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# Life and health satisfaction and their association toward health-related quality of life, body mass index and chronic diseases in Iran

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## Abstract:

**BACKGROUND:** The study aimed to investigate the associations between life and health satisfaction with health-related quality of life (HRQoL), body mass index (BMI) and chronic disease among people who are covered by health insurance schemes in Tehran city, Iran.

**METHODS:** A cross-sectional study was conducted in Tehran city, Iran, from May to June 2016. A total of 600 people were included in the study using a cluster sampling technique. The questionnaire that used for data collection included demographic and socioeconomic variables, questions about health variables such as chronic disease, weight, height, smoking status, and EQ-5D-3L questionnaire. Two univariate and multivariate regression models performed to examine affecting factors on life and health satisfaction.

**RESULTS:** The univariate regression showed that on average female have 0.22 and 0.69 score lower than males with their life and health satisfaction, respectively. Explanatory variables of gender, age, level of education, and employment status were not significantly associated with life and health satisfaction in multiple regression models. However, marital status was correlated with life satisfaction. Furthermore, HRQoL, BMI and chronic disease and smoking were associated with dependent variables ( $P < 0.001$ ).

**CONCLUSIONS:** The result showed that there was a strong association between BMI, HRQoL, chronic disease, and life and health satisfaction among participants. Therefore, the Iranian policymakers need to consider these factors on life and health satisfaction of adults and design health-promoting programs to improve health outcomes of them. Further studies should assess the associations between BMI, HRQoL, chronic conditions, and life and health satisfaction among Iranian adults.

## Keywords:

Body mass index, chronic diseases, health-related quality of life, health satisfaction, life satisfaction, Iran

## Introduction

Measurements of well-being of people with an appropriate index have been a challenge for policy makers and health researchers. Life satisfaction, as an index of individuals' well-being, was introduced in the 18<sup>th</sup> century and its concept developed in next years. In addition,

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the term Quality of Life (QOL) emerged in the 20<sup>th</sup> century.<sup>[1]</sup> In this century, the subjective well-being (SWB) indicators replaced with traditional economic indices, whereas economists have accepted SWB indicators as one of the main indicators of social welfare.<sup>[1,2]</sup> Furthermore, many developed countries have been focused on providing data and evidence on SWB to informed policymaking.<sup>[3-5]</sup>

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When well-being of individuals is defined or evaluated by themselves, it is termed SWB. Meanwhile, life satisfaction is one of the three separable elements of SWB. There are various definitions for this term. According to Diener *et al.*, life satisfaction is “individual’s cognitive judgment about comparisons based on the compatibility of their own living conditions with the standards.”<sup>[6]</sup> In addition, Ruut Veenhoven believed that “Life satisfaction is the degree to which a person positively evaluates the overall quality of his/her life-as-a-whole.”<sup>[7]</sup> Furthermore, life satisfaction is known as an indicator of positive well-being.<sup>[8]</sup> Socioeconomic variables, marital status, chronic conditions, and other related factors have been shown as predictors of life satisfaction.<sup>[9,10]</sup>

Furthermore, several studies have been investigated the associations between life satisfaction and variables related to population health such as health outcomes, Health-Related QOL (HRQoL), and health behaviors. These studies suggest the strong associations between life satisfaction and physical and mental health.<sup>[11-14]</sup> In a study in the U.S., Strine *et al.* showed that the prevalence of physical and mental disorders such as disability, poor health, anxiety, depression, and pain will increase with decreasing the level of life satisfaction. Also, this study implies that there are inverse associations between the life satisfaction and prevalence of negative health-related behaviors such as smoking, drinking, and physical inactivity.<sup>[11]</sup> However, another study in 21 countries on young adults showed that life satisfaction is not positively correlated with health behaviors such as smoking, physical activity, and alcohol consumption after adjusting for demographic variables.<sup>[12]</sup> Meanwhile, life satisfaction shown to be a good predictor of morbidity and mortality.<sup>[15]</sup> Also, there are a positive association between SWB (life satisfaction), health, and longevity.<sup>[16,17]</sup>

