

Original Research Article**Self-rated health of institutionalized elderly in Kuala Lumpur****Abstract**

Aims: There is a growing number of institutionalized elderly in Malaysia. This group of elderly are commonly not included in population based surveys, thus little is known about their health and well-being. This study aims to determine the self-rated health of the elderly living in institutions and the associated factors.

Methodology: This cross-sectional study was conducted in 2014, in eight elderly institutions in Kuala Lumpur. The institutions were selected randomly, and the participants were selected through stratified proportionate sampling. A total of 203 residents participated in this study. Chi-square test was used of univariable analysis and binary logistic regression was used for multivariate analysis. *P*value less than 0.05 were considered statistically significant.

Results: The prevalence of poor self-rated health was 39.9%, while 60.1% had good self-rated health. Factors significantly associated with self-rated health included educational level, physical activity, outdoor leisure activity, visual impairment, chronic pain, diabetes, heart disease, renal failure, fall, hospitalization, co-morbidities, and satisfaction with access to healthcare.

Conclusion: This study revealed a high prevalence of poor self-rated health among residents in these institutions. Factors significantly associated with self-rated health were mostly co-morbidities. There is need for interventions targeted at improving healthcare services and leisure activities for residents of these institutions.

Key words: Elderly, Kuala Lumpur, Self-rated health, Institutionalized, Malaysia

1. Introduction

In most nations of the world, the population of people aged 60 years and above is increasing rapidly than the other age groups. Thus ageing has become a global phenomenon, with an

27 estimated population of two billion elderly in 2050 [1]. Asia is forecasted to become one of
28 the oldest geographical regions of the world with an elderly population of one billion half
29 way through the 21st century [1]. In Malaysia, the population of the elderly was 2.4 million
30 (8.2%) in 2012. This is further anticipated to increase exponentially, and by 2030 the country
31 will become an ageing nation with the elderly population constituting about 15% of the entire
32 population [2].

33 This gradual demographic shift in Malaysia has resulted to a rise in the prevalence of non-
34 communicable diseases (NCDs), as well as other profound consequences on various social,
35 economic and political processes [1]. Aging can bring about a gradual deterioration of not
36 only physical and mental health, but also a reduction in social participation and increased
37 dependence [3, 4]. Thus the elderly usually require special care than the younger age groups,
38 and as a result, there has been a growing interest in the wellbeing of the elderly.

39 Self-rated health (SRH) has become a well know indicator for general health. Among the
40 elderly, it is a vital predictor of survival [5]. It is a subjective measurement of health,
41 denoting an individual's perception of their general health, and encompassing the biological,
42 mental, social and functional aspects of health [6]. The subjective nature of SRH implies that
43 it can be influenced by the norms and expectations that people (individuals, groups and
44 societies) have about health, as well as cultural factors, and as a result may not reflect
45 objective health status [7]. However, subjective ratings of general health have been reported
46 to be a good predictor of objective health status [8]. Rohrer et al. [9] reported that SRH is a
47 central patient-oriented outcome, and an essential outcome indicator in primary care. SRH is
48 also an important disease risk screening tool [10]. Evidence from previous studies have
49 linked SRH to diseases, disability, functional decline, future health, demographics, rate of
50 aging, and mortality [6, 11, 12, 13, 14]

51 Studies on SRH have focused more on developed countries. Due to the recognition of the
52 importance of assessing SRH in developing countries, researchers are beginning to evaluate it
53 in Asia and other developing parts of the world. Debpuur et al. [15] in a study among elderly
54 residents of Kassena-Nankana District in Ghana found an association between SRH and
55 gender, household wealth and functional ability. A study conducted in Thailand [16] reported
56 psychosocial symptoms, chronic diseases, and functional status as the most significant
57 factors associated with SRH. Another study conducted in Singapore [17] found out that
58 socioeconomic variables as well as health behaviors are significantly associated with SRH.
59 Despite this growing research on SRH in Asia, it remains under researched in Malaysia [18].
60 The few studies conducted in Malaysia have only targeted community dwelling elderly and
61 focused mainly on the association between socio-demographic variables and SRH. There is
62 therefore the need to assess the SRH of elderly living in institutions because they are usually
63 not included in population based surveys. Furthermore, a paramount environmental factor in
64 the life of an elderly is the place of residence. It determines access to health care, and other
65 social norms. Place of residence has the capacity to affect health and perception of health.
66 This implies that the health and perception of health of elderly in institutions would differ
67 from those living in communities. Therefore it is imperative to determine the general health
68 of this group of elderly who not only live in these institutions, but mostly depend on them to
69 provide the needed care. Knowledge of this would guide the planning and delivery of health
70 interventions aimed at improving the overall health and wellbeing of this population. This
71 study aims to determine the SRH of institutionalized elderly in Malaysia, and also determine
72 factors associated with it.

73 **2. Materials and methods**

74 2.1 Study population

75 This study was conducted in elderly institutions in Kuala Lumpur, Malaysia. These
76 institutions are elderly homes managed by non-governmental and non-profit organizations.
77 The homes are managed mostly in a similar manner. They do not provide nursing services,
78 thus they mostly accept people who are self-manageable. They depend mostly on charitable
79 donations from the public which could be in the form of cash donations, services, clothing,
80 and food. The residents in these homes share certain common characteristics; they were either
81 abandoned in hospitals within the capital or they were poor and unable to pay for a home.
82 They are transferred to these homes by the hospitals, some are taken to the homes by friends,
83 relatives, neighbors, and in some cases by the department of social welfare Malaysia.

