



## Self-rated Health of Institutionalized Elderly in Kuala Lumpur

Obinna, Francis, Onunkwor<sup>1\*</sup>, Sami, Abdo Radman, Al-Dubai<sup>2</sup>,  
John, Arokiasamy<sup>1</sup>, Hassana, Ojonuba, Shuaibu<sup>1</sup>, Philip, Parikial, George<sup>1</sup>  
and Lwin, Mie, Aye<sup>1</sup>

<sup>1</sup>Department of Community Medicine, International Medical University (IMU), Kuala Lumpur, Malaysia.

<sup>2</sup>Saudi Board Community Medicine Program, Ministry of Health, Al-Madina, Saudi Arabia.

### Authors' contributions

This work was carried out in collaboration between all authors. Author OFO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SARAD, JA and PPG supervised and managed the analysis of the study. Authors HOS and LMA managed the literature searches and interpretation of findings. All authors read and approved the final manuscript.

### Article Information

DOI: 10.9734/BJMMR/2017/33515

Editor(s):

(1) Thomas I. Nathaniel, University of South Carolina, School of Medicine-Greenville, Greenville, USA.

Reviewers:

(1) Ibtissam Sabbah, Lebanese University, Lebanon.

(2) Yu Koyama, Niigata University Graduate School of Health Sciences, Japan.

(3) Deepak Sharma, Government Medical College & Hospital, India.

Complete Peer review History: <http://www.sciencedomain.org/review-history/19050>

Original Research Article

Received 18<sup>th</sup> April 2017  
Accepted 8<sup>th</sup> May 2017  
Published 13<sup>th</sup> May 2017

### 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 for univariate 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%. Factors significantly associated with

\*Corresponding author: E-mail: [obieonunkwor@yahoo.com](mailto:obieonunkwor@yahoo.com);

self-rated health included educational level (OR=2.1, 95%CI=1.18-3.74), physical activity (OR=0.4, 95%CI=0.22-0.81) outdoor leisure activity (OR=0.4, 95%CI= 0.21-0.82), visual impairment (OR=1.9, 95%CI= 1.06-3.52), chronic pain (OR= 2.4, 95%CI=1.35-4.27), diabetes (OR=1.9, 95%CI=1.03-3.49) heart disease (OR=4.2, 95%CI=1.25-13.74), renal failure (OR=11.5, 95%CI= 1.38-94.89), fall (OR=2.9, 95%CI= 1.28-6.48) hospitalization (OR=4.9, 95%CI= 2.43-9.86) co-morbidities (OR=3.2, 95%CI=1.30-761), and satisfaction with access to healthcare (OR=0.3 95%CI= 0.17-0.79).

**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.

*Keywords: 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 compared to the other age groups. Thus ageing has become a global phenomenon, with an estimated population of two billion elderly in 2050 [1]. Asia is forecasted to become one of the oldest geographical regions of the world with an elderly population of one billion half way through the 21<sup>st</sup> century [1]. In Malaysia, the population of the elderly was 2.4 million (8.2%) in 2012. This is further anticipated to increase exponentially, and by 2030 the country will become an ageing nation with the elderly population constituting about 15% of the entire population [2].

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

Self-rated health (SRH) has become a well know indicator for general health. Among the elderly, it is a vital predictor of survival [5]. It is a subjective measurement of health, denoting an individual's perception of their general health, and encompassing the biological, mental, social and functional aspects of health [6]. The subjective nature of SRH implies that it can be influenced by the norms and expectations that people (individuals, groups and societies) have about health, as well as cultural factors, and as a result may not reflect objective health status [7].

However, subjective ratings of general health have been reported to be a good predictor of objective health status [8]. Rohrer et al. [9] reported that SRH is a central patient-oriented outcome, and an essential outcome indicator in primary care. SRH is also an important disease risk screening tool [10]. Evidence from previous studies have linked SRH to diseases, disability, functional decline, future health, demographics, rate of aging, and mortality [6,11,12,13,14].

