table 1. Socio-demographic Characteristics and Estimates of EQ-5D Index and VAS

Variables	Categories	n = 2454 (%)*	EQ-5D index	EQ-5D VAS
			Mean ± SD	Mean ± SD
Age group (years)	60 – 64	810 (33.0)	0.95 ± 0.12	80.26 ± 13.04
	65 – 74	1189 (48.5)	0.94 ± 0.14	79.11 ± 13.90
	75 – 84	342 (13.9)	0.91 ± 0.15	78.57 ± 13.39
	85 and above	113 (4.6)	0.86 ± 0.17	73.65 ± 15.90
Gender	Male	1050 (42.8)	0.95 ± 0.13	79.17 ± 13.82
	Female	1404 (57.2)	0.93 ± 0.14	79.16 ± 13.63
Ethnic group	Chinese	1940 (79.1)	0.94 ± 0.13	79.15 ± 13.48
	Indian	114 (4.6)	0.88 ± 0.23	80.23 ± 15.47
	Malay	301 (12.3)	0.92 ± 0.16	78.22 ± 14.74
	Others	99 (4.0)	0.94 ± 0.10	81.13 ± 12.61
Education	Degree and Higher	96 (3.9)	0.94 ± 0.15	80.65 ± 10.75
	Diploma	148 (6.0)	0.95 ± 0.09	79.38 ± 12.01
	Junior College	168 (6.8)	0.96 ± 0.08	79.64 ± 12.07
	Secondary	887 (36.1)	0.95 ± 0.11	80.07 ± 13.20
	Primary	600 (24.4)	0.94 ± 0.14	78.99 ± 13.74
	No formal qualification	555 (22.6)	0.90 ± 0.18	77.45 ± 15.58
Ownership‡	Owner	1954 (79.6)	0.94 ± 0.12	79.39 ± 13.25
	Tenant	386 (15.7)	0.90 ± 0.19	78.75 ± 15.73
Housing type	1 and 2 rooms	394 (16.1)	0.90 ± 0.19	78.98 ± 15.82
	3 rooms	832 (33.9)	0.94 ± 0.13	78.72 ± 13.63
	4 rooms	613 (25.0)	0.94 ± 0.13	80.29 ± 13.18
	5 rooms	615 (25.1)	0.95 ± 0.11	78.76 ± 12.82
Work status	Full time	389 (15.9)	0.96 ± 0.09	81.13 ± 12.85
	Housewife	714 (29.1)	0.93 ± 0.14	78.52 ± 14.08
	Part-time	304 (12.4)	0.96 ± 0.10	81.63 ± 13.07
	Retiree	992 (40.4)	0.93 ± 0.15	78.52 ± 13.19
	Unemployed	55 (2.2)	0.80 ± 0.28	71.51 ± 21.12
Average monthly income†	<$500	627 (25.6)	0.91 ± 0.17	76.94 ± 15.58
	$500 to <$1000	633 (25.8)	0.94 ± 0.12	79.92 ± 13.35
	$1000 to <$2000	373 (15.2)	0.95 ± 0.10	80.06 ± 12.44
	$2000 to <$3000	112 (4.6)	0.97 ± 0.08	79.38 ± 11.07
	$3000 and above	96 (3.9)	0.97 ± 0.07	82.17 ± 10.69

SD: Standard deviation

*The percentages are adjusted by the population sampling weights from Marine Parade.

†Ownership – others (n = 114) not shown in the Table.

‡Income not available for 613 respondents.

Prevalence of Self-reported Chronic Conditions

About three-fourth (77.3%) of the sample reported having at least one chronic medical condition and 4.8% reported more than 5 chronic conditions (Table 2). After adjusting for over-sampling, the percentage of respondents reporting each condition are shown in Table 2. Among the chronic conditions reported by respondents, high blood pressure (57.7%), high blood cholesterol (51.7%), diabetes (22.9%), arthritis (16.6%), were the most commonly reported, followed by falls (13.9%), hearing problems (13.3%) and urinary incontinence (12.7%). There was a significant decrease in EQ-5D index and VAS scores with increasing chronic conditions. (Trend test for ordered groups, $P = 0.0001$) (Table 3).