84 2.2 Sampling and data collection

85 This cross-sectional study was carried out in eight institutions in Kuala Lumpur, Malaysia.
86 The research data was collected in September through November 2014. Eight homes were
87 selected by simple random sampling. Following this, stratified proportionate sampling was
88 used to select the participants, using each home as a strata. A total of 203 residents
89 participated in this study. Those excluded in this study were residents aged less than 60 years,
90 residents unable to understand Chinese, Malay or English, residents who did not give written
91 consent and those that had cognitive impairment. Information on cognitive impairment was
92 obtained from the files of residents. Participants in each home were selected randomly using
93 a sampling frame of eligible participants of each home. All those selected participated in the
94 study. Data collection was by face interview and it was conducted by trained research
95 assistants. Detailed information about the study methodology, including sample size
96 calculation and the services and facilities in these institutions have been reported in a
97 previous study by Onunkwor et al. [19].

98 2.3 Outcome variable

99 SRH was determined by asking participants whether they perceived their general health as
100 excellent, good, fair, or poor. This variable was dichotomized to good (excellent and good)
101 and poor (fair and poor) for the purpose of analysis. Previous studies [6, 15] have evaluated
102 SRH similarly. The question on SRH was asked first before questions on other health
103 conditions.

104 2.4 Independent variables

105 The socio-demographic variables in this study included age, gender, ethnicity, marital status
106 (married, unmarried, separated, widowed, divorced) educational level (tertiary, secondary,
107 primary, no education), pension, economic status (poor, intermediate, good), and previous
108 employment sector (unemployed, self-employed, government sector, private sector). Other
109 variables included physical activity, hospitalization, falls, outdoor-leisure activity,
110 accommodation type (twin-sharing, ward-type), duration of residence in the home,
111 satisfaction with conditions of living place, satisfaction with healthcare access and chronic
112 co-morbidities. For the purpose of data analysis some variables were dichotomized; age was
113 categorized into 60-69 years and 70 years and over, marital status was grouped into married
114 and single (single included unmarried, separated and widowed, divorced), economic status
115 was grouped into good and poor (poor and intermediate), educational level was grouped into
116 none/primary and secondary/tertiary education, satisfaction with condition of living place
117 was grouped into satisfied (very satisfied and satisfied) and dissatisfied (very dissatisfied,
118 dissatisfied and neither satisfied nor dissatisfied), satisfaction with access to healthcare was
119 also grouped into satisfied (very satisfied and satisfied) and dissatisfied (very dissatisfied,
120 dissatisfied and neither satisfied nor dissatisfied). Data on pension was obtained by asking
121 participants whether they received pension or not. Data on economic status was obtained by
122 asking participants whether they perceived their present economic status as good,
123 intermediate or poor. Physical activity in this study was defined as weekly performance of

124 not less than 75 minutes of high-intensity exercise or 150 minutes of moderate-intensity
125 exercise [30]. Data on hospitalization was obtained by asking participants if they had been
126 hospitalized in the last six months. Regarding history of falls, participants were asked if they
127 had experienced falls in the past six months. Leisure activities that occurred outside the
128 elderly home not less than two times a month, which could include trips to recreational parks,
129 movie theatre among others was defined as outdoor leisure activity, with the exception of
130 hospital visits. For accommodation type, twin sharing accommodation housed two people in a
131 room while ward-type accommodation housed over two people in a room. Data on
132 satisfaction with condition of living place and satisfaction with access to health services was
133 obtained similarly by asking residents whether they were very satisfied, satisfied, neither
134 satisfied nor dissatisfied, dissatisfied or very dissatisfied with the condition of their living
135 place and access to health care. Data on chronic diseases was obtained through self-report of
136 previous diagnosis by a doctor or healthcare professional. Reported co-morbidities included;
137 stroke, heart disease, renal failure, hearing impairment, visual impairment, chronic pain,
138 diabetes and hypertension. For chronic pain, participants were asked if they have had any
139 persistent pain for over six months. “Co-morbidities yes” represent participants who reported
140 at least one chronic co-morbidity while “co-morbidity no” represent participants that did not
141 report a co-morbidity. Data was collected through face to face interview in Chinese, Malay
142 and English languages, using trained speakers of each language. Before the commencement
143 of the actual study, a pilot study was carried out.

144 2.5 Ethical approval and consent to participate

145 This research was approved by the International Medical University Joint-Committee on
146 Research and Ethics in August 2014. Prior to the commencement of the study, the
147 management of each elderly home gave permission for the study to be conducted in the

148 homes. The purpose of the study was clearly explained to all participants and each participant
149 signed a written consent sheet.

150 2.6 Statistical analysis

151
152 Data was analyzed using Statistical Package for Social Sciences (version 20.0) for windows.
153 Categorical variables were expressed as proportions and frequencies. Chi-square test was
154 used for univariable analysis while binary logistic regression was used for multivariable
155 analysis. Results of the analysis were expressed as odds ratios (OR) and 95% confidence
156 interval (CI) of the OR. The OR represents odds of having poor SRH. From the univariable
157 analysis, only statistically significant variables with p-value less than 0.05 were included in
158 the multivariable analysis. The variables were all included at the same time in one model for
159 the multivariable analysis. The independent variables included in the multivariable analysis
160 were; educational level, physical activity, outdoor leisure activity, visual impairment, chronic
161 pain, diabetes, heart disease, renal failure, fall, stroke, hospitalization, co-morbidities, and
162 satisfaction with access to healthcare. The dependent variable was SRH. Also in the multiple
163 logistic regression analysis only variables with p-value less than 0.05 were considered
164 statistically significant. Multicollinearity was checked for.

165 3. Results

166 The minimum age for this study was 60 years and the maximum was 95 years. The average
167 age was 71.5 (± 6.8). Table 1 shows some of the characteristics of the participants. Over half
168 of the participants were females (64.5%). Only 13.3% of the participants attained tertiary
169 level of education, 46.8% had secondary level of education, 22.2% had primary level of
170 education, and 17.7% had no formal education. Thirty-six percent (36%) were satisfied with
171 the conditions of their living place, and 45.8% had resided in an elderly home for two years
172 or more. Only 13.3% of the participants rated their health as excellent. Majority (46.8%) had

173 good SRH while 30% and 9.9% had fair and poor SRH respectively. After dichotomizing
 174 SRH, 60.1% had good SRH (excellent and good), while 39.9% had poor SRH (fair and poor).