There is limited evidence on life and health satisfaction and affecting factors in developing countries such as Iran. A study in Iran showed that age, marital status are the main determinants of life and health satisfaction in adults.<sup>[18]</sup> Another study indicated that life satisfaction is a predictor of mental health in students in Tehran. Also, the marital status is positively associated with mental health, higher level of life satisfaction, and social support feeling.<sup>[19]</sup> Another study indicated that personality traits, such as self-esteem could effect on life satisfaction in Iranian students.<sup>[20]</sup> Besides, the existing evidence did not include health-related factors such as body mass index (BMI), chronic condition, smoking, and HRQoL. These factors are the most important determinants of HRQoL and health in population. However, the association of these risk factors on health satisfaction, and life satisfaction is not well-known in Iran. Considering the importance of this evidence for policy making, this

study aimed to investigate the associations between life and health satisfaction with HRQoL, BMI, and chronic disease among people who are covered by health insurance schemes in Tehran city, Iran. Our findings can help to policymakers and health insurance organization to know the relation between included variable with health and life satisfaction and use this information to design some interventions to change these risk factors to improve life and health satisfaction in the population.

## Methods

This was a cross-sectional study that conducted in Tehran, Iran. A total of 600 people who referred to health insurance companies were included in the study using cluster sampling technique. For this purpose, Tehran city divided into five geographical zones, northern, southern, central, western, and eastern. Then one branch of the two main insurance agencies, Social Health Insurance and Iranian Health Insurance were selected randomly. After that, the number of sample in each branch was determined proportionally to size and in terms of number of people who were covered. The inclusion criteria were the age of 18 years and more and consent to participate in the study. People who had cognitive disorders were excluded from the study. The data were gathered from May to June 2016.

For data collection we used a standard questionnaire that performed in a similar study.<sup>[18]</sup> The questionnaires had some parts. The first part included demographic and socioeconomic variables such as sex, age, marital status, employment status, years of schooling, and monthly income of households. The second part involved questions about health variables such as the presence of any chronic disease, weight, height, smoking status of participants, and EQ-5D-3L questionnaire. The BMI was calculated by data on weight and height and according to the World Health Organization criteria<sup>[21]</sup> categorized into three groups: normal (BMI <25 kg/m<sup>2</sup>), overweight (BMI ≥25–30 kg/m<sup>2</sup>), and obese (BMI ≥30 kg/m<sup>2</sup>). In addition, EQ-5D-3L questionnaire was used to measure HRQoL of participants. The Iranian value set for EQ-5D-3-L was implied to calculate HRQoL.<sup>[22]</sup> HRQoL categorized into three groups: poor (HRQoL <0.5), moderate (0.8 > HRQoL ≥0.5), and good (HRQoL ≥0.8). The third part of questionnaire compromise life and health satisfaction questions include: “Overall, how satisfied are you with your life (health)?” on a 0–10 scale where zero implied not satisfied at all and 10 showed completely satisfied. The personal consent to participate in the study and being 18 and more years old in the time of data collection were inclusion criteria.

The two univariate and multivariate regression models performed to examine affecting factors on life and

health satisfaction. The Breusch–Pagan test was used to test heteroscedasticity in residuals. This test showed heteroscedasticity in the fitted models. Therefore, to allow heteroscedasticity in regression models robust standard errors estimated for all included variables. The Ramsey Regression Equation Specification Error Test was used to test functional misspecification in multiple models. All analysis performed by Stata V. 14 (StataCorp., College Station, TX, USA).

## Results

The total number of individuals was 600 people. Of whom, 327 (54.5%) were male. The response rate was 93.5%. The mean (standard deviation [SD]) age was 41.48 (14.67) years. The mean (SD) years of schooling of participants was 12.36 (4.63) years. In addition, the mean (SD) BMI of participants was 25.75 (4.25) kg/m<sup>2</sup>. The mean (SD) of HRQoL of participants was 0.74 (0.16). The details of HRQoL of participants have been reported in another article.<sup>[23]</sup> The mean (SD) score of health satisfaction and life satisfaction, on a scale of 0–10, were 7.33 (2.14) and 7.04 (2.84), respectively. About 27% of participants were single and 63.17% of them were married with their marital status. Thirty-eight subjects (6.33%) and 316 (52.67%) were unemployment and employed with their employment status, respectively. In addition, 338 (56.33%) of subjects have at least one chronic disease and 95 people (15.83%) were current smoker.

