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Original Research Article

Self-rated health status, functional difficulties in health domains and non-communicable diseases in Oman: Evidence from the World Health Survey in Oman

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This paper examined the pattern of self-rated Health (SRH) status, functional difficulties in health domains and non-communicable diseases among the Omani adult people. The paper also evaluated the association of SRH with the health functional difficulties and the chronic diseases. The data for the study obtained from the 2008 Oman World Health survey, involving a nationally representative sample of 3,770 Omani adult respondents of age 18 and above. Both descriptive and inferential statistical techniques, such as frequency distribution, bivariate analysis with chi-square test, factor analysis, multiple linear regression and logistic regression analysis were used for data analysis. The study revealed a very high rate of perceived good health status among Omani adults, as 78% of the adults rated their health as good or very good, while only 4% rated their health as bad or very bad and 18% as moderate. Female, elderly adult, people with low level of education, poor and widowed/divorced/separated were more likely to rate their health as bad or very bad. Poor SRH significantly associated with higher prevalence of all chronic diseases as well as higher functional difficulties of health domains. SRH can be used as a health screening tool in the national health care system, and health providers should incorporate it in their clinical practice. Appropriate intervention and policy measure should be taken to improve the health of the sub-groups of people with poor SRH, difficulties, and chronic diseases that have been identified in this study.

Keywords: Self-reported health status, functional difficulties, non-communicable diseases, Oman

INTRODUCTION

The potentially high costs and difficulties associated with assessing the general health of a population through physical testing or the collection of biomarkers have led public health specialist to develop a simple indicator of health status that can be measured with minimal expenditure of resources, including time, money, training, and logistics (Mossey and Shapiro, 1982; Kuhn et al., 2006). Self-rated health (SRH), also known as self-assessed health or self-perceived health, is one such innovation.

Despite its seemingly subjective nature, a series of studies mostly in developed countries with advanced medical systems have demonstrated that SRH is a good predictor of mortality, morbidity, functional ability and objective health status, even after controlling for other objective health measurements (Wu et al., 2013; Chen et al., 2007; DeSalvo et al., 2006; Frankenberg and Jones, 2004; Benjamins et al., 2004; Idler and Benyamini, 1997). Studies have also shown that SRH is a significant predictor of chronic conditions

such as coronary heart disease, diabetes, stroke, lung disease, and arthritis among older adults (Latham and Peek, 2013). Blaxter (1985) found that self-reported chronic conditions and diagnosed chronic conditions overlapped in 80% of the cases. Strong association between SRH and a wider context of health outcomes including physical functional difficulties have also been demonstrated by many studies (Tetteh et al., 2019; Biritwum et al., 2013; Mavaddat et al., 2011; Smith et al., 2010; Cesari et al., 2008). Self-reported other measures, such as self-reported functional limitations of health domains, have also been found to be fairly accurate and have been increasingly used in planning and policy making in public health (Cohen et al., 1995; Sutton et al., 1999).

There are some studies arguing that the relationship between SRH and mortality may be weaker in developing countries than developed countries because of differences in levels of health care system, disease patterns and socio-economic development (Frankenberg and Jones, 2004; Kuhn et al., 2006). For instance, study in India revealed that poorer groups report less morbidity than their mortality profile (Murray and Chen, 1994). Health problems may be stated more persuasively by wealthier groups, while poorer groups suffer in silence (Sen, 2002; Burström and Fredlund, 2001).

There is still dearth of studies on SRH status and its relationship with disease burden and other health measures on a nationwide basis in developing countries, partly because of lack of reliable data on health measures. Data from the World Health Survey series in different countries that have collected comprehensive information on the population health can be utilized to fill this research gap in developing countries including Oman. Oman is a high income country of Arabian Peninsula. With rapid socioeconomic development in recent time, the country is passing through crucial phase of demographic and health transition (Islam, 2020). Although the prevalence of communicable diseases declined substantially, the proportional share of the chronic non-communicable diseases, such as coronary heart disease, hypertension, diabetes mellitus and cancer, has emerged as new health challenges for the country (Hill 2000; Ganguli et al., 2009). Under this paradigm of health in Oman, it is important to gain insight about the pattern and determinants of SRH, morbidity and functional difficulties of health domains for enhancing public health services' effectiveness and health policy-making. With this backdrop, the aim of this study is to analyse the pattern of SRH status, self-reported functional difficulties of different health domains, and non-communicable diseases (NCD) among adult population in Oman. The study also examines the association of self-reported health functional difficulties and NCDs with SRH, and identifies the socio-demographic predictors of SRH.