175 **Table 1: Characteristics of participants**

Variable	Groups	Excellent N (%)	Good N (%)	Fair N (%)	Poor N (%)	Total N (%)
Age	60-69 years	15 (16)	42 (44.7)	28 (29.8)	9 (9.6)	94 (46.3)
	≥ 70 years	12 (11)	53 (48.6)	33 (30.3)	11 (10.1)	109 (53.7)
Gender	Female	6 (8.3)	33 (45.8)	25 (34.7)	8 (11.1)	72 (35.5)
	Male	21 (16)	62 (47.3)	36 (27.5)	12 (9.2)	131 (64.5)
Ethnicity	India	5 (29.4)	9 (52.9)	1 (5.9)	2 (11.8)	17 (8.4)
	Malay	0 (0)	4 (66.7)	1 (16.7)	1 (16.7)	6 (3.0)
	Chinese	21 (11.9)	81 (45.8)	58 (32.8)	17 (9.6)	177 (87.2)
	Others	1 (33.3)	1 (33.3)	1 (33.3)	0 (0)	3 (1.5)
Marital status	Unmarried	11 (16.9)	27 (41.5)	21 (32.3)	6 (9.2)	65 (32.2)
	Married	14 (11.2)	65 (52)	34 (27.2)	12 (9.6)	125 (61.6)
	Widowed	0 (0)	2 (50)	1 (25)	1 (25)	4 (2)
	Separated	0 (0)	0 (0)	4 (80)	1 (20)	5 (2.5)
	Divorced	2 (50)	1 (25)	1 (25)	0 (0)	4 (2.0)
Educational level	Tertiary	3 (11.1)	10 (37)	12 (44.4)	2 (7.4)	27 (13.3)
	Secondary	12 (12.6)	49 (51.6)	27 (28.4)	7 (7.4)	95 (46.8)
	Primary	6 (13.3)	25 (55.6)	10 (22.2)	4 (8.9)	45 (22.2)
	None	6 (16.7)	11 (30.6)	12 (33.3)	7 (19.4)	36 (17.7)
Previous employment sector	Unemployed	2 (33.3)	2 (33.3)	2 (33.3)	0 (0)	6 (3.0)
	Self	8 (13.3)	25 (41.7)	20 (33.3)	7 (11.7)	60 (29.6)
	Private	12 (9.7)	64 (51.6)	37 (29.8)	11 (8.9)	124 (61.1)
	Government	5 (38.5)	4 (30.8)	2 (15.4)	2 (15.4)	13 (6.4)

176

177

178 **Table 1: Characteristics of participants cont.**

Variable	Groups	Excellent N (%)	Good N (%)	Fair N (%)	Poor N (%)	Total N (%)
Pension	Yes	5 (26.3)	8 (42.1)	3 (15.8)	3 (15.8)	19 (9.4)
	No	22 (12)	87 (47.3)	58 (31.5)	17 (9.2)	184 (90.6)
Economic status	Good	1 (7.7)	4 (30.8)	6 (46.2)	2 (15.4)	13 (6.4)
	Intermediate	3 (17.6)	7 (41.2)	7 (41.2)	0 (0)	17 (8.4)
	Poor	23 (13.3)	84 (48.6)	48 (27.7)	18 (10.4)	173 (85.2)
Accommodation type	Twin-sharing	1 (5)	16 (80)	3 (15)	0 (0)	20 (9.9)
	Ward-type	26 (14.2)	79 (43.2)	58 (31.7)	20 (10.9)	183 (90.1)
Duration of residence	< 2 years	14 (12.7)	52 (47.3)	31 (28.2)	13 (11.8)	110 (54.2)
	≥ 2 years	13 (48.1)	43 (46.2)	30 (32.3)	7 (7.5)	93 (45.8)
Outdoor leisure activity	Yes	23 (14.5)	80 (50.3)	42 (26.4)	14 (8.8)	159 (78.3)
	No	4 (9.1)	15 (34.1)	19 (43.2)	6 (13.6)	44 (21.7)
Physical activity	Yes	16 (25)	31 (48.4)	11 (17.2)	6 (9.4)	64 (31.5)
	No	11 (7.9)	64 (46)	50 (36)	14 (10.1)	139 (68.5)
Satisfaction with conditions of living place	Satisfied	8 (11)	38 (52.1)	18 (24.7)	9 (12.3)	73 (36)
	Dissatisfied	19 (14.6)	57 (43.8)	43 (33.1)	11 (8.5)	130 (64.0)

179

180 Table 2 showing the medical history of the participants indicates that 45.3% had
181 hypertension, 8.4% had history of stroke, 6.9% had history of heart disease, 3.9% had history
182 of renal failure, 16.7% had hearing impairment, 32% had visual impairment, 48.8% had
183 chronic pain, 30% had diabetes, and 14.3% had history of falls. Only 17.2% of the
184 participants reported no chronic co-morbidity, 12.8% reported one chronic co-morbidity,

185 20.7% reported two, and 49.3% reported three or more chronic co-morbidity. Only 23.6% of
 186 the participants were hospitalized in the past three months. Majority of the participants
 187 (76.8%) were dissatisfied with access to healthcare.

