

COGNITIVE DECLINE AND SELF RATED HEALTH AMONG OLDER ADULTS IN LEBANON

Yasmine Moubasher¹, Monique Chaaya^{1*}, Sawsan Abdulrahim², Miran A. Jaffa¹, Abla M. Sibai¹

¹Faculty of Health Sciences, Department of Epidemiology and Population Health, American University of Beirut, Lebanon

²Faculty of Health Sciences, Department of Health Promotion and Community Health, American University of Beirut, Lebanon

*Corresponding Author

ABSTRACT

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Several studies examined the factors associated with self-rated health (SRH), but few studied the relationship between cognitive decline and SRH. The aim of this study was to explore the association between cognitive decline and SRH of Lebanese older adults. This is a secondary analysis of data collected for a cross-sectional study conducted in 2013 to assess prevalence of dementia among a selected representative sample of community older adults aged 65 years and above living in two governorates, Beirut and Mount Lebanon. 419 older adults with no dementia who answered the SRH question and had data on cognitive decline were included in this study. Cognitive decline was measured using the Arabic validated Informant Questionnaire on Cognitive Decline in the elderly (IQCODE). Results show that around 43% reported moderate/bad SRH and 8.8% suffered from cognitive decline. Adjusting for nine confounders, our results showed that the odds of reporting moderate/bad SRH among older adults with cognitive decline was 2.91 times than that of those with no cognitive decline (p -value=0.016). As a conclusion, this study findings suggest that SRH is strongly correlated with cognitive decline. Health care providers in primary care centers, neurologists, and geriatricians can use the SRH question as a preliminary screen of older adults' cognitive functions.

Keywords: Cognition, Cognitive Decline, Elderly, Lebanon, Older people, Self-Rated Health.

INTRODUCTION

Self-rated health (SRH) is a simple subjective measure that has routinely been used to assess an individual's overall mental and physical health based on perception (Suchman et al., 1958). The question that assesses SRH is simple, easy to use, and is often used in health surveys as a good predictor of mortality and morbidity particularly among older adults aging 65 years and above (Feng et al., 2016; Idler & Benyamini, 1997; Mavaddat et al., 2014).

Factors associated with SRH include demographic characteristics, socioeconomic status, lifestyle, and physical and mental health (Lee & Shinkai, 2003; Molarius et al., 2007; Svedberg

et al., 2006). SRH is highly correlated with mental health; mental illnesses, life and work pressure, poor spiritual status, and poor quality of interpersonal relationships are the most significant aspects for poor self-rated health (Wu et al., 2013). Moreover, depression is strongly associated with poor self-rated health (Molarius & Janson, 2002) even when controlling for physical illness and functional disabilities (Mulsant et al., 1997).

Cognitive health, a normal process of aging, is an important aspect of mental health, especially for older adults (Harada et al., 2013); however, its association with SRH has not been widely investigated. Cognitive decline, a common health complication among older adults, deactivates the older adults' mental functions, as it also limits the older adults' learning processes and executive functions which include cognitive abilities, such as planning, organizing and the ability to perform mental activities (Harada et al., 2013). Prospective studies of older adults reported a higher odds of poor SRH among those with a decrease in cognitive capacity, deterioration in the amount of information that the brain can recall at a specific time, compared to those with slight or no decrease (Bond et al., 2006; Carmelli et al., 1997; Leinonen et al., 2001). Bendayan et al. (2016) reported that the decline in older adults' SRH, over eight years' time span, was associated with a faster decline in their memory scores, assessed using immediate and delayed free recall of a word list (Bendayan et al., 2016). A strong association was found between fair/poor SRH and increase in cognitive change-computed by averaging the standardized scores of seven neuropsychological tests: immediate and delayed recall, digits backward, spot-the-word, symbol-digit modalities test, simple and complex reaction time (Sargent-Cox et al., 2011).