MATERIALS AND METHODS

Data for this study come from the 2008 Oman World Health

Survey (OWHS). The survey was implemented by the Ministry of Health of Oman in collaboration and technical support of the World Health Organization (WHO). It is a part of the World Health Survey (WHS) series which was developed by the WHO as a means to collect comprehensive baseline information on the health of populations in different countries across the world. The total population of Oman was estimated to be about 4.5 million in 2018 of which 60% are native Omani and the rest 40% are mostly working class expatriate people from other countries (National Center for Statistics and Information [NCSI], 2019).

Study design and sample

The target population of the 2008 OWHS was the adult population of age 18 and above irrespective of their marital status and nationality. Data was collected by face-to-face interview technique and structured questionnaires developed by the WHO for World Health Survey after extensive pre-testing and standardization. The details of the methodology of the survey have been published elsewhere (Al Riyami et al., 2012), and are briefly described here. A multi-stage stratified cluster sampling design was employed to select a nationally representative sample. Ultimately, 4,717 adults were interviewed successfully, of which 3,370 (71%) were Omani nationals and the rest of 1,347 (29%) were non-Omani. In this study we have considered only 3,370 Omani nationals as our study population.

Measurements

In this study, three indicators were used for measuring health and morbidity of the adult people. These are general health status, functional difficulties with health domains activities and chronic non-communicable diseases (NCDs).

General health status: To characterize the general health status, respondents were asked to rate their health status on the day of interview from very good', 'good', 'moderate', 'bad' or 'very bad'. However, for analytical purpose, we breakdown the responses into two categories by combining the categories 'very good' and 'good' into one category of 'optimal SRH' status and the categories 'moderate', 'bad' and 'very bad' into one category of 'poor SRH' status. Previous studies also adopted similar dichotomization approach (Debpuur et al., 2010; Tsai et al., 2010; Rahman and Barsky, 2003; Idler and Benyamini, 1997) and Manor et al. (2000) demonstrated that such dichotomization does not cause substantial loss of information.

Functional difficulties of health domains: The OWHS collected information about amount of difficulties related to work and household (HH) activities on eight selected health domains, namely: mobility, self-care, pain and discomfort, cognition, interpersonal activities, sleep and energy, affect and vision. For each domain, respondents were asked about the amount of difficulty that they had on five-point scale, from none (no difficulty), mild, moderate, severe or

extreme, and the rating was obtained for 30 days prior to the survey. The majority of these domains were investigated through two or more questions. To reduce data, a composite score variable was derived from these self-reported health questions on eight domains of health using factor analysis technique. The choice of a one-factor solution was justified by the high eigen value of the first factor (7.34, 62% as a cumulative percentage of the variance explained) and the high communalities of the original variables (between 0.30 and 0.78). We used the principal component method for factor extraction and the regression scoring method to obtain the factor scores. These composite raw scores were considered as the values of a single continuous variable representing the overall functional difficulties of health domains, and the variable was used as the outcome variable to examine the predictive validity of SRH in explaining the overall variation in functional difficulties of health domains.

Chronic NCDs: To understand the morbidity situation, we have considered eight selected NCDs. These are Arthritis, Stroke, Angina, Diabetes, Lung disease, Asthma, Depression and hypertension. To collect information about these diseases, respondents were asked, "Have you ever been diagnosed/told that you have (Name of disease)?"

Covariates: Gender, age, education, urban/rural place of residence, region of residence and wealth quintile of the respondents were used as the covariates of health outcome variables. Wealth quintile of respondents is a composite index derived from a set of variables on housing characteristics and ownership of household durable goods (such as TV, car, computer etc.) by using statistical techniques namely principal component analysis (PCA) (Rutstein and Johnson, 2004). The wealth scores obtained through PCA is attached to each household to indicate their relative wealth status. The households were then divided into five categories: the lowest quintile being the poorest, then poorer, middle, richer and the highest quintile as richest.