Studies on SRH have focused more on developed countries. Due to the recognition of the importance of assessing SRH in developing countries, researchers are beginning to evaluate it in Asia and other developing parts of the world. Debpuur et al. [15] in a study among elderly residents of Kassena-Nankana District in Ghana found an association between SRH and gender, household wealth and functional ability. A study conducted in Thailand [16] reported psychosocial symptoms, chronic diseases, and functional status as the most significant factors associated with SRH. Another study conducted in Singapore [17] found out that socioeconomic variables as well as health behaviors are significantly associated with SRH. Despite this growing research on SRH in Asia, it remains under researched in Malaysia [18]. The few studies conducted in Malaysia have only targeted community dwelling elderly and focused mainly on the association between socio-demographic variables and SRH. There is therefore the need to assess the SRH of elderly living in institutions because they are usually not included in population based surveys. Furthermore, a paramount environmental factor in the life of an elderly is the place of residence. It determines access to health care, and other social norms. Place of residence has the capacity to affect health and perception of health. This implies that the health and perception of health of elderly in

institutions would differ from those living in communities. Therefore it is imperative to determine the general health of this group of elderly who not only live in these institutions, but mostly depend on them to provide the needed care. Knowledge of this would guide the planning and delivery of health interventions aimed at improving the overall health and wellbeing of this population. This study aims to determine the SRH of institutionalized elderly in Malaysia, and also determine factors associated with it.

## **2. MATERIALS AND METHODS**

### **2.1 Study Population**

This study was conducted in elderly institutions in Kuala Lumpur, Malaysia. These institutions are elderly homes managed by non-governmental and non-profit organizations. The homes are managed mostly in a similar manner. They do not provide nursing services, thus they mostly accept people who are self-manageable. They depend mostly on charitable donations from the public which could be in the form of cash donations, services, clothing, and food. The residents in these homes share certain common characteristics; they were either abandoned in hospitals within the capital or they were poor and unable to pay for a home. They are transferred to these homes by the hospitals, some are taken to the homes by friends, relatives, neighbors, and in some cases by the department of social welfare Malaysia. Health services are mostly provided by medical volunteers free of cost. These medical volunteers visit intermittently, and their activities are mostly limited to physical examination.

### **2.2 Sampling and Data Collection**

This cross-sectional study was carried out in eight institutions in Kuala Lumpur, Malaysia. The research data was collected in September through November 2014. Using a sampling frame of thirteen elderly homes, eight homes were selected by simple random sampling. About 420 elderly resided in the selected homes. Following this, stratified proportionate sampling was used to select the participants, using each home as a strata. A total of 203 residents participated in this study. Those excluded in this study were residents aged less than 60 years, residents unable to understand Chinese, Malay or English, residents who did not give written consent and those that had cognitive impairment. Information on cognitive impairment was obtained from the files of residents. Participants in each home were selected randomly using a sampling frame of

eligible participants of each home. All those selected participated in the study. Data collection was by face interview and it was conducted by trained research assistants. Detailed information about the study methodology, including sample size calculation and the services and facilities in these institutions have been reported in a previous study by Onunkwor et al. [19].

### **2.3 Outcome Variable**

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

### **2.4 Independent Variables**

The socio-demographic variables in this study included age, gender, ethnicity, marital status (married, unmarried, separated, widowed, divorced) educational level (primary education refers to completion of 5-6 years of basic education, secondary education refers to completion of 5-7 years of junior and senior secondary education, tertiary education refers to completion of post-secondary education leading to conferment of an academic degree or professional certification), pension, economic status (poor, intermediate, good), and previous employment sector (unemployed, self-employed, government sector, private sector). Other variables included physical activity, hospitalization, falls, outdoor-leisure activity, accommodation type (twin-sharing, ward-type), duration of residence in the home, satisfaction with conditions of living place, satisfaction with healthcare access and chronic co-morbidities. For the purpose of data analysis some variables were dichotomized; age was categorized into 60-69 years and 70 years and over, marital status was grouped into married and single (single included unmarried, separated and widowed, divorced), economic status was grouped into good and poor (poor and intermediate), educational level was grouped into none/primary and secondary/tertiary education, satisfaction with condition of living place was grouped into satisfied (very satisfied and satisfied) and dissatisfied (very dissatisfied, dissatisfied and neither satisfied nor dissatisfied), satisfaction with access to healthcare was also grouped into satisfied (very satisfied and satisfied) and