188 **Table 2: Medical history of participants**

Variable	Groups	Excellent N (%)	Good N (%)	Fair N (%)	Poor N (%)	Total N (%)
Stroke	Yes	1 (5.9)	5 (29.4)	6 (35.3)	5 (29.4)	17 (8.4)
	No	26 (14)	90 (48.4)	55 (29.6)	15 (8.1)	186 (91.6)
Heart disease	Yes	1 (7.1)	3 (21.4)	8 (57.1)	2 (14.3)	14 (6.9)
	No	26 (13.8)	92 (48.7)	53 (28)	18 (9.5)	189 (93.1)
Renal failure	Yes	0 (0)	1 (12.5)	6 (75)	1 (12.5)	8 (3.9)
	No	27 (13.8)	94 (48.2)	55 (28.2)	19 (9.7)	195 (96.1)
Hearing impairment	Yes	2 (5.9)	17 (50)	11 (32.4)	4 (11.8)	34 (16.7)
	No	25 (14.8)	78 (46.2)	50 (29.6)	16 (9.5)	169 (83.3)
Visual impairment	Yes	3 (4.6)	29 (44.6)	24 (36.9)	9 (13.8)	65 (32.)
	No	24 (17.4)	66 (47.8)	37 (26.8)	11 (8)	138 (68)
Chronic pain	Yes	8 (8.1)	41 (41.4)	40 (40.4)	10 (10.1)	99 (48.8)
	No	19 (18.3)	54 (51.9)	21 (20.2)	10 (9.6)	104 (51.2)
Diabetes	Yes	3 (4.9)	27 (44.3)	24 (39.3)	7 (11.5)	61 (30)
	No	24 (16.9)	68 (47.9)	37 (26.1)	13 (9.2)	142 (70)
Falls	Yes	1 (3.4)	10 (34.5)	13 (44.8)	5 (17.2)	29 (14.3)
	No	26 (14.9)	85 (48.9)	48 (27.6)	15 (8.6)	174 (85.7)
Hypertension	Yes	12 (13)	40 (43.5)	30 (32.6)	10 (10.9)	92 (45.3)
	No	15 (13.5)	55 (46.8)	31 (27.9)	10 (9.0)	111 (54.7)

189 **Table 2: Medical history of participants cont.**

Variable	Groups	Excellent	Good	Fair	Poor	Total
co-morbidities	Yes	17 (10.1)	77 (45.8)	56 (33.3)	18 (10.7)	168 (82.8)
	No	10 (28.6)	18 (51.4)	5 (14.3)	2 (5.7)	35 (17.2)
Satisfaction with access to healthcare	Satisfied	10 (21.3)	26 (55.3)	8 (17)	3 (6.4)	47 (23.2)
	Dissatisfied	17 (10.9)	69 (44.2)	53 (34)	17 (10.9)	156 (76.8)
Hospitalization	Yes	0 (0)	15 (31.3)	25 (52.1)	8 (16.7)	48 (23.6)
	No	27 (17.4)	80 (51.6)	36 (23.2)	12 (7.7)	155 (76.4)

190

191 3.1 Factors associated with SRH in Univariable analysis

192 Table 3 shows the Univariable analysis. Educational level was significantly associated with
193 SRH, those with no education or primary education were two times more likely to have poor
194 SRH compared to those with secondary or tertiary education (OR= 2.1, 95%CI= 1.18-3.74,
195 $P= .01$). Those who were physical activity were significantly less likely to have poor SRH
196 (OR= 0.4, 95% CI= 0.22-0.81, $P= 0.008$). Those who engaged in outdoor leisure activity
197 were less likely to have poor SRH, and this association was significant (OR= 0.4, 95% CI=
198 0.21-0.82, $P= 0.01$). Among the chronic co-morbidities, there was a significant association
199 between SRH and stroke (OR=3.0, 95% CI= 1.08-8.57, $P= 0.03$), visual impairment (OR=
200 1.9, 95% CI= 1.06-3.52, $P= 0.03$), chronic pain (OR= 2.4, 95% CI= 1.35-4.27, $P= 0.003$),
201 diabetes (OR= 1.9, 95% CI= 1.03-3.49, $P= 0.04$), heart disease (OR= 4.2, 95% CI= 1.25-
202 13.74, $P= 0.01$), renal failure (OR= 11.5, 95% CI= 1.38-94.89, $P= 0.005$). Those that had one
203 or more chronic co-morbidity were three times more likely to have poor SRH compared to
204 those without chronic co-morbidity, and this association was statistically significant (OR=

205 3.2, 95% CI= 1.30-7.61, $P= 0.008$). Those satisfied with access to healthcare were less likely
 206 to have poor SRH compared to those dissatisfied, and this association was statistically
 207 significant (OR= 0.3, 95% CI= 0.17-0.79, $P= 0.008$). Falls (OR= 2.8, 95% CI= 1.28-6.48, $P=$
 208 0.008), and recent history of hospitalization (OR= 4.9, 95% CI= 2.43-9.86, $P= 0.001$) were
 209 significantly associated with SRH.

210 **Table 3: Factors associated with SRH in univariable analysis**

Variable	Poor SRH N (%)	Good SRH N (%)	OR	95% CI of OR	P-value
Age					
60-69 years	37 (39.4)	57 (60.6)	0.9	0.55-1.69	0.88
≥ 70 years	44 (40.4)	65 (59.6)			
Gender					
Female	33 (45.8)	39 (54.2)	1.5	0.82-2.62	0.20
Male	48 (36.6)	83 (63.4)			
Marital status					
Single	35 (44.9)	43 (55.1)	1.4	0.78-2.48	0.25
Married	46 (36.8)	79 (63.2)			
Educational level					
None/primary	41 (50.6)	40 (49.4)	2.1	1.18-3.74	0.01
Secondary/tertiary	40 (32.8)	82 (67.2)			
Economic status					
Poor	73 (38.4)	117 (61.6)	0.4	0.12-1.23	0.1
Good	8 (61.5)	5 (38.5)			
Pension					
Yes	6 (31.6)	13 (68.4)	0.7	0.24-1.84	0.43
No	75 (40.8)	109 (59.2)			
Physical activity					
Yes	17 (26.6)	47 (73.4)	0.4	0.22-0.81	0.008
No	64 (46.0)	75 (54.0)			
Outdoor leisure activity					
Yes	56 (35.2)	103 (64.8)			

No	25 (56.8)	19 (43.2)	0.4	0.21-0.82	0.01
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212 **Table 3: Factors associated with SRH in univariable analysis cont.**