Statistical analysis

Various statistical techniques, including descriptive and inferential statistical techniques were used for data analysis. Frequency distribution was used to describe the background characteristics, general health status, health functional difficulties, and prevalence of NCDs. Bivariate analysis or cross tabulation and chi-square tests were used to analyses the interrelationship between variables. A p-value of <0.05 was considered as statistically significant. Binary logistic regression analysis was done to identify the determinants of poor SRH. To examine the predictive validity of the subjective SRH in explaining health difficulties and disease burdens, both bivariate and multivariate analysis techniques were employed. In bivariate analysis, prevalence of health difficulties and selected NCDs were calculated by optimal SRH and poor SRH and their associations were measured by Chi-square test. To examine association between NCDs and SRH,

separate logistic regression models were fitted for each of the eight selected NCDs considering SRH status (optimal or poor) as explanatory variable after controlling the effect of socio-demographic variables of the respondents. On the other hand, ordinary least square (OLS) regression was employed to examine the relation between SHR and the composite scores of difficulties of health domains after controlling the effect of socio-demographic variables. The internal consistency of the health measure as assessed using Cronbach's alpha was 0.89. The test-retest reliability of individual items, measured by the weighted Kappa, ranged from 0.48–0.61.

RESULTS

Socio-demographic characteristics of respondents

Of the total 3,370 Omani adult respondents of age 18 years and above, 53% were female and 47% were male (Table 1). About half (51%) of the respondents were young adult of age below 35 years of age, and about 9% respondents were from elderly group (65 years and above). The average age of the respondents were 38.0 years. Most (71%) of the respondents were ever married, with 59% currently married and 12% were either widowed or divorced or separated. About 29% respondents were never married. More than one-fourth (28.7%) of the respondents had no education, while 12% had more than secondary level of education. Most of the respondents (72%) were from urban areas. The proportion of respondents varies from 7.4% to 21.8% across different regions.

Pattern of self-rated health status

Distribution of respondents by self-rated health (SRH) status indicates that majority (78%) of the respondents rated their health as good or very good. About 34% adults rated their health as very good, 44% as good, 18% as moderate and only 4% stated that their health was either bad or very bad (Figure 1). The results of the bivariate analysis indicate that poor health status was found to be significantly higher among females, elderly people, divorced or separated people, and the people with no education, living in urban place of residence, poorest wealth quintile and from Muscat region. As expected, the prevalence of poor health status increases with the age, while decrease with the level of education.

Multiple logistic regression analysis identified gender, age, marital status, education, and region of residence as independent significant predictor of poor SRH status (Table 2). Females were found to have almost two times higher odds of poor SRH compared to male adults [AOR (95% CI)=1.92 (1.56 - 2.36)]. Increasing age showed increased odds of poor health for adults. For example, elderly people of age 65 and above had more than seven times higher odds of poor health status compared to the young adult people of age 18 – 24 years [AOR (95% CI)=7.92 (4.08 - 13.01)].

Table 1. Percentage distribution of respondents according to their background characteristics

Background characteristics	Number	Percent
Total	3370	100.0
Gender		
Male	1579	46.9
Female	1791	53.1
Age		
18-24	779	23.1
25-34	941	27.9
35-44	632	18.7
45-54	398	11.8
55-64	321	9.5
65-74	204	6.1
75+	95	2.8
Mean(SD)	38.0(16.2)	
Marital status		
Never married	983	29.2
Married	1995	59.2
Widowed/divorced/separated	392	11.6
Education		
No education	936	27.8
Primary	618	18.3
Secondary	1397	41.5
Higher	419	12.4
Wealth Quintile		
Q1(poorest)	565	16.8
Q2	815	24.2
Q3	755	22.4
Q4	677	20.1
Q5(richest)	558	16.5
Place of residence		
Urban	2433	72.2
Rural	937	27.8
Region		
Muscat	555	16.5
Dhofar	369	11.0
AdDakhiliyah	480	14.2
North AshSharqiya	249	7.4
South AshSharqiya	323	9.6
North AlBatinah	734	21.8
South AlBatinah	410	12.2
AdDhahira	251	7.4

Adults having marital disruptions (divorced, separated or widowed) were more likely to report poor SRH compared to those with current marital status [AOR (95% CI)=1.43 (1.08 - 1.89)]. Education showed significant negative association with poor SRH status. Adults with no education had 1.56 times higher odds of poor SRH status than the adults with higher level of education [AOR (95% CI)=1.56 (1.05 - 2.42)]. There are significant regional variations in reporting poor health status among the regions. Adults from Muscat region were 1.62 times more likely to report poor health status compared to adults from AdDhahira region [AOR (95% CI)=1.62 (1.08 - 2.43)], while adults from South Ash Sharqiya had 52% lower odds of reporting poor health than the adults from North AshSharqiya [AOR (95% CI)=0.48 (0.30 - 0.78)].