dissatisfied (very dissatisfied, dissatisfied and neither satisfied nor dissatisfied). Data on pension was obtained by asking participants whether they received pension or not. Data on economic status was obtained by asking participants whether they perceived their present economic status as good, intermediate or poor. Adequate Physical activity in this study was defined as weekly performance of not less than 75 minutes of high-intensity exercise or 150 minutes of moderate-intensity exercise [20]. Data on hospitalization was obtained by asking participants if they had been hospitalized in the last six months. Regarding history of falls, participants were asked if they had experienced falls in the past six months. Leisure activities that occurred outside the elderly home not less than two times a month, which could include trips to recreational parks, movie theatre among others was defined as outdoor leisure activity, with the exception of hospital visits. For accommodation type, twin sharing accommodation housed two people in a room while ward-type accommodation housed over two people in a room. Data on satisfaction with condition of living place and satisfaction with access to health services was obtained similarly by asking residents whether they were very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied or very dissatisfied with the condition of their living place and access to health care. Data on chronic diseases was obtained through self-report of previous diagnosis by a doctor or healthcare professional. Reported co-morbidities included; stroke, heart disease, renal failure, hearing impairment, visual impairment, chronic pain, diabetes and hypertension. For chronic pain, participants were asked if they have had any persistent pain for over six months [21]. "Co-morbidities yes" represent participants who reported at least one chronic co-morbidity while "co-morbidity no" represent participants that did not report a co-morbidity. Data was collected through face to face interview in Chinese, Malay and English languages, using trained speakers of each language. Before the commencement of the actual study, a pilot study was carried out.

### **2.5 Ethical Approval and Consent to Participate**

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

the study was clearly explained to all participants and each participant signed a written consent sheet.

### **2.6 Statistical Analysis**

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

## **3. RESULTS**

The minimum age for this study was 60 years and the maximum was 95 years. The average age was 71.5 ( $\pm 6.8$ ). Table 1 shows some of the characteristics of the participants. Over half of the participants were females (64.5%). Only 13.3% of the participants attained tertiary level of education, 46.8% had secondary level of education, 22.2% had primary level of education, and 17.7% had no formal education. Thirty-six percent (36%) were satisfied with the conditions of their living place, and 45.8% had resided in an elderly home for two years or more. Only 13.3% of the participants rated their health as excellent. Majority (46.8%) had good SRH while 30% and 9.9% had fair and poor SRH respectively. After dichotomizing SRH, 60.1% had good SRH (excellent and good), while 39.9% had poor SRH (fair and poor).

Table 2 showing the medical history of the participants indicates that 45.3% had hypertension, 8.4% had history of stroke, 6.9% had history of heart disease, 3.9% had history of renal failure, 16.7% had hearing impairment,

32% had visual impairment, 48.8% had chronic pain, 30% had diabetes, and 14.3% had history of falls. Only 17.2% of the participants reported no chronic co-morbidity, 12.8% reported one chronic co-morbidity, 20.7% reported two, and 49.3% reported three or more chronic co-morbidity. Only 23.6% of the participants were hospitalized in the past three months. Majority of the participants (76.8%) were dissatisfied with access to healthcare.

### 3.1 Factors Associated with SRH in Univariate Analysis

Table 3 shows the Univariate analysis. Educational level was significantly associated with SRH, those with no education or primary education were two times more likely to have poor SRH compared to those with secondary or tertiary education (OR= 2.1, 95%CI= 1.18-3.74, P= .01). Those who had adequate physical

**Table 1. Characteristics of participants**

| Variable                   | Groups      | Excellent<br>N (%) | Good<br>N (%) | Fair<br>N (%) | Poor<br>N (%) | Total<br>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)       |

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

| Variable                                     | Groups       | Excellent<br>N (%) | Good<br>N (%) | Fair<br>N (%) | Poor<br>N (%) | Total<br>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)     |

activity were significantly less likely to have poor SRH (OR= 0.4, 95% CI= 0.22-0.81, *P*= 0.008). Those who engaged in outdoor leisure activity were less likely to have poor SRH, and this association was significant (OR= 0.4, 95% CI= 0.21-0.82, *P*= 0.01). Among the chronic co-morbidities, there was a significant association between SRH and stroke (OR=3.0, 95% CI= 1.08-8.57, *P*= 0.03), visual impairment (OR= 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), diabetes (OR= 1.9, 95% CI= 1.03-3.49, *P*= 0.04), heart disease (OR= 4.2, 95% CI= 1.25-13.74, *P*= 0.01), renal failure (OR= 11.5, 95% CI= 1.38-94.89, *P*= 0.005). Those that had one or more chronic co-morbidity were three times more likely to have poor SRH compared to those without chronic co-morbidity, and this association was statistically significant (OR= 3.2, 95% CI= 1.30-7.61, *P*= 0.008). Those satisfied with access to healthcare were less likely to have poor SRH compared to those dissatisfied, and this association was statistically significant (OR= 0.3, 95% CI= 0.17-0.79, *P*= 0.008). Falls (OR= 2.8,

95% CI= 1.28-6.48, *P*= 0.008), and recent history of hospitalization (OR= 4.9, 95% CI= 2.43-9.86, *P*= 0.001) were significantly associated with SRH.