Socio-demographics, Self-reported Chronic Conditions, Limitations in ADL and HRQoL

There was a significant positive correlation between ED-

Table 2. Health Status, Activities of Daily Living and Estimates of EQ-5D Index and VAS

Variables	Categories	n = 2454 (%)*	EQ-5D index Mean ± SD	EQ-5D VAS Mean ± SD
Self-reported chronic conditions†	Diabetes	560 (22.9)	0.97 ± 0.09	77.15 ± 14.82
	High blood pressure	1404 (57.7)	0.97 ± 0.08	77.75 ± 13.57
	High cholesterol	1267 (51.7)	0.97 ± 0.09	77.83 ± 13.86
	Heart attack	117 (4.9)	0.86 ± 0.21	74.19 ± 16.55
	Heart failure	60 (2.5)	0.88 ± 0.21	73.43 ± 15.81
	Chest pain	93 (3.9)	0.82 ± 0.27	72.32 ± 17.82
	Stroke	83 (3.5)	0.79 ± 0.25	70.30 ± 16.96
	Kidney disorders	61 (2.5)	0.81 ± 0.28	70.13 ± 16.47
	Asthma	102 (4.2)	0.94 ± 0.18	75.82 ± 13.97
	Dementia	7 (0.3)	0.90 ± 0.13	78.14 ± 19.97
	Depression	35 (1.4)	0.86 ± 0.11	67.97 ± 18.26
	Arthritis	406 (16.6)	0.94 ± 0.10	75.58 ± 14.92
	Osteoporosis	230 (9.6)	0.90 ± 0.16	74.45 ± 15.87
	History of falls	332 (13.9)	0.89 ± 0.19	75.50 ± 16.33
	Urinary Incontinence	309 (12.7)	0.92 ± 0.16	74.96 ± 15.20
	Hearing problem	314 (13.3)	0.93 ± 0.13	79.76 ± 13.36
Activities of daily living (ADL)	Unable to feed	9 (0.4)	0.43 ± 0.34	58.63 ± 21.33
	Unable to dress	31 (1.3)	0.52 ± 0.34	62.13 ± 15.52
	Unable to get out of bed / chair	46 (1.9)	0.59 ± 0.31	65.40 ± 18.37
	Unable to shower	47 (1.9)	0.59 ± 0.32	62.76 ± 14.97
	Unable to use the toilet	34 (1.4)	0.53 ± 0.31	61.88 ± 15.54
	Unable to use the telephone	40 (1.6)	0.66 ± 0.31	68.62 ± 17.56
	Unable to get to places within walking distance	177 (7.2)	0.73 ± 0.27	68.24 ± 16.54
	Unable to shop for groceries / clothes	180 (7.3)	0.74 ± 0.26	68.32 ± 16.10
	Unable to prepare meals	142 (5.8)	0.71 ± 0.29	68.08 ± 16.76
	Unable to do housework	230 (9.4)	0.77 ± 0.26	69.28 ± 15.67
	Unable to take his/her medicines	74 (3.0)	0.69 ± 0.31	66.77 ± 16.87
	Unable to handle his/her money	57 (2.3)	0.68 ± 0.31	69.24 ± 21.32
Geriatric depression scale (GDS-15)‡	Respondents with depressive symptoms (GDS-15 score ≥5)	188 (7.7)	0.75 ± 0.26	66.10 ± 15.33
	Respondents without depression symptoms (GDS-15 score ≤4)	2241 (91.3)	0.95 ± 0.11	80.28 ± 12.95
Cognitive impairment§	AMT score ≤7	168 (6.8)	0.82 ± 0.24	71.47 ± 14.27
	AMT score ≥8	2281 (92.9)	0.95 ± 0.12	79.76 ± 13.46

SD: Standard deviation

*The percentages are adjusted by the population sampling weights from Marine Parade.

†Only one chronic condition reported by 5 or more people is included in the Table.