Variable	Poor SRH N (%)	Good SRH N (%)	OR	95% CI	P-value
Duration of residence					
< 2 years	44 (40.4)	66 (60.0)	1.0	0.57-1.77	0.97
≥ 2 years	37 (39.8)	56 (60.2)			
Satisfaction with conditions of living place					
Satisfied	27 (37.0)	46 (63.0)	0.8	0.46-1.48	0.52
Dissatisfied	54 (41.5)	76 (58.5)			
Hypertension					
Yes	40 (43.5)	52 (56.5)	1.3	0.74-2.31	0.34
No	41 (36.9)	70 (63.1)			
Hearing impairment					
Yes	15 (44.1)	19 (55.9)	1.2	0.58-2.59	0.58
No	66 (39.1)	103 (60.9)			
Visual impairment					
Yes	33 (50.8)	32 (49.2)	1.9	1.06-3.52	0.03
No	48 (34.8)	90 (65.2)			
Chronic pain					
Yes	50 (50.5)	49 (49.5)	2.4	1.35-4.27	0.003
No	31 (29.8)	73 (70.2)			
Diabetes					
Yes	31 (50.8)	30 (49.2)	1.9	1.03-3.49	0.03
No	50 (35.2)	92 (64.8)			
Renal failure					
Yes	7 (87.5)	1 (12.5)	11.5	1.38-94.89	0.005
No	74 (37.9)	121 (62.1)			

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214

215 **Table 3: Factors associated with SRH in univariable analysis cont.**

Variable	Poor SRH N (%)	Good SRH N (%)	OR	95% CI	P-value
Fall					
Yes	18 (62.1)	11 (37.9)	2.9	1.28-6.48	0.008
No	63 (36.2)	111 (63.8)			
Stroke					
Yes	11 (64.7)	6 (35.3)	3.0	1.08-8.57	0.02
No	70 (37.6)	116 (62.4)			
Satisfaction with access to healthcare					
Satisfied	11 (23.4)	36 (76.6)	0.3	0.17-0.79	0.008
Dissatisfied	70 (44.9)	86 (55.1)			
Hospitalization					
Yes	33 (68.8)	15 (31.3)	4.9	2.43-9.86	0.0001
No	48 (31.0)	107 (69.0)			
Heart disease					
Yes	10 (71.4)	4 (28.6)	4.2	1.25-13.74	0.013
No	71 (37.6)	118 (62.4)			
Chronic comorbidities					
Yes	74 (44.0)	94 (56.0)	3.2	1.30-7.61	0.008
No	7 (20.0)	28 (80.0)			

216 OR (Odds ratio) represents the odds of having poor SRH and 95%CI represents the 95% confidence interval of
 217 the OR

218 **3.2 Factors associated with SRH in multivariable analysis**

219 The multivariable analysis is shown in table 4. From the univariable analysis, the statistically
 220 significant variables were all included at the same time in one model for the multivariable
 221 analysis. The variables in table 4 are the statistically significant variables from the
 222 multivariable analysis. The total sample size (N) included in this model was 203. Those with
 223 chronic pain were twice more likely to have poor SRH compared to those without chronic
 224 pain (OR= 2.2, 95% CI= 1.15-4.31, P= 0.01). Those with heart disease were four times more

225 likely to have poor SRH compared to those without heart disease (OR= 4.7, 95% CI= 1.33-
 226 17.27, $P= 0.02$). Those with renal failure were thirteen times more likely to have poor SRH
 227 compared to those without renal failure (OR= 13.9, 95% CI= 1.56-124.07, $P= 0.01$). Those
 228 with history of fall were twice more likely to have poor SRH (OR= 2.6, 95% CI= 1.09-6.56,
 229 $P= 0.03$). Those with history of hospitalization were four times more likely to have poor SRH
 230 (OR= 4.1, 95% CI= 1.94-8.78, $P= 0.0001$). Those satisfied with access to healthcare were
 231 less likely to have poor SRH (OR= 0.3, 95% CI= 0.15-0.86, $P= 0.02$). These associations
 232 were statistically significant.

233 **Table 4: Factors associated with SRH in multivariable analysis**

Variable	OR	95% CI	P-value
Chronic pain (Yes)	2.2	1.15-4.31	0.01
Heart disease (Yes)	4.7	1.33-17.27	0.02
Renal failure (Yes)	13.9	1.56-124.07	0.01
Fall (Yes)	2.6	1.09-6.56	0.03
Hospitalization (Yes)	4.1	1.94-8.78	<0.0001
Satisfaction with access to healthcare (satisfied)	0.3	0.15-0.86	0.02

234 Binary logistic regression was used for data analysis, N=203, the reference group was “no” for the first five
 235 variables and “dissatisfaction” was the reference group for the last variable. OR (Odds ratio) represents the odds
 236 of having poor SRH and 95%CI is the 95% confidence interval of the odds ratio

237 **4. Discussion**

238 The prevalence of good SRH in this study was 60.1% while 39.9% had poor SRH. The
 239 prevalence of poor SRH is considerable higher in this study compared to that reported in a
 240 study by Chan et al. [18] among community dwelling adults in Malaysia (20.1%). A possible
 241 reason for the difference could be because the study by Chan et al. [18] was conducted
 242 among adults eighteen years and above while the present study was conducted among older
 243 adults 60 years and above. Older adults are more susceptible to chronic diseases which could

244 have a negative impact on health and perception of health. Another possible reason could be
245 because the residents in these homes had poor access to healthcare. They mostly depend on
246 medical volunteers to provide health services. These medical volunteers visit intermittently,
247 and their activities are mostly limited to physical examination. The difference in prevalence
248 rates between both studies could also be attributed to the variances in the wording of the
249 response categories of the outcome variable. It has been reported that SRH scales using
250 different measures are not directly comparable [20], thus comparing such scales should be
251 done with caution. On the other hand, the prevalence of poor SRH in this study is
252 comparable to that reported in a study by Damian et al. [21] which reported a 45% prevalence
253 of poor SRH among institutionalized elderly people in Spain.