### 3.2 Factors Associated with SRH in Multivariate Analysis

The multivariate analysis is shown in Table 4. From the univariate analysis, the statistically significant variables were all included at the same time in one model for the multivariate analysis. The variables in Table 4 are the statistically significant variables from the multivariate analysis. The total sample size (N) included in this model was 203. Those with chronic pain were twice more likely to have poor SRH compared to those without chronic pain (OR= 2.2, 95% CI= 1.15-4.31, *P*= 0.01). Those with heart disease were four times more likely to have poor SRH compared to those without heart disease (OR= 4.7, 95% CI= 1.33-17.27, *P*= 0.02). Those with renal failure were thirteen times more likely to have poor SRH compared to

**Table 2. Medical history of participants**

| Variable           | Groups | Excellent<br>N (%) | Good<br>N (%) | Fair<br>N (%) | Poor<br>N (%) | Total<br>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)     |

**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) |

those without renal failure (OR= 9.9, 95% CI= 2.56-10.7, *P*= 0.05). Those with history of fall were twice more likely to have poor SRH (OR= 2.6, 95% CI= 1.09-6.56, *P*= 0.03). Those with history of hospitalization were four times more likely to have poor SRH (OR= 3.0, 95% CI= 1.94-8.78, *P*= 0.0001). Those satisfied with access to healthcare were less likely to have poor SRH (OR= 0.3, 95% CI= 0.15-0.86, *P*= 0.02). These associations were statistically significant.

**Table 3. Factors associated with SRH in univariate analysis**

| Variable                          | Poor SRH<br>N (%) | Good SRH<br>N (%) | OR  | 95% CI of<br>OR | P value |
|-----------------------------------|-------------------|-------------------|-----|-----------------|---------|
| <b>Age</b>                        |                   |                   |     |                 |         |
| 60-69 years                       | 37 (39.4)         | 57 (60.6)         |     |                 |         |
| ≥ 70 years                        | 44 (40.4)         | 65 (59.6)         | 0.9 | 0.55-1.69       | 0.88    |
| <b>Gender</b>                     |                   |                   |     |                 |         |
| Female                            | 33 (45.8)         | 39 (54.2)         |     |                 |         |
| Male                              | 48 (36.6)         | 83 (63.4)         | 1.5 | 0.82-2.62       | 0.20    |
| <b>Marital status</b>             |                   |                   |     |                 |         |
| Single                            | 35 (44.9)         | 43 (55.1)         |     |                 |         |
| Married                           | 46 (36.8)         | 79 (63.2)         | 1.4 | 0.78-2.48       | 0.25    |
| <b>Educational level</b>          |                   |                   |     |                 |         |
| None/primary                      | 41 (50.6)         | 40 (49.4)         |     |                 |         |
| Secondary/tertiary                | 40 (32.8)         | 82 (67.2)         | 2.1 | 1.18-3.74       | 0.01    |
| <b>Economic status</b>            |                   |                   |     |                 |         |
| Poor                              | 73 (38.4)         | 117 (61.6)        |     |                 |         |
| Good                              | 8 (61.5)          | 5 (38.5)          | 0.4 | 0.12-1.23       | 0.1     |
| <b>Pension</b>                    |                   |                   |     |                 |         |
| Yes                               | 6 (31.6)          | 13 (68.4)         |     |                 |         |
| No                                | 75 (40.8)         | 109 (59.2)        | 0.7 | 0.24-1.84       | 0.43    |
| <b>Adequate physical activity</b> |                   |                   |     |                 |         |
| Yes                               | 17 (26.6)         | 47 (73.4)         |     |                 |         |
| No                                | 64 (46.0)         | 75 (54.0)         | 0.4 | 0.22-0.81       | 0.008   |
| <b>Outdoor leisure activity</b>   |                   |                   |     |                 |         |
| Yes                               | 56 (35.2)         | 103 (64.8)        |     |                 |         |
| No                                | 25 (56.8)         | 19 (43.2)         | 0.4 | 0.21-0.82       | 0.01    |

**Table 3. Factors associated with SRH in univariate analysis cont.**

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

| Variable             | Poor SRH<br>N (%) | Good SRH<br>N (%) | OR   | 95% CI     | P value |
|----------------------|-------------------|-------------------|------|------------|---------|
| <b>Diabetes</b>      |                   |                   |      |            |         |
| Yes                  | 31 (50.8)         | 30 (49.2)         | 1.9  | 1.03-3.49  | 0.03    |
| No                   | 50 (35.2)         | 92 (64.8)         |      |            |         |
| <b>Renal failure</b> |                   |                   |      |            |         |
| Yes                  | 7 (87.5)          | 1 (12.5)          | 11.5 | 1.38-94.89 | 0.005   |
| No                   | 74 (37.9)         | 121 (62.1)        |      |            |         |

Table 3. Factors associated with SRH in univariate analysis cont.