AMT score§ and GDS-15‡ score are not available for 5 and 25 respondents respectively, hence their number would not add up to the total, n.

Table 3. Self-reported Chronic Conditions and EQ-5D Index and VAS Scores (n = 2454)

No of chronic diseases	Frequency n, %	Weighted, %	Cumulative, %	ED-5D index Mean ± SD	EQ-5D VAS Mean ± SD
0	564 (23.0)	22.7	23.0	0.97 ± 0.08	83.29 ± 12.36
1	543 (22.1)	22.1	45.1	0.96 ± 0.10	80.03 ± 12.61
2	615 (25.1)	25.2	70.2	0.94 ± 0.12	78.87 ± 13.21
3	445 (18.1)	18.1	88.3	0.91 ± 0.15	77.16 ± 13.92
4	171 (7.0)	7.1	95.3	0.85 ± 0.22	73.98 ± 16.01
5	78 (3.2)	3.2	98.5	0.87 ± 0.18	73.22 ± 13.67
6	8 (0.3)	1.2	99.6	0.76 ± 0.26	72.30 ± 18.53
7	14 (0.5)	0.3	99.9	0.63 ± 0.40	63.13 ± 25.77
≥8	3 (0.1)	0.1	100.0	0.64 ± 0.11	55.00 ± 7.07

Table 4. Regression Coefficients for Significant Predictors of the EQ-5D VAS and Index Score

Categories	EQ-5D VAS (R^2 = 0.12)		EQ-5D index (R^2 = 0.36)	
	UnS (b)	S(B)	UnS (b)	S(B)
Intercept	87.587†		0.976†	
Age	0.076	0.038	0.001†	0.053
Females	− 1.453*	− 0.052*	0.001	0.004
Indian	3.140*	0.048	− 0.042†	− 0.064
Work status : Unemployed	− 6.510†‡	− 0.070	− 0.098†‡	− 0.105
Income <$500	− 3.845*	− 0.122	− 0.023	− 0.073
Owner	0.395	0.012	− 0.032†	− 0.094
Tenant	− 2.963	− 0.079	− 0.063†‡	− 0.167
Housing : 4 rooms	− 5.610*‡	− 0.194	− 0.021	− 0.070
Housing: 1 – 2 rooms	− 6.217†‡	− 0.197	− 0.023	− 0.072
Self-reported Chronic Conditions				
Urinary incontinence	− 2.7892†	− 0.0654	− 0.0127	− 0.0304
Hearing problems	− 2.1323†	− 0.0523	− 0.0069	− 0.0173
Falls	− 1.7425	− 0.0431	− 0.0180*	− 0.0453
High blood pressure	− 1.7948†	− 0.0644	− 0.0112	− 0.0407
Chest pain	− 1.7148	− 0.0250	− 0.0493†	− 0.0733
Dementia	8.8467	0.0333	0.1452†	0.0557
Depression	− 6.6825*‡	− 0.0514	− 0.1425†‡	− 0.1116
Arthritis	− 3.1215†	− 0.0822	− 0.0436†	− 0.1169
Osteoporosis	− 2.7822*	− 0.0580	− 0.0511†	− 0.1085
Activities of Daily Living				
Unable to feed	− 8.1468	− 0.0307	− 0.1799†‡	− 0.0690
Unable to dress	− 7.6619	− 0.0575	− 0.1916†‡	− 0.1464
Unable to get out of bed/chair	11.8686†	0.1140	0.0124	0.0121
Unable to shower	− 9.2657*	− 0.0903	− 0.0637	− 0.0632
Unable to use the toilet	− 0.4442	− 0.0037	− 0.0944†	− 0.0806
Unable to use the telephone	9.1073†	0.0748	0.0208	0.0174
Unable to shop for groceries / clothes	− 0.4929	− 0.0092	− 0.0412*	− 0.0781
Unable to do housework	− 4.8532†‡	− 0.1023	0.0054	0.0117
Unable to handle his/her money	− 3.0912	− 0.0310	− 0.0647†	− 0.0660
Geriatric Depression Scale (GDS-15) score	− 0.1195†	− 0.0870	− 0.0007†	− 0.0552

*P <0.05, †P <0.01

UnS:Unstandardised coefficients; S:Standardised coefficients

‡Top 5 predictors associated with lower absolute EQ-5D index / VAS with largest coefficients

Reference category: Males, Chinese, Degree, working-full time, income SGD $3000 and above, ownership status others, housing status (5-room hdb), absence of the above stated chronic conditions and no limitations in the above ADLs.