The univariate regression showed that on average female have 0.22 score lower than males with their life satisfaction. Explanatory variables of age, employment status have not a significant association with life satisfaction. However, marital status was correlated with life satisfaction. Married individuals on average had 0.54 score higher than never married people with regarding a 0–10 score on life satisfaction ( $P < 0.05$ ). The widowed, divorced, or separated individuals were less satisfied with their life ( $P > 0.05$ ). Participants with 14 years of schooling and more, on average significantly had 0.89 score higher than others with 0–8 years of schooling ( $P < 0.01$ ). The current smokers had 0.74 scores less than subjects who did not smoke in the time of the study ( $P < 0.05$ ). In addition, HRQoL was strongly associated with life satisfaction ( $P < 0.001$ ). Participants with 30 and more BMI score on average rated their life satisfaction 1.15 score less than other participants with normal BMI ( $P < 0.001$ ).

In the multiple regression model, the variables of marital status, smoking, HRQoL, and BMI were correlated with life satisfaction. Married individuals had a higher average score than those who never married ( $\beta = 0.91, P < 0.001$ ). Also, respondents with moderate and good HRQoL had significantly higher average score with their life

satisfaction ( $P < 0.001$ ). Higher BMI was negatively associated with life satisfaction. In ceteris paribus (other things being equal), obese respondents (with BMI  $\geq 30$ ) on average had 0.73 score less than that of normal group, on a 0–10 scale for life satisfaction ( $P < 0.05$ ). Age and gender had no significant correlation with the dependent variable. However, subjects in middle age groups (25–35, 35–44, 45–54 years old) had a lower score than reference group (<25 years old). The multiple regression model was statistically significant ( $P < 0.001$ ), and adjusted  $R^2$  was 0.19 [Table 1].

The univariate model for health satisfaction showed that all explanatory variables, except smoking, significantly are associated with health satisfaction. Female respondents on average reported 0.69 score lower than male ( $P < 0.001$ ). Older subjects had lower scores on health satisfaction and the coefficients were statistically significant for all age group, except 25–34 years group ( $P < 0.05$ ). Married respondents had lower scores ( $\beta = -0.5$ ) than never married group ( $P < 0.01$ ). Furthermore, other group (widowed, divorced, or separated subjects) on average had 1.35 point lower than in never married group ( $P < 0.001$ ). On average, life satisfaction score, on a 0–10 scale, in respondent with moderate and good HRQoL was 2.65 and 4.11 scores higher than in the reference group ( $P < 0.001$ ). Obese respondents and respondents with a chronic disease had lower life satisfaction ( $P < 0.001$ ).

In the multiple regressions, employment status, smoking status, HRQoL, BMI, and chronic disease were statistically correlated with health satisfaction. With regarding employment status, employed and homemaker on average had lower scores than unemployed ( $P < 0.05$ ). Smoking was negatively correlated with health satisfaction ( $P < 0.05$ ), and current smokers, on average, had 0.41 score lower than that of the respondent who did not smoke in the time of the study. Even after control the other variables, HRQoL was significantly correlated with health satisfaction and respondents with moderate and good HRQoL reported on average 2.36 and 3.55 scores higher than in the reference group ( $P < 0.001$ ). BMI was inversely correlated with health satisfaction and obese subjects (BMI  $\geq 30$ ), on average reported 0.51 score lower than that of the reference group (BMI <25) ( $P < 0.05$ ). Finally, having a chronic disease decreased health satisfaction by 0.44 on a 0–10 scale ( $P < 0.05$ ). Adjusted  $R^2$  for the multiple regression model of health satisfaction was 0.32 and this model was statistically significant ( $P < 0.001$ ) [Table 2].