Little attention has been given in the Arab region to research on SRH among older adults. The limited data show a wide range of prevalence figures; for example, a cross-sectional study conducted in the Kingdom of Saudi Arabia indicated close to 35% of Saudi participants aging 65 and above reported fair and poor SRH (Moradi-Lakeh et al., 2015). Sibai et al. (2017) studied SRH in urban poor neighborhoods in Lebanon and results showed that proportion with poor SRH was highest in a refugee camp (43.5%) (Sibai et al., 2017). Moreover, a cross-sectional study of women living in six Arab countries, including Lebanon, examined the validity of SRH in predicting self-reported physical health problems showed a positive and strong association between increase in number of chronic condition and reporting fair/poor SRH (Abdulrahim & El Asmar, 2012). None of the national studies addressed cognitive decline with SRH.

Ageing of the population is one of the most significant mega trends of the twenty first century, and Lebanon is no exception (Desa, 2019; Nations, 2019). Currently, the percentage of older adults aging 65 and above living in Lebanon is estimated at 7.3% and this is expected to increase to 21% by 2050 (Sibai et al., 2014). In general, aging raises concerns about cognitive decline and overall wellbeing of the older adult population.

This study fills the gap in literature by assessing the association between cognitive decline and SRH among older adults in Lebanon. Detecting cognitive decline at early stage would help caregivers and health workers to follow up on elderly's mental health and prevent its further deterioration.

MATERIAL AND METHODS

A. Data Sources

This is a secondary analysis of data collected for a cross-sectional study conducted in 2013, that aimed at investigating prevalence of dementia and cognitive decline and their associated factors. The study targeted older adults aging 65 years and above living in Lebanon's capital city, Beirut, and Mount Lebanon, the largest governorate (Phung et al., 2017). A multistage cluster sampling was used where seven out of sixty clusters in Beirut were randomly chosen and sixteen villages in Mount Lebanon in which villages were randomly chosen and weighted according to their respective sizes (Phung et al., 2017). Among the selected clusters, trained interviewers checked each house to recruit participants and at last 508 elderly participated in the study (322 from Beirut, 186 from Mount Lebanon). Trained interviewers collected comprehensive data from older adults and their informants, a person who best knew the older person, through face-to-face interviews. All older adults completed the decision-making competency (DMC) test to ensure that they were able to answer the questions. A total of 446 older adults had complete data on SRH and cognitive decline. Individuals diagnosed with dementia were excluded (27 older adults). The final sample size considered in this paper was 419.

B. Concepts and Measures

SRH, the outcome of interest, was assessed using a single question: "How do you rate your overall health in the past 30 days?" measured on a 5-point Likert scale: Very good, Good, Moderate, Bad, and Very bad. Ninety-three participants reported "very good", 152 "good", 174 "moderate", 27 "bad", and 0 "very bad". Based on categorization of SRH in the literature (Bendayan et al., 2016; Dong et al., 2017; Sargent-Cox et al., 2011), and the observed frequency for each SRH category in our study, SRH was dichotomized into "good/very good" and "moderate/bad/very bad".

Cognitive decline, the main exposure, was assessed using the Arabic validated version of the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) questionnaire, a 16-item questionnaire addressed to an informant, and that rates the change in cognitive function over time (Phung et al., 2015). The IQCODE questions are used to test the individual's memory to check whether it stayed the same, improved or became worse compared to 10 years ago. Examples of questions in the survey are: Remember events that have happened recently, remember where things are, knowing how to work familiar machines around the house, learning to use a new gadget or machine around the house. The response for each question was rated using a 5-point Likert scale: (1) much improved, (2) a bit improved, (3) not much change, (4) a bit worse, and (5) much worse. An average score was computed and dichotomized based on a 3.34 cutoff. It has been found that a score > 3.34 yielded the best sensitivity (92.5%) and specificity (94.4%) for dementia screening (Phung et al., 2015). In this study the average score ranged between 1.38 and 5.00 and an average score greater than 3.34 indicated a cognitive decline.