Functional difficulties of health domains

About two-thirds (65%) of the Omani adults reported that they had no difficulties with work or household activities, while 35% had mild to severe difficulties (Figure 2). The individual analysis of the functional difficulties related to different domains of health indicates that the reported mild to extreme functional difficulties with various aspects of health varies from as low as 4.4% in washing and dressing to as high as 34% in bodily aches or pain (Table 3). About 32% Omani adults reported that they had mild to extreme bodily discomfort and another 31% had difficulties in performing vigorous activities. About 23% adults had anxiety, while 22% reported to have depression.

The results of regression analysis of the composite scores

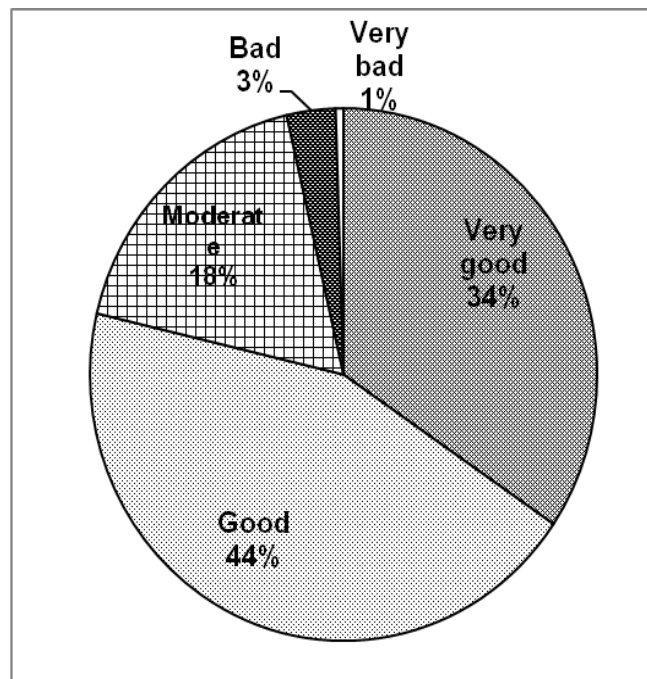


Figure 1: Distribution of respondents by SRH status

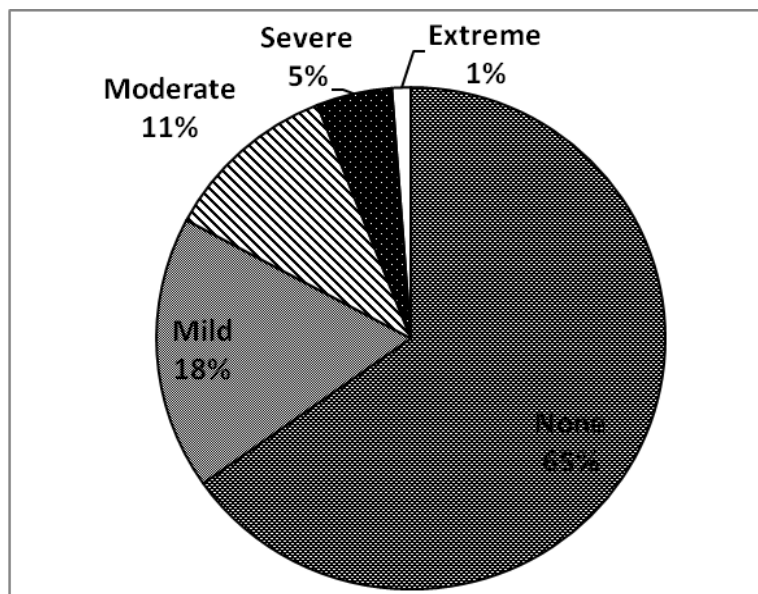


Figure 2: shows the distribution of adults by their self-reported difficulty with work and household activities

of all functional difficulties indicate that SRH, gender, age, marital status, place of residence, wealth quintiles and region of residence appeared as significant predictors of functional difficulties with health domains (Table 4). Adults who had reported their health status as poor tends to have higher scores of overall health functional difficulties than the adults reporting good health status ($p < 0.001$). It is evident that males had lower difficulties than females. The

functional difficulties of the health domains increases with age. Widowed, divorced or separated adults were more likely to suffer from health difficulties than their never married or currently married counterparts. Results of the model also show that people living in urban area have higher risk of functional difficulties, as is having less education, and having poorest wealth quintiles, and being unemployed. People living in both North and South

Table 2. Percentage of respondents by SRH status and adjusted odds ratios (AORs) of poor health status according to socio-demographic factors.