254 4.1 Sociodemographic variables and SRH

255 Age was not significantly associated with SRH in this study, however those aged 60-69 years
256 were less likely to have poor SRH compared to those aged 70 years or more. The odds of
257 developing chronic diseases increases with age thus health usually deteriorates with age, and
258 this could impact perception of general health. Previous studies have also reported poorer
259 health status among older age groups when compared to younger groups [22, 23]. Gender was
260 not significantly associated with SRH in this study although women were more likely to have
261 poor SRH compared to men. Previous studies [24, 25] have reported poorer SRH among
262 women when compared to men. This gender differences in SRH has been attributed to higher
263 prevalence rates of chronic diseases and other mental disorders such as depression and
264 anxiety among women when compared to men. There was no association between economic
265 status and SRH in this study. Previous studies [26, 27] have reported an association between
266 economic status and SRH. A good economic status could improve access to healthcare,
267 reduce the incidence and prevalence of diseases, and even mortality. Although some residents
268 perceived their economic status as good, they were still incapable of meeting most of their

269 health needs. As a result of this, they were mostly dependent on the elderly homes and the
270 medical volunteers to provide the needed medical services. Educational level was
271 significantly associated with SRH. Those with no education or primary education were
272 twice more likely to have poor SRH compared to those with secondary/tertiary level of
273 education. This is because of the positive impact of higher educational level on health. Higher
274 educational level has been linked to healthy behaviors [28], better coping strategies and
275 mental resilience [29]. Therefore it is possible that the residents in these homes with higher
276 educational level are better informed about healthy behaviours and ways they could improve
277 their health. Ocampo-Chaparro et al. [6] in a study in Colombia and Chan et al. [18] in a
278 study in Malaysia reported a similar relationship between education and SRH. Physical
279 activity was significantly associated with SRH in this study. Previous studies [30, 31] have
280 also found an association between physical activity and SRH. The benefits of physical
281 activity among the elderly includes reduced risk of cardiovascular diseases, diabetes, cancers,
282 risk of falling, functional limitations, improved cardiorespiratory and muscular fitness,
283 cognitive function, bone health among others [32]. Outdoor leisure activity was significantly
284 associated with SRH. Those that participated in outdoor leisure activities were less likely to
285 have poor SRH compared to those that did not. This is probable because those that were able
286 to participate in outdoor leisure activities had more opportunities to interact with people
287 outside the home and in a friendlier environment. This could improve psychological feelings.
288 A study by Ryan et al. [33] reported that outdoor activities can bring about increased energy
289 and sense of vitality, which can lead to increased resilience to physical and mental illness. It
290 is also important to note that participation in outdoor leisure activity and physical activity
291 may be directly hampered by poor health

292 4.2 Health conditions and SRH

293 History of falls was significantly associated with SRH in this study. Falls could be
294 deleterious. It could lead to injuries (fractures, and brain injuries) and hospitalization. It also
295 leads to “Post-fall Syndrome”, a condition characterized by depression, restriction in routine
296 activities, dependence, and confusion [34]. In the absence of proper medical care those that
297 experience falls are likely going to suffer some of these consequences associated with falls
298 and this could affect their general health. A study by Confortin et al. [35] also reported better
299 SRH among participants without history of falls. The authors attributed the poor SRH among
300 participants with history of falls to loss of autonomy, dependence on others for activities of
301 daily living, and feelings of insecurity and low self-esteem which occurs as a result of falls.
302 Those with visual impairment were more likely to have poor SRH, and this association was
303 statistically significant. This is perhaps because visual impairment can limit participation in
304 certain activities such as exercises, trips to movie theatres or even trips to the recreational
305 park. Visual impairment can also increase risk of falls, and dependence in certain activities of
306 daily living. Previous studies [36, 37] have also found a significant association between
307 visual impairment and SRH. Wang et al. [36] in his study in Australia linked visual
308 impairment to greater independence in activities of daily living, increased loneliness and
309 hospitalization. Hypertension was not significantly associated with SRH in this study. This
310 could be because residents perceive hypertension to be a condition that is naturally associated
311 with aging rather than a serious medical condition, thus when they compare themselves with
312 people with other health conditions they consider severe, they are likely to perceive their
313 health as good. A study by Rahman et al. [38] conducted in eight Asian countries including
314 Malaysia reported a lack of urgency in the control of hypertension among participants due to
315 the perception of the disease. A study by Ocampo-Chaparro et al. [6] also found an
316 insignificant association between SRH and hypertension. In contrast, other studies [18, 27]
317 have reported a significant association between hypertension and SRH. This study reported

318 an association between some health conditions and SRH. Chronic pain, heart disease, renal
319 failure, stroke, and diabetes were significantly associated with SRH. Renal failure was one of
320 the most significant predictors of poor SRH. Previous studies [18, 27, 39, 40, 41] have also
321 found a significant association between SRH and chronic conditions such as heart diseases,
322 renal failure, diabetes, chronic pain and stroke. This is because people with chronic diseases
323 suffer physically and mentally. They experience pain, discomfort, physical limitations which
324 could lead to increased dependence and social isolation, anxiety, depression and stress.
325 Chronic diseases could also lead to adjustment of lifestyle and life aspirations. Studies have
326 also shown that chronic diseases negatively affect quality of life [42, 43]. Those that had
327 recent history of hospitalization were four times more likely to have poor SRH and this
328 association was statistically significant. This is perhaps because those with recent history of
329 hospitalization had a co-morbidity which negatively affects their general health. For some of
330 the residents that were previously abandoned in hospitals, returning to such environment
331 could trigger negative feelings and cause distress. Confortin et al. [35] reported a link
332 between hospitalization and SRH in a study in Brazil.

333 Satisfaction with access to healthcare was significantly associated with SRH in this study.
334 Those satisfied with access to healthcare were less likely to have poor SRH. This could be
335 because those dissatisfied with access to healthcare have a co-morbidity or some other health
336 conditions and are not getting the desired medical care. In contrast, those satisfied with access
337 to health care could be free of any severe medical condition thus would be content with the
338 physical examination provided by medical volunteers that visit these homes occasionally.
339 Goins et al. [44] in a study conducted in USA reported an association between SRH and
340 access to healthcare.