The following covariates were examined given evidence on their association with SRH: demographic and socioeconomic characteristics (age, gender, marital status, source of income, educational level, and self-rated social status); lifestyle factors (smoking status and physical exercise engagement between 40-64 years of age); mental health (depression - determined using the Geriatric Mental State Agecat Package (GMS) questionnaire) (Copeland, Dewey, &

Griffiths-Jones, 1986), and physical health (presence of chronic diseases and experiencing body pain in the past 30 days due to health issues).

C. Statistical Analysis

A power analysis adjusted for cluster effect revealed that the sample size of 419 was large enough to conduct regression analysis and reach valid inferences and reliable estimates with a power of 80%, significance of 5%, and 12 predictors in a regression framework.

Pearson's Chi-square tests were conducted to test the statistical significance of the univariate associations between SRH, the outcome, and the covariates, and between cognitive decline as main exposure and the covariates. Factors that had p-values of 0.2 and below at the univariate level were included in the multivariable model. Simple and multivariable logistic regressions adjusted for cluster effect at the level of clusters in each governorate were carried out with SRH being the binary outcome of interest. Unadjusted and adjusted odds ratios (ORs) of "moderate/bad" self-rated health versus "good/very good", their corresponding 95% confidence intervals, and p-values were reported. Goodness of fit tests were conducted to check whether the regression models fitted the data. Statistical analysis was performed using the software STATA version 12.

RESULTS

A. Sample Profile

The highest proportion of older adults in the sample were between 65 and 69 (46.8%) and were females (53.5%) (Table 1). Moreover, 146 older adults were without a partner (never married, widowed, divorced/separated) (34.9%) at the time of the survey. The majority of the sample had some formal education ranging from primary school to university (82.6%) and the highest proportion reported at least one source of income (84%). More than half were non-smokers and suffered from chronic diseases (63.8% and 67.8% respectively), and close to two thirds were not physically active in midlife (76.7%). Fourteen percent rated their social status as worse or much worse compared to other Lebanese older people. Little bit less than one in 10 of older adults were depressed and around one-fifth experienced body pain (22.9%). Out of the 419 older adult participants, 178 (42.5%) reported moderate/bad SRH, with the highest proportion reporting moderate SRH (37.7%). The proportion of older adults who had cognitive decline based on an IQCODE score greater than 3.34 was 8.8%.

Table 1. Descriptive and bivariate analysis of SRH, cognitive decline, and other covariates with crude ORs accounting for cluster effect.

Covariates			Total Frequency (%)	N (%) Moderate/Bad SRH	Un-adjusted OR	95 % CI for unadjusted OR	p-value
	cognitive decline	no	382 (91.2 %)	148 (38.7 %)	1	-	-
		yes	37 (8.8 %)	30 (81.1 %)	6.78	(4.16 – 11.05)	<0.001
Demographic	age	(65 – 69)	196 (46.8 %)	54 (27.6 %)	1	-	-

		(70 – 79)	150 (35.8 %)	75 (50 %)	2.63	(1.69 – 4.08)	<0.001
		(80 +)	73 (17.4 %)	49 (67.1 %)	5.37	(2.83 – 10.2)	<0.001
	gender	female	244 (53.5 %)	121 (54 %)	1	-	-
		male	195 (46.5 %)	57(29.2 %)	0.35	(0.23 – 0.53)	<0.001
Socioeconomic	marital status	no spouse currently	146 (34.9 %)	81 (55.5 %)	1	-	-
		with a spouse currently	272 (65.1 %)	97 (35.7 %)	0.44	(0.28 – 0.7)	<0.001
	source of income	no	67 (16 %)	43 (64.2 %)	1	-	-
		yes	351 (84 %)	135 (38.5 %)	0.35	(0.21 – 0.58)	<0.001
	educational status	no formal education	73 (17.4 %)	43 (58.9 %)	1	-	-
		formal education	346 (82.6 %)	135 (39 %)	0.45	(0.3 – 0.66)	<0.001
	social status	worse/much worse	59 (14.1 %)	34 (57.6 %)	1	-	-
		approximately the same/better/much better	359 (85.9 %)	144 (40.1 %)	0.49	(0.29 – 0.84)	0.01
Mental Health	depression status	no	384 (91.6 %)	153 (39.8 %)	1	-	-
		yes	35 (8.4 %)	25 (71.4 %)	3.77	(2.06 – 6.91)	<0.001
Physical Health	chronic diseases	no	133 (32.2 %)	30 (22.6 %)	1	-	-
		yes	280 (67.8 %)	147 (52.5 %)	3.79	(2.48 – 5.81)	<0.001
	experienced body pain	no	323 (77.1 %)	97 (30 %)	1	-	-
		yes	96 (22.9 %)	81 (84.4 %)	12.58	(6.59 – 24)	<0.001
Lifestyle	smoking status	non-smoker	252 (63.8 %)	113 (44.8 %)	1	-	-
		smoker	143 (36.2 %)	54 (37.8 %)	0.75	(0.44 – 1.28)	0.288
	exercise during middle age	not active during middle age	274 (76.7 %)	108 (39.4 %)	1	-	-
		active during middle age	83 (23.3 %)	39 (46.9 %)	1.36	(0.9 – 2.05)	0.139