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

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

Table 4. Factors associated with Poor SRH in multivariate 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)                                | 9.9 | 2.56-10.7  | 0.05    |
| Fall (Yes)   | 2.6 | 1.09-6.56  | 0.03    |
| Hospitalization (Yes)                              | 3.0 | 1.94-8.78  | <0.0001 |
| Satisfaction with access to healthcare (satisfied) | 0.3 | 0.15-0.86  | 0.02    |

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

#### 4. DISCUSSION

The prevalence of good SRH in this study was 60.1% while 39.9% had poor SRH. The prevalence of poor SRH is considerable higher in this study compared to that reported in a study by Chan et al. [18] among community dwelling adults in Malaysia (20.1%). A possible reason for the difference could be because the study by Chan et al. [18] was conducted among adults eighteen years and above while the present

study was conducted among older adults 60 years and above. Older adults are more susceptible to chronic diseases which could have a negative impact on health and perception of health. Another possible reason could be because the residents in these homes had poor access to healthcare. They mostly depend on medical volunteers to provide health services. These medical volunteers visit intermittently, and their activities are mostly limited to physical examination. The difference in prevalence rates



between both studies could also be attributed to the variances in the wording of the response categories of the outcome variable. It has been reported that SRH scales using different measures are not directly comparable [22] thus comparing such scales should be done with caution. On the other hand, the prevalence of poor SRH in this study is comparable to that reported in a study by Damian et al. [23] which reported a 45% prevalence of poor SRH among institutionalized elderly people in Spain.

#### **4.1 Sociodemographic Variables and SRH**

Age was not significantly associated with SRH in this study, however those aged 60-69 years were less likely to have poor SRH compared to those aged 70 years or more. The odds of developing chronic diseases increases with age thus health usually deteriorates with age, and this could impact perception of general health. Previous studies have also reported poorer health status among older age groups when compared to younger groups [24,25]. Gender was not significantly associated with SRH in this study although women were more likely to have poor SRH compared to men. Previous studies [26,27] have reported poorer SRH among women when compared to men. This gender differences in SRH has been attributed to higher prevalence rates of chronic diseases and other mental disorders such as depression and anxiety among women when compared to men. There was no association between economic status and SRH in this study. Previous studies [28,29] have reported an association between economic status and SRH. A good economic status could improve access to healthcare, reduce the incidence and prevalence of diseases, and even mortality. Although some residents perceived their economic status as good, they were still incapable of meeting most of their health needs. As a result of this, they were mostly dependent on the elderly homes and the medical volunteers to provide the needed medical services. Educational level was significantly associated with SRH. Those with no education or primary education were twice more likely to have poor SRH compared to those with secondary/tertiary level of education. This is because of the positive impact of higher educational level on health. Higher educational level has been linked to healthy behaviors [30], better coping strategies and mental resilience [31]. Therefore it is possible that the residents in these homes with higher educational level are better informed about healthy behaviours and ways they could improve their health. Ocampo-Chaparro et al. [6]

in a study in Colombia and Chan et al. [18] in a study in Malaysia reported a similar relationship between education and SRH. Physical activity was significantly associated with SRH in this study. Previous studies [32,33] have also found an association between physical activity and SRH. The benefits of physical activity among the elderly includes reduced risk of cardiovascular diseases, diabetes, cancers, risk of falling, functional limitations, improved cardiorespiratory and muscular fitness, cognitive function, bone health among others [20]. Outdoor leisure activity was significantly associated with SRH. Those that participated in outdoor leisure activities were less likely to have poor SRH compared to those that did not. This is probably because those that were able to participate in outdoor leisure activities had more opportunities to interact with people outside the home and in a friendlier environment. This could improve psychological feelings. A study by Ryan et al. [34] reported that outdoor activities can bring about increased energy and sense of vitality, which can lead to increased resilience to physical and mental illness. It is also important to note that participation in outdoor leisure activity and physical activity may be directly hampered by poor health.