Factors	Self-rated health			Logistic regression analysis of poor SRH status		
	Optimal	Poor	p-value‡	AOR	95 CI	p-value
Total	78.7	21.3				
Gender			<0.001			
Male (ref)	84.0	16.0		1.00		
Female	74.0	26.0		1.92	1.56 - 2.36	<0.001
Age			<0.001			
18-24 (ref)	89.5	10.5		1.00		
25-34	87.6	12.4		0.92	0.62 - 1.34	0.660
35-44	82.1	17.9		1.14	0.73 - 1.77	0.564
45-54	70.9	29.2		2.13	1.30 - 3.47	0.002
55-64	66.3	33.8		2.44	1.43 - 4.16	<0.001
65-74	40.5	59.5		7.29	4.08 - 13.01	<0.001
75+	35.8	64.2		9.97	5.14 - 19.30	<0.001
Marital status			<0.001			
Never married	90.4	9.6		0.64	0.44 - 0.92	0.017
Married (ref.)	77.9	22.1		1.00		
Widowed/divorced/separated	53.3	46.7		1.43	1.08 - 1.89	0.011
Education			<0.001			
No education	60.8	39.2		1.56	1.05 - 2.42	0.038
Primary	79.6	20.4		1.48	1.01 - 2.22	0.046
Secondary	87.3	12.6		1.41	0.99 - 2.02	0.050
Higher (ref.)	88.3	11.7		1.00		
Wealth Quintile			<0.001			
Q1(poorest)	73.9	26.2		0.95	0.66 - 1.35	0.782
Q2	79.9	20.2		0.95	0.69 - 1.29	0.737
Q3	78.5	21.5		1.09	0.80 - 1.48	0.575
Q4	80.8	19.2		0.77	0.56 - 1.05	0.108
Q5(richest) (ref.)	79.4	20.6		1.00		
Place of residence			0.101			
Urban	77.8	22.2		1.18	0.93 - 1.50	0.162
Rural (ref.)	81.0	19.0		1.00		
Region			<0.001			
Muscat	70.9	29.1		1.62	1.08 - 2.43	0.019
Dhofar	86.8	13.3		0.56	0.34 - 0.89	0.014
AdDakhiliyah	76.5	23.5		0.92	0.61 - 1.39	0.699
North AshSharqiya	81.1	18.9		0.89	0.54 - 1.45	0.648
South AshSharqiya	83.6	16.5		0.48	0.30 - 0.78	0.003
North AlBatinah	77.7	22.3		0.96	0.65 - 1.44	0.871
South AlBatinah	79.0	21.0		1.08	0.71 - 1.67	0.705
AdDhahira (ref.)	81.7	18.3		1.00		

‡ p- values are attached with chi-square test between self-rated health and socio-demographic factors

AshSharqiya and Dhofar regions have lower risk of functional difficulties than other regions. The results indicate strong association between SRH and functional difficulties after controlling the effect of socio-demographic factors.

Non-communicable diseases and SRH

Table 5 shows the prevalence of eight selected self-rated non-communicable diseases (NCDs) by gender. The prevalence of the NCDs ranges from as low as about 1% for Stroke and Lung disease to as high as about 10% for hypertension. Hypertension showed the highest burden

with nearly 10% adults reporting that they had Hypertension, followed by Arthritis (8.3%), Diabetes (6.3%), Asthma (3.2%), Depression (2.1%) and Angina (1.9%). Almost all the NCDs were found to be more common among females than males. However, significant gender differentials were found for Arthritis, Asthma, Depression and Hypertension.

Table 6 presents the prevalence (in %) of NCDs by SRH status as well as results of logistic regression analysis of each of the NCDs showing the effect of SRH status on NCDs after controlling the effect of socio-demographic factors. The results indicate significantly higher prevalence of all NCDs among the adults with poor SRH status than those

Table 3. Descriptive assessment of health functioning difficulties of various health domains