B. Univariate Associations

Table 1 presents crude associations of cognitive decline and other covariates with SRH. Cognitive decline was significantly associated with SRH with an odds ratio of 6.78 (95% CI for the unadjusted OR [4.16 – 11.05]). Gender, marital status, source of income, educational status, and social status, were significantly associated with SRH at 0.05 level of significance. Moreover,

the presence of body pain, having chronic diseases, depression, and increasing age were all significantly associated with increased odds of moderate/bad SRH.

The unadjusted associations between all covariates and cognitive decline, the main exposure, are reported in Table 2. Age, gender, depression status, experiencing body pain, and smoking status were significantly associated with cognitive decline at 0.05 level of significance.

Table 2. Bivariate analysis of the exposure (cognitive decline) and other covariates accounting for cluster effect.

Covariates		N (%) Cognitive Decline	p-value	
Demographic	age	(65 – 69)	6 (3.1 %)	-
		(70 – 79)	21 (14 %)	<0.001
		(80 +)	10 (13.7 %)	0.014
	gender	female	26 (11.6 %)	-
male		11 (5.6 %)	0.024	
Socioeconomic	marital status	no spouse currently	14 (9.6 %)	-
		with a spouse currently	23 (8.5 %)	0.734
	source of income	no	10 (14.9 %)	-
		yes	27 (7.7 %)	0.257
	educational status	no formal education	9 (12.3 %)	-
		formal education	28 (8.1 %)	0.378
social status	worse/much worse	7 (11.9 %)	-	
	approximately the same/better/much better	28 (9.3 %)	0.567	
Mental Health	depression status	no	29 (7.6 %)	-
		yes	8 (22.9 %)	0.006
Physical Health	chronic diseases	no	9 (6.8 %)	-
		yes	28 (10 %)	0.077
	Experienced body pain	no	21 (6.5 %)	-
		yes	16 (16.7 %)	0.012
Lifestyle	smoking status	non-smoker	30 (11.9 %)	-
		smoker	5 (3.5 %)	0.011
	exercise during middle age	not active during middle age	14 (5.1 %)	-
		active during middle age	6 (7.2 %)	0.56

C. Multivariable Analysis

All covariates that had a p-value that is less than or equal to 0.2 at the univariable level were eligible to be included in the multivariable model and were therefore included in the multiple logistic regression. These variables were cognitive decline, age, gender, marital status, source of income, educational status, self-rated social status, depression status, chronic diseases, experienced body pain, and exercise during middle age.

After adjusting for age, gender, marital status, educational status, self-reported social status, depression status, chronic diseases, experienced body pain, and exercising during middle age, the odds of older adults reporting moderate/bad SRH for those with cognitive decline was 2.91 times that of older adults with no cognitive decline (95% CI = [1.22 – 6.99], p-value = 0.016). Experiencing body pain was also reported as a significantly associated factor of SRH with the highest OR = 8.88 and 95% CI = [4.4 – 17.9]. Age has a significant role on SRH since the adjusted ORs of reporting moderate/bad SRH increased with age (adjusted OR = 2.39 for those aging between 70 and 79 with 95% CI = [1.28 – 4.46] compared to those aging between 65 and 69, adjusted OR = 5.2 with 95% CI = [1.98 – 13.7] for those aging 80 and above compared to those aging between 65 and 69). Being a male and reporting a good social status are associated with significantly lower odds of moderate/poor SRH compared to their counterparts (ORs 0.3 and 0.46 respectively) (Table 3).