#### **4.2 Health Conditions and SRH**

History of falls was significantly associated with SRH in this study. Falls could be deleterious. It could lead to injuries (fractures, and brain injuries) and hospitalization. It also leads to "Post-fall Syndrome", a condition characterized by depression, restriction in routine activities, dependence, and confusion [35]. In the absence of proper medical care those that experience falls are likely going to suffer some of these consequences associated with falls and this could affect their general health. A study by Confortin et al. [36] also reported better SRH among participants without history of falls. The authors attributed the poor SRH among participants with history of falls to loss of autonomy, dependence on others for activities of daily living, and feelings of insecurity and low self-esteem which occurs as a result of falls. Those with visual impairment were more likely to have poor SRH, and this association was statistically significant. This is perhaps because visual impairment can limit participation in certain activities such as exercises, trips to movie theatres or even trips to the recreational park. Visual impairment can also increase risk of falls, and dependence in certain activities of daily living. Previous studies [37,38] have also found a

significant association between visual impairment and SRH. Wang et al. [37] in his study in Australia linked visual impairment to greater independence in activities of daily living, increased loneliness and hospitalization. Hypertension was not significantly associated with SRH in this study. This could be because residents perceive hypertension to be a condition that is naturally associated with aging rather than a serious medical condition, thus when they compare themselves with people with other health conditions they consider severe, they are likely to perceive their health as good. A study by Rahman et al. [39] conducted in eight Asian countries including Malaysia reported a lack of urgency in the control of hypertension among participants due to the perception of the disease. A study by Ocampo-Chaparro et al. [6] also found an insignificant association between SRH and hypertension. In contrast, other studies [18,29] have reported a significant association between hypertension and SRH. This study reported an association between some health conditions and SRH. Chronic pain, heart disease, renal failure, stroke, and diabetes were significantly associated with SRH. Renal failure was one of the most significant predictors of poor SRH. Previous studies [18,29,40,41,42] have also found a significant association between SRH and chronic conditions such as heart diseases, renal failure, diabetes, chronic pain and stroke. This is because people with chronic diseases suffer physically and mentally. They experience pain, discomfort, physical limitations which could lead to increased dependence and social isolation, anxiety, depression and stress. Chronic diseases could also lead to adjustment of lifestyle and life aspirations. Studies have also shown that chronic diseases negatively affect quality of life [43,44]. Those that had recent history of hospitalization were four times more likely to have poor SRH and this association was statistically significant. This is perhaps because those with recent history of hospitalization had a co-morbidity which negatively affects their general health. For some of the residents that were previously abandoned in hospitals, returning to such environment could trigger negative feelings and cause distress. Confortin et al. [36] reported a link between hospitalization and SRH in a study in Brazil.

Satisfaction with access to healthcare was significantly associated with SRH in this study. Those satisfied with access to healthcare were less likely to have poor SRH. This could be because those dissatisfied with access to

healthcare had a co-morbidity or some other health conditions and are not getting the desired medical care. In contrast, those satisfied with access to health care could be free of any severe medical condition thus would be contempt with the physical examination provided by medical volunteers that visit these homes occasionally. Goins et al. [45] in a study conducted in USA reported an association between SRH and access to healthcare.

This study provides an insight into the health status of elderly in these institutions. The findings of this study show residents in these institution have poor access to health care, and comparatively poorer health when compared to the general populace. Poor access to healthcare will invariably lead to increased chronic diseases morbidity and mortality. This emphasizes the need for proper management of chronic diseases, improved healthcare and welfare services for residents in these institutions. There is need for policy makers to step in and incorporate residents of these homes in holistic interventions targeted at improving their health and wellbeing. The interventions should strive to improve access to healthcare and should also include health education programs to teach and improve healthy behavior. This could provide an opportunity for the residents to know more about their health, improve practice of preventive medicine, prevent deterioration of health and unnecessary hospitalization. Credit must be given to the medical volunteers and the administrators of these homes who endeavor to provide as much medical care as they can.

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

## 5. CONCLUSION

This study revealed a high prevalence of poor SRH among residents of these institutions.

Among the socio-demographic variables, only educational level was significantly associated with SRH. Physical activity, outdoor-leisure activity, chronic diseases, chronic pain, and dissatisfaction with access to healthcare were all significantly associated with SRH. These findings highlight the impact of co-morbidities on the general health of residents in these institutions. There is a need for improved health access to meet some of the needs of these residents.

## CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

## ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. United Nations Department of Economic and Social Affairs, Population Division. World Population Ageing; 2013.
2. Zawawi R. Active ageing in Malaysia. The Second Meeting of the Committee on International Cooperation on Active Ageing. Malaysia; 2013.
3. World Health Organization. Mental health and older adults; 2017. Available:<http://www.who.int/mediacentre/factsheets/fs381/en/>
4. American Psychological Association. Older adults' health and age-related changes; 2017. Available:<http://www.apa.org/pi/aging/resources/guides/older.aspx>
5. Burstrom B, Fredlun P. Self-rated health: Is it as good a predictor of subsequent mortality among adults in lower as well as in higher social classes? *Journal of Epidemiology & Community Health*. 2001; 55(11):836-840.
6. Ocampo-Caparro. Self-rated health: Importance of use in elderly adults. *Colombia Medica*. 2010;41(3):275-289.
7. Van Ginneken JK, Groenewold G. A single vs. Multi-Item self-rated health status measure: A 21-country study. *The Open Public Health Journal*. 2012;5(1):1-9.
8. Meng Q, Xie Z, Zhang T. A single-item self-rated health measure correlates with objective health status in the elderly: A survey in suburban Beijing. *Frontiers in Public Health*; 2014.
9. Rohrer JE, Arif A, Denison A, Young R, Adamson S. Overall self-rated health as an outcome indicator in primary care. *Journal of Evaluation of Clinical Practice*. 2007;13:882-888.
10. May M, Lawlor DA, Brindle, Patel R, Ebrahim S. Cardiovascular disease risk assessment in older women: Can we improve on Framingham? *British Women's Heart and Health Prospective Cohort Study*. *Heart*. 2006;92:1396-1401.
11. Jylhä M, Guralnik JM, Balfour J, Fried LP. Walking difficulty, walking speed, and age as predictors of self-rated health. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*. 2001;56:M609-M617.
12. Lee Y. The predictive value of self-assessed general, physical, and mental health on functional decline and mortality in older adults. *Journal of Epidemiology and Community Health*. 2000;54:123-129.
13. Wilcox VL, Kasl SV, Idler EL. Self-rated health and physical disability in elderly survivors of a major medical event. *Journal of Gerontology Series B: Psychological Sciences and Social Sciences*. 1996;51B: S96-S104.
14. Idler L, Kasl S. Self-ratings of health: Do they also predict change in functional ability? *Journal of Gerontology Series B: Psychological Sciences and Social Sciences*. 1995;50B:S344-S353.
15. Debpuur C, Welaga P, Wak G, Hodgson A. Self-reported health and functional limitations among older people in the Kassena-Nankana district, Ghana. *Global Health Action Supplement*. 2010;2:54-63.
16. Haseen F, Adhikari R, Soonthornhdada K. Self-assessed health among Thai elderly. *BMC Geriatrics*. 2010;10:30.
17. Lim W, Ma S, Heng D, Bhalla V, Chew SK. Gender, ethnicity, health behavior & self-rated health in Singapore. *BMC Public Health*. 2007;7:184.
18. Chan Y, Teh C, Lim K, Lim KH, Yeo PS, Kee CC, et al. Lifestyle, chronic diseases and self-rated health among Malaysian