In the last 30 days, how much difficulty did you have in ...	Level of difficulties		n
	None	Mild to sever	
Moving around	85.9	14.1	3370
Performing vigorous activities	68.8	31.2	3370
Washing or dressing yourself	95.6	4.4	3370
Maintaining your general appearance	95.3	4.7	3370
Staying by yourself for few days	71.7	28.3	3370
Bodily aches or pain	65.8	34.2	3370
Bodily discomfort	68.4	31.6	3370
Concentrating or remembering things	73.4	26.6	3370
Learning a new task	76.0	24.0	3370
Personal relationship or participation in the community	90.9	9.1	3370
Dealing with conflicts and tensions	84.4	15.6	3370
Making new friendships	91.0	9.0	3370
Dealing with strangers	86.3	13.7	3370
Sleeping	81.0	19.0	3370
Not feeling rested and refreshed	80.6	19.4	3370
Feeling sad or depressed	78.3	21.7	3370
Worry or anxiety	77.3	22.7	3370
Seeing and recognizing a person or objects across the road	79.1	20.9	3370
Seeing and recognizing a person or objects at arm's length	82.2	17.8	3370

with optimal SRH. For example, the prevalence of Arthritis was found to be five times higher among the adults with poor SRH compared to adults with optimal SRH (22.3% vs. 4.6%, $p < 0.001$). The results of logistic regression analysis also showed significant higher odds of having a disease among respondents with poor SRH than those with optimal SRH. The AORs of diseases were found to be at least two-fold when comparing poor SRH status group with optimal SRH status group. As for Hypertension, the AOR was 2.08 (95% CI: 1.48 – 3.95), while for Depression the AOR was 6.91 (95% CI: 4.04 – 11.84). The results thus indicate that SRH is a significant predictor of reported diseases prevalence.

DISCUSSION

The analysis of the OWHS data revealed a very high rate of perceived good health status among Omani adults. In general, about 96% of the adults rated their health status as moderate/good/very good, while only 4% rated their health as bad or very bad. Our result is comparable to the findings of the study conducted in the neighboring country Saudi Arabia, which demonstrated that 6% Saudi adults rated their health as bad or very bad (Moradi-Lakeh et al., 2015). Recent study in the United States of America revealed that 18% adults in the country rated their health as bad or very bad (CDC, 2018). A large population based study in China revealed that about 6% Chinese rated their health as bad or very bad (Wu et al., 2013). Considering good and very good categories as a single category of optimal SRH, the observed prevalence of optimal SRH status (78%) among Omani adults appeared to be higher than observed in several South Asian countries, such as 44.3%, 58.7%, 37.7%, and 73.7% among adults from

Bangladesh, India, Nepal, and Sri Lanka, respectively (Yaya and Bishwajit, 2020). The results indicate that Omani adults rated their health more positively, and the prevalence of poor SRH (4%) in Oman was found to be lower than observed elsewhere.

It is worth mentioning here that the SRH indicator could be context dependent and the variations in the prevalence of self-perceived good or bad health status across the countries might be due to cultural and socioeconomic differences in perceptions or reporting of health status (Desesquelles et al., 2009; Salomon et al., 2004; Sen, 2002). In some cultures, particularly in the Muslim Arab World including Oman, a self-satisfaction prevails, and it is a norm to say 'I am fine by the mercy of Almighty Allah', unless he/she is in a severe health condition. The relatively higher prevalence of optimal SRH in Oman, to some extent, might be related to the Arab culture of self-satisfaction with the present state of health. Nevertheless, the high positive rating of health among Omani adult is consistent with its low mortality rate (3 deaths/1000 population) and high life expectancy (78 years) (NCSI, 2019).

This study findings that the prevalence of poor SRH increases with age and decreases with the level of education are consistent with findings of other population-based studies elsewhere (Kraja et al., 2016; Moradi-Lakeh et al., 2015; Asfar et al., 2007). As age increases, the physical health gradually worsen, and thus older people are more likely to report poor health. On the other hand, people with higher education might be more aware of their health and healthy behaviors, thereby, taking more care to protect their health, thus rating their health as good.

Our findings that women are almost two times more likely to report poor health is in line with the findings of the other studies in both developed and developing countries (Rahman and Barsky 2003; Gilmore et al., 2002; Asfar et al.,