341 This study provides an insight into the health status of elderly in these institutions. The
342 findings of this study show residents in these institutions have poor access to health care, and

343 comparatively poorer health when compared to the general populace. Poor access to
344 healthcare will invariably lead to increased chronic diseases morbidity and mortality. This
345 emphasis the need for proper management of chronic diseases, improved healthcare and
346 welfare services for residents in these institutions. There is need for policy makers to step in
347 and incorporate residents of these homes in holistic interventions targeted at improving their
348 health and wellbeing. The interventions should strive to improve access to healthcare and
349 should also include health education programs to teach and improve healthy behavior. This
350 could provide an opportunity for the residents to know more about their health, improve
351 practice of preventive medicine, prevent deterioration of health and unnecessary
352 hospitalization. Credit must be given to the medical volunteers and the administrators of these
353 homes who endeavor to provide as much medical care as they can.

354 The limitations of this study include the study design, which is cross-sectional in which the
355 causal relationship between the variables cannot be established. In addition, dichotomizing
356 SRH did not provide information about individual differences between the different response
357 categories. The study only included institutions in Kuala Lumpur and as a result of this, the
358 findings may not reflect the situation in the entire country. Future research should include a
359 representative sample from the whole country. Longitudinal studies will better clarify the
360 direction of association between SRH and the associated factors. In addition future studies
361 should clinically examine residents to determine the true prevalence of chronic diseases.

362 **Conclusion**

363 This study revealed a high prevalence of poor SRH among residents of these institutions.
364 Among the socio-demographic variables, only educational level was significantly associate
365 with SRH. Physical activity, outdoor-leisure activity, chronic diseases, chronic pain, and
366 dissatisfaction with access to healthcare were all significantly associated with SRH. These
367 findings highlight the impact of co-morbidities on the general health of residents in these

368 institutions. There is a need for improved health access to meet some of the needs of these
369 residents.

370 **References**

- 371 1. United Nations Department of Economic and Social Affairs, Population Division.
372 World Population Ageing 2013.
- 373 2. Zawawi R. Active ageing in Malaysia. The second meeting of the committee on
374 international cooperation on active ageing. Malaysia 2013.
- 375 3. World Health Organization. Mental health and older adults. Available from
376 <http://www.who.int/mediacentre/factsheets/fs381/en/>. 2017.
- 377 4. American Psychological Association. Older adults' health and age-related changes.
378 Available from <http://www.apa.org/pi/aging/resources/guides/older.aspx>. 2017
- 379 5. Burstrom B, Fredlun P. Self-rated health: Is it as good a predictor of subsequent
380 mortality among adults in lower as well as in higher social classes? *Journal of*
381 *Epidemiology & Community Health*. 2001; 55(11), 836-840.
- 382 6. Ocampo-Caparro. Self-rated health: Importance of use in elderly adults. *Colombia*
383 *Medica*. 2010; 41(3), 275-289.
- 384 7. Van Ginneken JK, Groenewold G. A Single vs. Multi-Item Self-Rated Health Status
385 Measure: A 21-Country Study. *The Open Public Health Journal*. 2012; 5(1):1-9.
386
- 387 8. Meng Q, Xie Z, Zhang T. A Single-Item Self-Rated Health Measure Correlates with
388 Objective Health Status in the Elderly: A Survey in Suburban Beijing. *Frontiers in*
389 *Public Health*. 2014.
- 390
- 391 9. Rohrer JE, Arif A, Denison A, Young R, Adamson S. Overall self-rated health as an
392 outcome indicator in primary care. *Journal of Evaluation of Clinical Practice*. 2007;
393 13:882-888.

- 394 10. May M, Lawlor DA, Brindle, Patel R, Ebrahim S. Cardiovascular disease risk
395 assessment in older women: can we improve on Framingham? British Women's Heart
396 and Health prospective cohort study. *Heart*. 2006; 92:1396-1401.
- 397 11. Jylhä M, Guralnik JM, Balfour J, Fried LP. Walking difficulty, walking speed, and
398 age as predictors of self-rated health. *The Journals of Gerontology Series A:
399 Biological Sciences and Medical Sciences*. 2001; 56:M609-M617.
- 400 12. Lee Y. The predictive value of self-assessed general, physical, and mental health on
401 functional decline and mortality in older adults. *Journal of Epidemiology and
402 Community Health*. 2000; 54:123-129.
- 403 13. Wilcox VL, Kasl SV, Idler EL. Self-rated health and physical disability in elderly
404 survivors of a major medical event. *Journal of Gerontology Series B: Psychological
405 Sciences and Social Sciences*. 1996; 51B:S96-S104.
- 406 14. Idler L, Kasl S. Self-ratings of health: Do they also predict change in functional
407 ability? *Journal of Gerontology Series B: Psychological Sciences and Social Sciences*.
408 1995; 50B:S344-S353.
- 409 15. Debpuur C, Welaga P, Wak G, Hodgson A. Self-reported health and functional
410 limitations among older people in the Kassena-Nankana District, Ghana. *Global
411 Health Action Supplement*. 2010; 2, 54-63.
- 412 16. Haseen F, Adhikari R, Soonthorndhada K. Self-assessed health among Thai elderly.
413 *BMC Geriatrics*. 2010; 10:30.
- 414 17. Lim W, Ma S, Heng D, Bhalla V, Chew SK. Gender, ethnicity, health behaviour &
415 self-rated health in Singapore. *BMC Public Health*. 2007; 7:184.
- 416 18. Chan Y, Teh C, Lim K, Lim KH, Yeo PS, Kee CC. et al. Lifestyle, chronic diseases
417 and self-rated health among Malaysian adults: results from the 2011 National Health
418 and Morbidity Survey (NHMS). *BMC Public Health*. 2015; 15(1).