## Discussion

Our findings showed that both health and life satisfaction may be an important for health care in Iran. Therefore,

**Table 1: Determinants of life satisfaction in univariate and multiple regression analysis**

Variables	Univariate regression		Multiple regression	
	Coefficient	Robust SE	Coefficient	Robust SE
Gender				
Male				
Female	-0.22	0.23	-0.23	0.27
Age				
<25				
25-34	0.27	0.42	0.21	0.41
35-44	-0.31	0.45	-0.23	0.48
45-54	-0.43	0.49	-0.11	0.54
55-64	-0.60	0.51	-0.32	0.57
>65	-0.20	0.51	0.10	0.55
Marital status				
Never married				
Married	0.54***	0.26	0.91*	0.30
Others (widowed, divorced, or separated)	-0.66	0.44	0.58	0.54
Years of schooling				
0-8				
9-13	0.33	0.36	-0.03	0.38
≥ 14	0.89**	0.34	0.45	0.39
Employment status				
Unemployed				
Employed	-0.06	0.44	-0.27	0.43
Homemaker	0.12	0.49	0.55	0.51
Others	-0.12	0.49	0.04	0.50
Smoking				
No				
Yes	-0.74***	0.33	-0.73**	0.32
Health-related quality of life				
Poor				
Moderate	1.84*	0.47	1.70*	0.52
Good	3.43*	0.47	3.02*	0.56
BMI				
Normal				
Overweight	0.26	0.24	0.26	0.23
Obese	-1.15*	0.41	-0.73****	0.41
Presence of any chronic diseases				
No				
Yes	-1.38*	0.22	-0.41	0.27
Constant			3.55*	0.85
Adjusted R <sup>2</sup>				0.19
F (19, 580)				7.96
Breusch-Pagan				41.94
Ramsey RESET				1.82

\*Significant at  $P<0.001$ , \*\*Significant at  $P<0.01$ , \*\*\*Significant at  $P<0.05$ , \*\*\*\*Significant at  $P<0.1$ . BMI=Body mass index, RESET=Ramsey regression equation specification error test, SE=Standard error

this study result showed that the majority (63.17%) of the people who are covered their health care services with health insurance schemes in Iran was married and only 27% of them were single by marital status. In contrast, a study was conducted in Ghana by Akazili *et al.* suggested that most (41.3%) of insured people were married; however, only 37.3% of unmarried. It indicated that there was correlation between health insurance and their marital status in the country.<sup>[24]</sup> Similar to our findings, a study conducted in Iran by Daroudi *et al.* found that

satisfaction with life and health among never-married and married participants was significantly higher than divorced respondents.<sup>[18]</sup> Also, similar to Daroudi *et al.*'s study, we found a U-shape relationship between age and life satisfaction.<sup>[18]</sup>

According to our findings, most (52.67%) of people who are covered their health-care services with health insurance schemes in Iran were employed. However, >10% of those who had covered their health insurances

**Table 2: Determinants of health satisfaction in univariate and multiple regression analysis**

Variables	Univariate regression		Multiple regression	
	Coefficient	Robust SE	Coefficient	Robust SE
Gender				
Male				
Female	-0.69*	0.18	-0.28	0.19
Age				
<25				
25-34	-0.10	0.27	0.06	0.26
35-44	-0.73***	0.30	-0.08	0.31
45-54	-1.05**	0.34	0.03	0.33
55-64	-1.14*	0.35	-0.07	0.35
>65	-0.74***	0.32	0.30	0.33
Marital status				
Never married				
Married	-0.50**	0.19	-0.04	0.21
Others	-1.35*	0.36	0.13	0.36
Years of schooling				
0-8				
9-13	0.56***	0.27	0.12	0.25
≥ 14	1.11*	0.26	0.20	0.25
Employment status				
Unemployed				
Employed	-0.32	0.29	-0.52***	0.26
Housewife	-1.39*	0.36	-0.74***	0.35
Others	-0.60	0.33	-0.44	0.33
Smoking status				
No				
Yes	-0.14	0.25	-0.41****	0.23
Health-related quality of life				
Poor				
Moderate	2.66*	0.39	2.36*	0.42
Good	4.11*	0.38	3.55*	0.43
BMI				
Normal				
Overweight	-0.31	0.18	-0.16	0.16
Obese	-1.30*	0.30	-0.51***	0.26
Presence of any chronic diseases				
No				
Yes	-1.47*	0.16	-0.45***	0.18
Constant			4.79*	0.61
Adjusted R <sup>2</sup>				0.32
F (19, 580)				11.77
Breusch-Pagan				65.10
Ramsey RESET				1.53