Table 4. Regression results of overall difficulties of health domains

Factors	B	SE of B	p-value
Self-rated health status			
Good	Ref		
Poor	0.76	0.036	<0.001
Gender			
Male	-0.42	0.033	<0.001
Female	Ref.		
Age			
18-24	-1.46	0.118	<0.001
25-34	-1.40	0.107	<0.001
35-44	-1.42	0.103	<0.001
45-54	-1.14	0.101	<0.001
55-64	-1.06	0.101	<0.001
65-74	-0.47	0.107	<0.001
75+	Ref.		
Marital status			
Never married	-0.43	0.076	<0.001
Married	-0.44	0.055	<0.001
Widowed/divorced/separated	Ref.		
Education			
No education	0.10	0.072	0.165
Primary	-0.03	0.061	0.597
Secondary	0.01	0.052	0.866
Higher	Ref.		
Place of residence			
Urban	Ref.		
Rural	-0.04	0.040	0.27
Region			
Muscat	0.01	0.066	0.887
Dhofar	-0.41	0.072	<.001
AdDakhiliyah	-0.07	0.066	0.290
North AshSharqiya	-0.25	0.081	0.002
South AshSharqiya	-0.45	0.074	<.001
North AlBatinah	0.03	0.061	0.664
South AlBatinah	-0.01	0.067	0.919
AdDhahira	Ref.		
Wealth Quintile			
Q1(poorest)	0.12	0.059	0.048
Q2	-0.07	0.051	0.198
Q3	0.06	0.050	0.208
Q4	-0.09	0.051	0.091
Q5(richest)	Ref.		

Table 5. Prevalence of self-reported non-communicable diseases (NCDs) by gender

	Male	Female	Total	p-value*
Arthritis	6.6	9.9	8.3	<0.001
Stroke	0.8	0.7	0.8	0.747
Angina	1.7	2.0	1.9	0.521
Diabetes	5.8	6.8	6.3	0.264
Lung diseases	0.8	1.3	1.0	0.134
Asthma	2.4	3.9	3.2	0.017
Depression	1.3	2.8	2.1	0.002
Hypertension	7.2	11.9	9.7	<0.001

* Based on chi-square test for male-female difference

2007; Desesquelles et al., 2009). Studies have shown that mental distress, anxiety, depression and low psychological

well-being are more prevalent among women than men (Benyamini et al., 2000; Maziak et al., 2002; Maziak et al.,

Table 6. Prevalence (%) of NCDs by SRH status, and results of logistic regression analysis of each of the NCDs showing the adjusted odds ratio of poor SRH with reference to optimal SRH status after controlling the effect of socio-demographic factors

NCDs	Prevalence of NCDs by		<i>p</i> -value†	Odds ratio of poor SRH Vs. optimal SRH (ref.)		
	Optimal SRH	Poor SRH		AOR*	95 CI	<i>p</i> -value
Arthritis	4.6	22.3	<0.001	3.03	2.28 – 4.04	<0.001
Stroke	0.2	2.8	0.010	3.38	1.16 – 9.91	0.021
Angina	0.9	5.4	<0.001	3.03	1.67 – 5.49	<0.001
Diabetes	4.1	14.3	<0.001	2.82	1.32 – 2.53	<0.001
Lung diseases	0.6	2.8	<0.001	4.80	2.30 – 10.01	<0.001
Asthma	1.8	8.1	<0.001	3.72	2.39 – 5.79	<0.001
Depression	1.0	6.3	<0.001	6.91	4.04 – 11.84	<0.001
Hypertension	6.6	21.3	<0.001	2.08	1.48 – 3.95	<0.001

† *p*- values are attached with chi-square test between self-rated health and socio-demographic factors

* The adjusted odds ratios (AORs) were calculated by logistic regression analysis after controlling for gender, age, region, marital status, educational level, and wealth quintiles

2005). This study finding also demonstrates that functional difficulties of various health domains and almost all the NCDs were more common among women than men. Given the higher life expectancies among women in general, the relatively lower reported optimal SRH among women might be due to the fact that they are more worried about their health and pay more attention to minor problems than men.

We found that single or never married adults were less likely to rate their health as poor compared to currently married or being separated, divorced, or widowed people. Our findings corroborate the findings of the study based on World Health Survey (WHS) data from 60 countries in all regions of the world (Moussavi et al., 2007) as well as the population-based study in China (Wu et al., 2007), Syria (Asfar et al., 2007) and Senegal (Duboz et al., 2017) that never married adults are less likely to report poor SRH. As never married persons tend to be young, educated and might lead a healthy life style, and thereby they are more likely to be in good health. However, our results contradict the findings of the study in Saudi Arabia (Moradi-Lakeh et al., 2015), which indicated that never married Saudi adults were more likely to rate their health as bad than other marital status. Our result also indicate that being separated, divorced, or widowed is associated with worse health status than currently married or never married persons, which is in line with the findings of the study in China (Wu et al., 2007). The higher rate of reporting poor health status by the people with marital status widowed/divorced/separated might be linked to their relatively lower economic and social status, which restrict or limit their access to health as compared to married people.