- adults: Results from the 2011 National Health and Morbidity Survey (NHMS). *BMC Public Health*. 2015;15(1).
19. Onunkwor O, Al-Dubai S, George P, Arokiasamy J, Yadav H, Barua A, et al. A cross-sectional study on quality of life among the elderly in non-governmental organizations' elderly homes in Kuala Lumpur. *Health and Quality of Life Outcomes*. 2016;14(1).
  20. World Health Organization. *Physical activity and older adults*; 2014. Available:[http://www.who.int/dietphysicalactivity/factsheet\\_olderadults/en/](http://www.who.int/dietphysicalactivity/factsheet_olderadults/en/)
  21. Rosenblum A, Joseph H, Fong C. Prevalence and characteristics of chronic pain among chemically dependent patients in methadone maintenance and residential treatment facilities. *AMA*. 2003;289(18): 2370-2378.
  22. Jurges H, Avendano M Mackenbach JP. Are different measures of self-rated health comparable? An assessment in five European countries. *European Journal of Epidemiology*. 2008;23:773-781.
  23. Damián J, Pastor-Barriuso R, Valderrama-Gama E. Factors associated with self-rated health in older people living in institutions. *BMC Geriatrics*. 2008;8(1):5.
  24. Shi J, Liu M, Zhang Q, Lu M, Quan H. Male and female adult population health status in China: A cross-sectional national survey. *BMC Public Health*. 2008;8(1): 277.
  25. Zimmer Z. Poverty, wealth inequality and health among older adults in rural Cambodia. *Social Science & Medicine*. 2008;66(1):57-71.
  26. Ahmad K, Jafar T, Chaturvedi N. Self-rated health in Pakistan: Results of a national health survey. *BMC Public Health*. 2005;5:51.
  27. Arnadottir S, Gunnarsdottir E, Stenlund H, Lundin-Olsson L. Determinants of self-rated health in old age: A population-based, cross-sectional study using the international classification of functioning. *BMC Public Health*. 2011;11(1):670.
  28. Haron S, Sharpe D, Masud J, Abdel-Ghany M. Health divide: Economic and demographic factors associated with self-reported health among older Malaysians. *Journal of Family and Economic Issues*. 2010;31(3):328-337.
  29. Rathnayake S, Siop S. Self-rated health and its determinants among older people living in the rural community in Sri Lanka. *Journal of Nursing and Health Science*. 2015;4(6):39-45.
  30. Van-Oort F, van-Lenthe F, Mackenbach J. Cooccurrence of lifestyle riskfactors and the explanation of education inequalities in mortality: Results from the GLOBE study. *Preventive Medicine*. 2004;39(6):1126-34.
  31. Christensen U, Schmidt L, Kriegbaum M, Hougaard C, Holstein B. Coping with unemployment: Does educational attainment make any difference? *Scandinavian Journal of Public Health*. 2006;34:363-70.
  32. Rosenkranz R, Duncan M, Rosenkranz S, Kolt G. Active lifestyles related to excellent self-rated health and quality of life: Cross sectional findings from 194,545 participants in the 45 and up study. *BMC Public Health*. 2013;13:1071.
  33. Sodergren M, Sundquist J, Johansson S, Sundquist K. Physical activity, exercise and self-rated health: A population-based study from Sweden. *BMC Public Health*. 2008;8:352.
  34. Ryan R, Weinstein N, Bernstein J, Grown K, Mistretta L, Gagne M. Vitalizing effects of being outdoors and in nature. *Journal of Environmental Psychology*. 2010;30(2): 159-168
  35. World Health Organization. *WHO Global Report on Falls Prevention in Older Age*; 2007.
  36. Confortin S, Giehl M, Antes D, Schneider IJ, D'Orsi E. Positive self-rated health in the elderly: A population-based study in South of Brazil. *Cad. Saude Publica*. 2015;31(15):1-11.
  37. Wang J, Mitechell P, Smith W. Vision and low self-rated health: The Blue Mountains Eye Study. *Investigative Ophthalmology and Visual Science*. 2000;41(1):45-54.
  38. Jacobs J, Hammerman-Rozenberg R, Maaravi Y, Cohen A, Stessman J. The impact of visual impairment on health, function and mortality. *Aging Clinical and Experimental Research*. 2005;17(4):281-286.
  39. Rahman A, Wang J, Kwong G, Morales D, Sritara P, Sukmawan R. Perception of hypertension management by patients and doctors in Asia: Potential to improve blood pressure control. *Asia Pacific Family Medicine*. 2015;14(1).
  40. Molarius A, Janson S. Self-rated health, chronic diseases, and symptoms among

- middle-aged and elderly men and women. Journal of Clinical Epidemiology. 2002;55(4):364-370.
41. Mavaddat N, Van Der Linde R, Parker R, Sawa G, Linmonth A, Brayne C, et al. Relationship of self-rated health to stroke incidence and mortality in older individuals with and without a history of stroke: A longitudinal study of the MRC Cognitive Function and Ageing (CFAS) population. PLOS ONE. 2016;11(2).
42. Mäntyselkä P. Chronic pain and poor self-rated health. JAMA. 2003;290(18).
43. Tsai S, Chi L, Lee L, Chou P. Health related quality of life among urban, rural, and island community elderly in Taiwan. Journal of Formosan Medical Association Taiwan. 2004;103(3):196-204.
44. Centre for disease control and prevention. Chronic diseases. Notes and Reports. 2003;16(1).
45. Goins R, Hays J, Landerman L, Hobbs G. Access to health care and self-rated health among community-dwelling older adults. Journal of Applied Gerontology. 2011; 20(3):307-321.

© 2017 Onunkwor et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*  
*The peer review history for this paper can be accessed here:*  
<http://sciencedomain.org/review-history/19050>