\*Significant at  $P < 0.001$ , \*\*Significant at  $P < 0.01$ , \*\*\*Significant at  $P < 0.05$ , \*\*\*\*Significant at  $P < 0.1$ . BMI=Body mass index, RESET=Ramsey regression equation specification error test, SE=Standard error

were unemployment. Unemployed and housewife had higher satisfaction with life. However, homemaker had the lower health satisfaction than other employment status. However, marital status was correlated with life satisfaction. Similar with a study was conducted in China by Gu *et al.* showed that the life satisfaction of the elderly who were single was lower than that of the elderly who had spouses.<sup>[25]</sup> Similarly, the study of Daroudi *et al.* showed that employment status and marital status are associated with life and health

satisfaction and these associations are weaker than other included variables.<sup>[18]</sup>

This study result revealed that the mean (SD) BMI of peoples who are covered their health-care services with health insurance schemes in Iran was  $(25.75 \pm 4.25)$  kg/m<sup>2</sup>. It supported by Fong and Franks (2008) adjusted probability of workers being offered and holding employment-based health insurance if offered by BMI  $\geq 30$  was 0.62. Moreover, there was no

any relationship between BMI and gender or age.<sup>[26]</sup> This may be insured people lifestyle and a time difference.

In the multiple regressions, BMI, smoking status, HRQoL, and chronic disease were strongly and significantly correlated with life and health satisfaction. The results showed that the life satisfaction of obese subjects were 1.15 scores less than peoples with normal BMI. In other hands, higher BMI was negatively associated with life satisfaction. Meanwhile, in *Ceteris Paribus*, the life satisfaction among obese respondents (with BMI  $\geq 30$ ) had scored an average of 0.73 less than normal groups. Furthermore, after adjusting for other variables, obese participants had lower health satisfaction. Another study showed that BMI and smoking status are significantly associated with health status (HRQoL) of adults who are covered by health insurance schemes in Iran.<sup>[23]</sup> An international study disclosed that there is a positive association between life satisfaction and health-promoting behaviors such as physical exercise, not smoking, healthy diet (limiting fat intake and taking fiber) after adjusting for demographic factors in young adults.<sup>[12]</sup> In addition, this study suggests a bidirectional association between life satisfaction and health-promoting behaviors. It is supported by Strine *et al.*, there are inverse association between the life satisfaction and prevalence of obesity, smoking, physical inactivity, and drinking. Also, peoples without to report life dissatisfaction were significantly less likely than adults with chronic illnesses.<sup>[11]</sup>

Findings from this study also indicate that the mean score of HRQoL of participants was 0.74 (0.16). Hence, the mean score of health satisfaction ( $7.33 \pm 2.14$ ) was more than the mean score of life satisfaction among the people who are covered their health-care services with health insurance schemes ( $7.04 \pm 2.84$ ). Meanwhile, the findings showed that an average life satisfaction score of female participants were lower by 0.22 than males. This study confirmed findings from previous research suggesting that life satisfaction is associated with several behavioral characteristics. As a study was conducted in Germany by Bock *et al.* the regression models showed that there was no any statistically significant differences among cognitive function, less depressive symptoms and better HRQoL among participants in private health insurance.<sup>[27]</sup> Also, Strine *et al.* showed that besides health behaviors, HRQoL is positively correlated with levels of life satisfaction.<sup>[11]</sup>

These study findings shown that after adjusting for other variables an average score of life satisfaction among participants with moderate HRQoL was 1.70 score higher than those reference groups. Moreover, those people who had good HRQoL were 3.02 score higher than reference groups in the study area. There was the difference between

smoker and nonsmoker in this study area. It indicated that the average score of smokers was 0.73 score higher than nonsmokers. Also, the respondents with moderate and good HRQoL had significantly higher average score with their life satisfaction. Similarly, Daroudi *et al.* felt that the scores for life satisfaction in respondents who rated their health status as excellent were higher than in those who rated their health status as poor.<sup>[18]</sup>