Table 3. Unadjusted vs adjusted ORs, 95 % confidence intervals, and p-values of different predictors of poor SRH accounting for cluster effect.

Covariates			Un-adjusted OR	95 % CI for unadjusted OR	p-value	Adjusted OR (model 3)	95 % CI for adjusted OR (model 3)	p-value (model 3)
	cognitive decline	no	1	-	-	1	-	-
		yes	6.7	(4.15 – 11.05)	<0.001	2.91	(1.22 – 6.99)	0.016
Demographic	age	(65 – 69)	1	-	-	1	-	-
		(70 – 79)	2.63	(1.69 – 4.08)	<0.001	2.39	(1.28 – 4.46)	0.006
		(80 +)	5.37	(2.83 – 10.2)	<0.001	5.2	(1.98 – 13.7)	0.001
	gender	female	1	-	-	1	-	-
		male	0.35	(0.23 – 0.53)	<0.001	0.3	(0.13 – 0.67)	0.003
Socioeconomic	marital status	no spouse currently	1	-	-	1	-	-
		with a spouse currently	0.45	(0.282 – 0.7)	<0.001	1.39	(0.74 – 2.65)	0.307
	educational status	no formal education	1	-	-	1	-	-
		formal education	0.45	(0.3 – 0.663)	0.0001	0.77	(0.42 – 1.41)	0.401
	social status	worse/much worse	1	-	-	1	-	-
		approximately the same/better/much better	0.49	(0.287 – 0.843)	0.0097	0.46	(0.29 – 0.69)	<0.001
Mental Health		no	1	-	-	1	-	-

	depression status	yes	3.77	(2.06 – 6.9)	<0.001	1.93	(0.69 – 5.37)	0.211
Physical Health	chronic diseases	no	1	-	-	1	-	-
		yes	3.79	(2.48 – 5.8)	<0.001	1.64	(0.83 – 3.25)	0.153
	experienced body pain	no	1	-	-	1	-	-
		yes	12.58	(6.6 – 24.0)	<0.001	8.88	(4.4 – 17.9)	<0.001
Lifestyle	exercise (middle)	no	1	-	-	1	-	-
		yes	1.36	(0.904 – 2.05)	0.139	0.71	(0.4 – 1.24)	0.227
Goodness of fit p-value						0.1233		

DISCUSSION

This study provided preliminary evidence that cognitive decline is associated with SRH among older adults 65 years and above in the Lebanese context. Our results are in line with what has been reported in other studies. These studies have examined cognition using different terms such as cognitive performance (Carmelli et al., 1997), cognitive capacity (Leinonen et al., 2001), memory (Bendayan et al., 2016), cognitive change (Sargent-Cox et al., 2011), and cognitive impairment (Bond et al., 2006); yet all terms refer to cognition function in general. Furthermore, when the association between memory decline and SRH was considered longitudinally, results showed that elderly people with good SRH had minimal memory decline compared to those with bad SRH; and hence, the alteration in memory decline can be classified by the change in SRH and SRH status can be used as a “marker” for cognitive decline as described by Bendayan et al. (2017).