- 419 19. Onunkwor O, Al-Dubai S, George P, Arokiasamy J, Yadav H, Barua A, et al. A cross-
420 sectional study on quality of life among the elderly in non-governmental
421 organizations' elderly homes in Kuala Lumpur. *Health and Quality of Life Outcomes*.
422 2016; 14(1).
- 423 20. Jurges H, Avendano M Mackenbach JP. Are different measures of self-rated health
424 comparable? An assessment in five European Countries. *European Journal of*
425 *Epidemiology*. 2008; 23:773-781.
- 426
- 427 21. Damián J, Pastor-Barriuso R, Valderrama-Gama E. Factors associated with self-rated
428 health in older people living in institutions. *BMC Geriatrics*. 2008; 8(1):5.
- 429 22. Shi J, Liu M, Zhang Q, Lu M, Quan H. Male and Female Adult Population Health
430 Status in China: A Cross-Sectional National Survey. *BMC Public Health*. 2008;
431 8(1):277.
- 432 23. Zimmer Z. Poverty, wealth inequality and health among older adults in rural
433 Cambodia. *Social Science & Medicine*. 2008; 66(1):57-71.
- 434 24. Ahmad K, Jafar, T, Chaturvedi N. Self-rated health in Pakistan: results of a national
435 health survey. *BMC Public Health*. 2005; 5:51.
- 436 25. Arnadottir S, Gunnarsdottir E, Stenlund H, Lundin-Olsson L. Determinants of self-
437 rated health in old age: A population-based, cross-sectional study using the
438 International Classification of Functioning. *BMC Public Health*. 2011; 11(1):670.
- 439 26. Haron S, Sharpe D, Masud J, Abdel-Ghany M. Health Divide: Economic and
440 Demographic Factors Associated with Self-Reported Health Among Older
441 Malaysians. *Journal of Family and Economic Issues*. 2010; 31(3):328-337.
- 442 27. Rathnayake S, and Siop S. Self-rated health and its determinants among older people
443 living in the rural community in Sri Lanka. *Journal of Nursing and Health Science*.
444 2015; 4(6): 39-45.

- 445 28. Van-Oort F, van-Lenthe F, Mackenbach J. Cooccurrence of lifestyle riskfactors and
446 the explanation of education inequalities in mortality: results from the GLOBE study.
447 Preventive Medicine. 2004; 39(6):1126-34.
- 448 29. Christensen U, Schmidt L, Kriegbaum M, Hougaard C, Holstein B. Coping with
449 Unemployment: Does educational attainment make any difference? Scandinavian
450 Journal of Public Health. 2006; 34:363-70.
- 451 30. Rosenkranz R, Duncan M, Rosenkranz S, Kolt G. Active lifestyles related to excellent
452 self-rated health and quality of life: cross sectional findings from 194,545 participants
453 in the 45 and up study. BMC Public Health. 2013; 13:1071.
- 454 31. Sodergren M, Sundquist J, Johansson S, Sundquist K. Physical activity, exercise and
455 self-rated health: a population-based study from Sweden. BMC Public Health. 2008;
456 8:352.
- 457 32. World Health Organization. Physical activity and older adults. Available from
458 http://www.who.int/dietphysicalactivity/factsheet_olderadults/en/. 2014.
- 459 33. Ryan R, Weinstein N, Bernstein J, Grown K, Mistretta L, Gagne M. Vitalizing effects
460 of being outdoors and in nature. Journal of Environmental Psychology. 2010;
461 30(2):159-168
- 462 34. World Health Organization. WHO Global Report on Falls Prevention in Older Age.
463 2007
- 464 35. Confortin S, Giehl M, Antes D, Schneider IJ, D'Orsi E. Positive self-rated health in
465 the elderly: a population-based study in South of Brazil. Cad. SaudePublica. 2015;
466 31(15), 1-11.
- 467 36. Wang J, Mitechell P, Smith W. Vision and low self-rated health: the Blue Mountains
468 eye study. Investigative Ophthalmology and Visual science. 2000; 41(1), 45-54.

- 469 37. Jacobs J, Hammerman-Rozenberg R, Maaravi Y, Cohen A, Stessman J. The impact of
470 visual impairment on health, function and mortality. *Aging Clinical and Experimental*
471 *Research*. 2005; 17(4), 281-286.
- 472 38. Rahman A, Wang J, Kwong G, Morales D, Sritara P, Sukmawan R. Perception of
473 hypertension management by patients and doctors in Asia: potential to improve blood
474 pressure control. *Asia Pacific Family Medicine*. 2015; 14(1).
- 475 39. Molarius A, Janson S. Self-rated health, chronic diseases, and symptoms among
476 middle-aged and elderly men and women. *Journal of Clinical Epidemiology*. 2002;
477 55(4), 364-370.
- 478 40. Mavaddat N, Van Der Linde R, Parker R, Sawa G, Linmonth A, Brayne C. et al.
479 Relationship of Self-Rated Health to Stroke Incidence and Mortality in Older
480 Individuals with and without a History of Stroke: A Longitudinal Study of the MRC
481 Cognitive Function and Ageing (CFAS) Population. *PLOS ONE*. 2016 11(2).
- 482 41. Mäntyselkä P. Chronic Pain and Poor Self-rated Health. *JAMA*. 2003; 290(18).
- 483 42. Tsai S, Chi L, Lee L, Chou P. Health related quality of life among urban, rural, and
484 island community elderly in Taiwan, *Journal of Formosan Medical Association*
485 *Taiwan*. 2004; 103 (3), 196-204.
- 486 43. Centre for Disease control and Prevention. *Chronic diseases; Notes and reports*. 2003;
487 16(1).
- 488 44. Goins R, Hays J, Landerman L, Hobbs G. Access to Health Care and Self-Rated
489 Health Among Community-Dwelling Older Adults. *Journal of Applied Gerontology*.
490 2011; 20(3):307-321.