Unlike most other studies, we did not find any significant association between urban-rural place of residence and level of SRH. However, the geographical locations showed significant influence on level of SRH in that, people living in Muscat region had 1.6 times higher risk of poor SRH than the people living in AdDhahira region. On the other hand,

adults living in Dofar region and South AshSharqiya region were less likely to report poor SRH than the adults living in AdDhahira region. This regional difference in the level of SRH might be linked with the socio-demographic differences of the people in these regions. Economic status also showed no significant association with reporting poor health status, although most previous studies reported that optimal SRH tends to become more common among people with higher wealth status (Duboz et al., 2017; Kraja et al., 2016; Asfar et al., 2007).

In terms of self-reported functional difficulties with various aspects of health domains, the response with no difficulties varies from 65% with work or household activities to 95% with self-care (washing, dressing or maintaining general appearance). About 69% of the Omani adults had no difficulty with vigorous activities. The difficulties were more pronounced in case of bodily aches and pains, and bodily discomfort, as 34% and 31% of the adults, respectively, suffered from bodily aches and pains, and bodily discomfort. The results indicate that over two-third Omani adults have ability to perform various health function without any difficulty and the rest one-third have some difficulties with various aspects of health. Our findings are consistent with findings of the similar study in Ghana (Tetteh et al., 2019). Functional difficulties with various health domains were found to be higher among women compared to men, which reinforce the findings of the previous study in Ghana (Debpuur et al., 2010). As expected, difficulties in health domains increase with age. People living in urban areas, having marital status as widowed, divorced or separated, with poorest wealth quintile and from Dhofar and AsSharquiya regions were more likely to report higher level of difficulties in health domains. This study found strong significant association between SRH and function difficulties of health domains, as functional difficulties were found more common among adults with poor SRH. Our finding is supported by the findings of different studies conducted elsewhere (Asfar et al., 2007; Debpuur et al., 2010; Tetteh et al., 2019).

Among the selected NCDs, hypertension showed the highest burden with nearly 10% adults reporting to have hypertension, followed by arthritis (8.3%), diabetes (6.3%), asthma (3.2%), depression (2.1%) and angina (1.9%). NCDs were found to be more common among females than males. We found strong significant association between SRH status and the prevalence of NCDs. Adults with poor SRH were found to have a disease at a higher rate than the adults with optimal SRH or vice versa. This indicates that the SRH indicator has the ability to distinguish healthy from non-healthy people. Our findings are in line with the findings of other studies, which demonstrated that chronic diseases are strongly associated with poor SRH (Wu et al., 2013; Moussavi et al., 2007; Molarius and Janson, 2002).

There are some limitations in the analysis of the study. First, the cross-sectional nature of the survey data limited our ability to investigate the causal mechanisms between SRH on the one hand and diseases or functional difficulties on the other. For, it was not clear whether diseases or functional difficulties among the adults results in poorer SRH or whether poor health outcomes result in a higher level of functional difficulties or disease prevalence. Second, as all health measurements were based on self-reported, there might be some biases. However, the amount of bias is expected to be low due to intensive measure of questionnaire validation by WHO. Finally, we could not control for several other important variables related to SRH. Nevertheless, the study has strengths as well. It is based on data from a national survey that used sound methodology and validated questionnaires. The findings of the study are generalizable to the whole country as the analysis is based on nationally representative survey data.

CONCLUSION

The findings of this study revealed that SRH status is a significant predictor of other health measures. We found that adults reporting poor SRH had significantly higher prevalence of all chronic diseases as well as higher functional difficulties of health domains than those reporting good SRH status, even after controlling for socio-demographic factors. The results emphasize on the importance of SRH as a single health indicator that can be used comprehensively for evaluating a person's health status. SRH could be used as a population health screening tool in the national health care system, which could help health care providers in identifying patients who are most in need of their services. Considering the benefits of SRH, health providers should incorporate it in their clinical practice. However, despite international consensus on the validity of SRH as a good predictor of general health status, still health policy-makers and service providers in Oman are reluctant to incorporate it in health care system. This study identified many sub-groups of people with poor health status, health functional difficulties and chronic diseases. Female, elderly adult, people with low level of education, poor and widowed/divorced/separated were

more likely to rate their health as bad/very bad. Appropriate intervention and policy measure should be taken to improve the health of such vulnerable groups of people. The significantly higher reported poor health status in the Muscat region of Oman underscores the need for special attention to this region to find solutions for further improvement of health status.

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Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this manuscript.

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