This study result shown that an obese respondents and respondents with a chronic disease had lower life satisfaction. More than half (56.33%) of the subjects have had at least one chronic disease. Nearly 16% of people had smoking habit. Gu *et al.* agreed that life satisfaction of the elderly has been negatively affected by chronic diseases and drinking habits in China. Especially, they found that sometimes the life satisfaction of the old aged groups is markedly increased by proper leisure activities and psychologically well-being.<sup>[25]</sup>

It is supported by a study conducted in Wee *et al.* suggested that the normal people reported better HRQoL than obese person. As a result, according to five classifications of BMI, the median overall HRQoL scores were not significantly difference among those classification and other related factors.<sup>[28]</sup> The evidence shows that after adjusting for confounders, thin (BMI  $< 18$  kg/m<sup>2</sup>) and obese people (BMI  $\geq 30$  kg/m<sup>2</sup>), have lower self-reported HRQoL than people with normal BMI.<sup>[29]</sup> In addition, the risk of mortality is higher in obese people. Atherosclerotic cardiovascular disease and cancer suggested as main causes of death in obese people, too.<sup>[30]</sup>

As more than 90% of people in Iran covered by health insurance after implementation of health evolution plan in 2014, the finding of this study could generalizable to adults' population of Iran. This study examined the effects of BMI, HRQoL, smoking, chronic condition on health, and life satisfaction for first time in Iran. However, the sampling was done by convenience sampling method, and this can decrease the generalizability of the results. Also, BMI was calculated by self-reported weight and height. Hence, this variable could suffer from some biases. Our findings provide new evidence about the relation between the main health risk factors and life and health satisfaction. The results can help to policymakers and health insurance organization to a better understanding about these topics and this information is helpful to design some interventions to change these risk factors to improve life and health satisfaction in the Iranian population.

## Conclusions

This study has identified the life and health satisfaction among adults with health insurance and their association

toward HRQoL, BMI, and chronic diseases in Iran. The result showed that there was strongly associated between BMI, HRQoL, chronic disease, and life, and health satisfaction among people who are covered by health insurance schemes in the country. Therefore, the Iranian policymakers need to awareness consider the significance of these factors on life and health satisfaction of adults and design health-promoting programs to improve health outcomes of them. Further studies should assess the associations among BMI, HRQoL, chronic conditions and life and health satisfaction among Iranian adults to provide more evidence in this area.

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### Conflicts of interest

There are no conflicts of interest.