5D index scores and the VAS score (Spearman correlation coefficient, r = 0.28, P = 0.0001). ED-5D index and VAS scores decreased significantly with increasing age, lower housing type, income and education.(Trend test for ordered groups, P = 0.0001). Females, respondents with lower educational qualification, tenants and unemployed respondents had lower EQ-5D and VAS scores. (KW test, P <0.001). (Table 1) Similarly respondents with depression and limitations in activities of daily living such as "feeding" had the lowest EQ-5D index and VAS scores compared to others. Respondents with cognitive impairment (AMT score ≤7) and those with depressive symptoms (GDS-15 score ≥ 15) had a significantly lower EQ-5D index and VAS scores. (KW test, P <0.001) (Table 2).

Predictors of the EQ-5D VAS and Index Score

We explored associations between chronic conditions, limitations in activities of daily living and HRQoL after statistically controlling for age, gender, ethnicity, education, work status, income, ownership status and housing status. The regression coefficients of EQ-5D and VAS models are presented in Table 4. The amount of variance explained by EQ-5D VAS and index were 13% and 36% respectively. Table 4 also presents the standardised regression coefficients which help us examine the magnitude of the association between independent variables and the dependent variable; the larger the coefficient, the greater the association.

The top 5 independent predictors associated with a lower absolute EQ-5D index were unemployment, house ownership, self-reported depression, limitations in activities of daily living such as feeding and dressing. Similarly, the top 5 independent predictors associated with larger coefficients for EQ-5D VAS were unemployment, respondents living in 4-room and 2-room HDB (Housing and Development Board) flat, self-reported depression and limitations in activities of daily living such as housework. Respondents who were unemployed, with income less than $500, with depression, arthritis, osteoporosis and higher GDS-15 scores were associated with substantially lower absolute EQ-5D index and VAS scores. Respondents with depression, arthritis and osteoporosis had more than a 2.5-point decrease in the EQ-5D index and more than a 0.4-point decrease in the EQ-5D VAS score. Females, unemployed, income <$500, elderly staying in 1 to 2 room and 4-room HDB flats, respondents with urinary incontinence, hearing problems, high blood pressure, depression, arthritis, elderly with limitations in activities of daily living such as "showering", "feeding" and "dressing" and "unable to do housework" and higher GDS-15 score had a significant negative association with EQ-5D VAS scores (Table 4). Increasing age, being unemployed, income <$500, owners, tenants, respondents with chest pain, dementia, depression,

arthritis, osteoarthritis, respondents who were unable to feed, dress, use the toilet, to shop for groceries, handle money and respondents with higher GDS-15 scores had significant negative association with EQ-5D index scores (Table 4).

Discussion

This is the first study to report HRQoL and its association between self-reported chronic conditions and limitations in activities of daily living among the community dwelling elderly in Singapore. In our study, about 3 out 4 (77%) elderly respondents had at least one chronic condition. High blood pressure, high blood cholesterol, diabetes, arthritis were the most commonly reported conditions. The self-reported prevalence of high blood pressure, arthritis, falls and urinary incontinence were lower while the high blood cholesterol, diabetes and hearing problems were marginally higher than previous reports from a National Health Surveillance Survey.[23] Our study sample was not nationally representative. In addition, self-reported health underestimates true disease prevalence in older populations.[24,25] Hence, the observed self-reported estimates of chronic conditions were lower than national estimates.