Older adults with cognitive decline encounter several barriers that make them feel uncomfortable when their cognitive skills start deteriorating. For instance, they lose self-confidence and feel angry, lonely, threatened, anxious, ashamed, and socially rejected (Joosten-Weyn Banningh et al., 2008). Moreover, older adults feel uncomfortable and embarrassed about their condition specially when their brain’s processing speed decreases which makes it hard for them to follow up on a conversation; hence, they withdraw from social event and isolate themselves (Howieson, 2015; Morris et al., 2004). Besides that, forgetting the names and people’s information make older adults feel anxious and awkward as well as it threatens their social confidence (Morris et al., 2004). In such cases, older adults with social isolation are more likely to report an increase in depression symptoms and cognitive decline leading to poor SRH (Alexopoulos, 2005; Dotson et al., 2010). For instance, a longitudinal study conducted in Chicago metropolitan area indicated that the rate of cognitive decline was reduced by around 70% for socially active older adults compared to those with inactive social life (James et al., 2011). On the other hand, some older adults shift to avoidance and denial which increase their risk of depression (Arnett et al., 2002; Carver et al., 1989; Rabinowitz & Arnett, 2009).

This study also reported a significant association between gender and SRH similar to studies conducted among Arab immigrants in the United States as well as in Brazil, Spain, and Uganda (Abdulrahim & Baker, 2009; Confortin et al., 2015; Wandera et al., 2015; Zunzunegui et al., 2001; Zunzunegui et al., 2006). The explanations for women’s poorer SRH have been linked to psycho-social reasons such as depression, fatigue, work stress, and nervousness, and

to presence of chronic diseases (Confortin et al., 2015; Salem et al., 2009; Szwarcwald et al., 2005; Wandera et al., 2015; Whiteford, 2002; Zunzunegui et al., 2001; Zunzunegui et al., 2006). Furthermore, adults aging 45 and above suffering from body pains (shoulder, neck, or back) that interrupt their daily life activities was reported as one of the factors that are associated with future poor SRH after controlling for age, sex, illness, education and socio-economic status (Svedberg et al., 2006). Likewise, experienced body pain was one of the variables that was highly associated with SRH with adjusted OR = 8.88.

This was a population-based study that targeted community older adults aged 65 years and above living in the largest two governorates of Lebanon, with a powerful sample size, using validated measures, and including an adequate number of covariates. Nevertheless, this study has some limitations. First, it was based on a cross-sectional design where there is no evidence of a temporal relationship between the exposure, cognitive decline, and SRH. Second, it was challenging to compare cognitive decline results with similar studies given the different tools employed. Third, it was also challenging to compare SRH results with other studies since SRH question has been used in several versions with different types of categorizations.

➤ Implications

Besides the studies that reported an association between SRH and mortality and chronic conditions, such as: cancer, stroke, heart attack, diabetes, asthma/bronchitis and arthritis; this study indicated that SRH is correlated with cognitive decline as well. SRH is a simple question that can be used by non-physicians, such as caregivers, to give a signal for whether older adult is suffering from cognitive decline even before being diagnosed by the physicians. Therefore, it is suggested that caregivers regularly ask older adults about their health, and if any negative change in the response arises; then, this might be a clue for cognitive decline. In such cases, caregivers may start implementing some training exercises to improve older adults' cognitive skills, besides to referring older adults to geriatricians to assess their mental health.

Moreover, primary health care physicians, geriatricians, geriatric psychiatrists, neurologists and neuropsychologists may use the SRH question as an additional tool in their assessment and follow-up evaluation. Likewise, social workers who are doing evaluation on older adults, may include SRH question in their estimation that will add extra information about older adult's mental health especially regarding cognitive decline.

When studying mental health features, it is somehow indirectly linked to cognitive function since while answering the SRH question, older adults refer to mental health factors such as social status, depression, and anxiety more than physical health aspects such as disability and chronic diseases (Idler, 1993).

CONCLUSION

This is the first study in Lebanon to provide evidence of association between cognitive decline and SRH among older adults. Cognitive decline may be one of the aspects that makes older adults uncomfortable about their health. Older adults with cognitive decline are more likely to report moderate/bad SRH compared to those with no cognitive decline. Therefore, moderate/bad SRH may be a signal for cognitive decline, additional to other bodily ailments, notably pain.

To better understand the relationship between cognitive decline and SRH, future studies are recommended to examine this association among older adults living in rural regions and in different countries. Moreover, longitudinal studies are also needed to determine the long-term relationship between cognitive decline and SRH especially in areas where the proportion of older adults is in rapid growth.

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