### References

1. Prasoorn R, Chaturvedi K. Life satisfaction: A literature review. *Int J Manag Humanit Soc Sci* 2016;1:25-32.
2. Kahneman D, Krueger AB. Developments in the measurement of subjective well-being. *J Econ Perspect* 2006;20:3-24.
3. Diener E. Guidelines for national indicators of subjective well-being and ill-being. *J Happiness Stud* 2006;7:397-404.
4. OECD Better Life; 2017. Available from: <http://www.oecdbetterlifeindex.org/topics/life-satisfaction/>. [Last accessed on 2017 Sep 14].
5. Stiglitz J, Sen AK, Fitoussi JP. The Measurement of Economic Performance and Social Progress Revisited: Reflections and Overview; 2009.
6. Diener E, Emmons RA, Larsen RJ, Griffin S. The satisfaction with life scale. *J Pers Assess* 1985;49:71-5.
7. Veenhoven R. Conclusions. How Harmful is Happiness? Consequences of Enjoying Life or Not. Ch. 11. The Netherlands: Universitaire Pers Rotterdam; 1989.
8. Pressman SD, Cohen S. Does positive affect influence health? *Psychol Bull* 2005;131:925-71.
9. Enkvist A, Ekström H, Elmståhl S. What factors affect life satisfaction (LS) among the oldest-old? *Arch Gerontol Geriatr* 2012;54:140-5.
10. Chatfield WF. Economic and sociological factors influencing life satisfaction of the aged. *J Gerontol* 1977;32:593-9.
11. Strine TW, Chapman DP, Balluz LS, Moriarty DG, Mokdad AH. The associations between life satisfaction and health-related quality of life, chronic illness, and health behaviors among U.S. Community-dwelling adults. *J Community Health* 2008;33:40-50.
12. Grant N, Wardle J, Steptoe A. The relationship between life satisfaction and health behavior: A cross-cultural analysis of young adults. *Int J Behav Med* 2009;16:259-68.
13. Palmore E, Luikart C. Health and social factors related to life satisfaction. *J Health Soc Behav* 1972;13:68-80.
14. Fergusson DM, McLeod GF, Horwood LJ, Swain NR, Chapple S, Poulton R. Life satisfaction and mental health problems (18 to 35 years). *Psychol Med* 2015;45:2427-36.
15. Koivumaa-Honkanen H, Honkanen R, Viinamäki H, Heikkilä K, Kaprio J, Koskenvuo M, *et al.* Self-reported life satisfaction and 20-year mortality in healthy Finnish adults. *Am J Epidemiol* 2000;152:983-91.
16. Parker MG, Thorslund M, Nordström ML. Predictors of mortality for the oldest old. A 4-year follow-up of community-based elderly in Sweden. *Arch Gerontol Geriatr* 1992;14:227-37.
17. Diener E, Chan MY. Happy people live longer: Subjective well-being contributes to health and longevity. *Appl Psychol Health Well Being* 2011;3:1-43.
18. Daroudi R, Rashidian A, Zeraati H, Oliyaemanesh A, Akbari Sari A. Life and health satisfaction in the adult population of Iran. *Epidemiol Health* 2016;38:e2016047.
19. BakhshiPour RA, Peyrovi H, Abedian A. Investigating relationship between satisfaction with life and social support with mental health among freshman students of Tehran university. *QJ Fundam Ment Health* 2005;7:145-52.
20. Joshanloo M, Afshari S. Big five personality traits and self-esteem as predictors of life satisfaction in Iranian Muslim university students. *J Happiness Stud* 2011;12:105-13.
21. World Health Organization. BMI Classification: Global Database on Body Mass Index. Available from: [http://www.apps.who.int/bmi/index.jsp?introPage=intro\\_3.html](http://www.apps.who.int/bmi/index.jsp?introPage=intro_3.html). [Last accessed on 2017 Nov 15].
22. Goudarzi R, Zeraati H, Akbari Sari A, Rashidian A, Mohammad K. Population-based preference weights for the EQ-5D health states using the visual analogue scale (VAS) in Iran. *Iran Red Crescent Med J* 2016;18:e21584.
23. Karyani AK, Rashidian A, Sefiddashti SE, Sari AA. Self-reported health-related quality of life (HRQoL) and factors affecting HRQoL among individuals with health insurance in Iran. *Epidemiol Health* 2016;38:e2016046.
24. Akazili J, Welaga P, Bawah A, Achana FS, Oduro A, Awoonor-Williams JK, *et al.* Is Ghana's pro-poor health insurance scheme really for the poor? Evidence from Northern Ghana. *BMC Health Serv Res* 2014;14:637.
25. Gu L, Feng H, Jin J. Effects of medical insurance on the health status and life satisfaction of the elderly. *Iran J Public Health* 2017;46:1193-203.
26. Fong RL, Franks P. Body mass index and employment-based health insurance. *BMC Health Serv Res* 2008;8:101.
27. Bock JO, Hajek A, Lühmann D, Ernst A, Mamone S, Wiese B, *et al.* Health insurance in old age and differences in cognition, depressive symptoms and health-related quality of life. *Psychiatr Prax* 2018;45:148-53.
28. Wee HL, Cheung YB, Loke WC, Tan CB, Chow MH, Li SC, *et al.* The association of body mass index with health-related quality of life: An exploratory study in a multiethnic Asian population. *Value Health* 2008;11 Suppl 1:S105-14.
29. Ford ES, Moriarty DG, Zack MM, Mokdad AH, Chapman DP. Self-reported body mass index and health-related quality of life: Findings from the behavioral risk factor surveillance system. *Obes Res* 2001;9:21-31.
30. Jee SH, Sull JW, Park J, Lee SY, Ohrr H, Guallar E, *et al.* Body-mass index and mortality in Korean men and women. *N Engl J Med* 2006;355:779-87.