HRQoL decreased with age and number of chronic diseases. It was also lower for females than males. Elderly without employment, with no education and lower income (<$500 per month) had the lowest scores, similar to studies elsewhere.[26-28] Elderly with self-reported depression and limitations in activities of daily living such as feeding, toileting and dressing had the lowest HRQoL. Similarly, HRQoL was significantly lower for elderly with depressive symptoms (GDS-15 score ≥5) and those with cognitive impairment (AMT score ≤ 7). In our study, Indians had poor HRQoL when compared to the other ethnic groups. Chan et al,[29] reported gender and ethnic differences in self-reported health, older women and Indians had poorer health. In a study done by Wee HL[30] on HRQoL among patients with diabetes mellitus using SF-6D, Indians with DM were found to have lower HRQoL than the other ethnic groups. Findings from our study and literature confirm that ethnic difference does exist in HRQol. Independent predictors of HRQoL with greatest decrements in EQ-5D index and VAS scores were unemployment, self-reported depression, arthritis and osteoporosis and ADL limitations for activities such as "unable to shower", "unable to do housework" and elderly with depressive symptoms (GDS score ≥ 5). Similar results were observed elsewhere.[31-34]

HRQoL measured by EQ-5D index score estimated using preference weights from UK population correlated well with VAS scores which were direct measurement of respondent's self-rated health, similar findings were observed by Luo Nan et al.[35] In our study, the HRQoL model explained only

13% of the variance in EQ-5D VAS and explained 36% of the variance in the EQ-5D index using UK preference weights. In a recent study, Luo Nan et al found that Chinese and English speaking Singaporeans respond differently to the EQ-5D VAS. In our study we used Mandarin and Malay versions of EQ-5D for Chinese and Malays.[35] Among the ethnic groups, HRQoL model explained 13% and 19% of the variance in EQ-5D VAS in Chinese and Malays respectively. However, for Indians, 44% of the variation in EQ-5D VAS was explained by the model. Previous studies have shown that non-English versions of EQ-VAS (especially Chinese version) were not sensitive for self-assessment of health in the Singaporean population.[35] Hence, use of non-English version of EQ-5D VAS in this population needs further investigation.

The study had few methodological limitations. First, EQ-5D preference weights for Singapore are not available yet, hence we used the UK preference weights for estimating EQ-5D index values for Singapore. Second, chronic conditions were self-reported. As such it is unknown if the chronic conditions reported were actually diagnosed by a physician. Third, the causal relationship between self-reported chronic conditions, activities of daily living and HRQoL cannot be determined due to the cross-sectional nature of the data.

Limitations not withstanding, this study provides crucial information on the predictors of HRQol among community dwelling elderly in Singapore. This information would aid planning active aging interventions to improve the health related quality of life of the country's rapidly aging population. Cost-effectiveness analyses of treatment options are often underpinned by decision analytic models. These models typically assess the benefits of treatment options in terms of the QALY gain associated with avoiding a clinical event or alleviating a particular health condition. Consequently, in addition to the utility values associated with the event or health condition, analysts also need the utility values associated with not experiencing the event or the health condition, i.e. the baseline or counterfactual values. For example, in patients with a history of cardiovascular disease (CVD), an intervention may have the potential to avoid a stroke. To model the benefits of avoiding a stroke, the analyst would ideally require a mean utility value from a cohort of patients who have recently experienced a stroke (plus follow-up data) and a mean utility value from a cohort who have not experienced a stroke but do have a history of CVD. Another example would be a screening programme for hearing impairment. In this instance, analysts would need the mean utility value from a cohort with hearing impairment (plus follow-up data to capture potential changes in HRQoL over time) and a mean utility value from a cohort without a history of hearing impairment. Our study provides utility estimates for self-reported chronic conditions and

for respondents with ADL limitations, these values could be used for the calculation of quality-adjusted life years (QALYs) for cost-effectiveness analysis.

Conclusion

Singapore is countering ageing by rolling out several active aging initiatives to enhance the quality of life of elderly. At this juncture, this study has identified significant predictors of HRQoL in elderly Singapore residents, which are potential targets for active aging interventions. The study also provides community-based EQ-5D index and VAS scores associated with a wide variety of chronic conditions and ADL limitations, these can be used to estimate quality-adjusted life-years in cost-effectiveness analyses.

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