Original Article
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Medical Journal of the Islamic Republic of Iran (MJIRI)

Med J Islam Repub Iran. 2018(18 Oct);32.101. https://doi.org/10.14196/mjiri.32.101

Application of the short form of quality of life instrument version 2 in a large population of Tehran

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Received: 15 Dec 2017 Published: 18 Oct 2018

Abstract

Background: Quality of life (QoL) is now considered as a key indicator in health studies. Therefore, this study was conducted to evaluate QoL in the general population of Tehran (capital of Iran) using SF-12v2 questionnaire and determine some factors associated with it.

Methods: This was part of a large population-based cross sectional study conducted in Tehran, Iran, in 2011. Participants were selected from all districts of Tehran using multistage cluster random sampling method. Data were collected using the Iranian version of the SF-12v2 questionnaire. Linear regression model was used to assess the independent effect of surveyed variables of the study population on their QoL. $P< 0.05$ was considered statistically significant.

Results: Overall, 30 809 individuals over the age of 20 from 22 urban districts were included in this study and evaluated by SF-12v2 questionnaire. The mean age of the study population was 44.5±15.9, and most of them were female (19 967 (64.8%)). The total mean score of SF-12v2 was 60.4 and the lowest and highest mean scores were observed in GH (46.9±26.5) and MH subscales (64.1±24.7), respectively. It was also observed that District 3 of Tehran had the highest mean score (65.2±18.7) in the total QoL and District 12 had the lowest mean score (56.6±18.7), respectively. The results of multiple linear regression model showed that sex, age, education, household size, presence of chronic disease in family, having insurance, smoking, and marital status were significantly related to most subscales and two summary components of QoL.

Conclusion: The results of this study showed that the surveyed population of Tehran had a relatively moderate QoL, but it changed from district to district. It was also observed that age and education of the study population were important variables in relation to QoL.

Keywords: Quality of life, QoL, Short form instrument, SF-12v2, Iran

Conflicts of Interest: None declared
Funding: Declared none
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Cite this article as: Gholami A, Nadjafi Sh, Moradpour F, Mousavi Jahromi Z, Montazeri A, Vaez-Mahdavi MR, Haeri Mehrizi AA, Abbasi-Ghahramanloo A, Hatamian S, Sohrabi M, Asadi-lari M. Application of the short form of quality of life instrument version 2 in a large population of Tehran. *Med J Islam Repub Iran. 2018* (18 Oct);32:101. https://doi.org/10.14196/mjiri.32.101

Introduction

Health condition measurement in a society is essential for both assessing the impact of the interventions and forecasting the health care needs; although mortality and morbidity are appropriate indicators, they have limitations (1). Nowadays, it is accepted that the health measurement is one of the most important issues, such as quality of life (QoL) (2). QoL is now considered as a key indicator in health studies (3); also, it is known as an instrument for measuring health status in public health and medical investigations (4). The word QoL is applied to the assessment of the general health of individuals and societies, therefore, QoL is defined by the World Health

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↑What is "already known" in this topic:
Measuring quality of life is a robust way to assess health status in medical situations and for public health purposes. Few studies have been conducted on the general population to measure quality of life in large cities of Iran.

→What this article adds:
Findings of this large study revealed the moderate level of quality of life in the general population of Tehran and confirmed its modest changes over districts.

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[DOI: 10.14196/mjiri.32.101]

Organization (WHO) as the "individuals' perceptions of their position in life, in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns" (5). This definition indicates that QoL is a multi-dimensional and subjective concept (6,7). Indeed, QoL is associated with physical health, psychological status, level of independence, social relationships, personal factors and beliefs, environmental and other factors (5,8,9). Thus, measuring QoL can be used to study the burden of diseases and medical treatments (10).

On the other hand, urbanization is one of the main outcomes of the demographic transition that can be associated with QoL (11). Different studies have examined the relationship between various factors that are associated with urbanization and QoL. They showed that these factors can affect QoL. However, few studies have been conducted on the general population (12-14). At this time, Tehran metropolis is facing a variety of health, environmental, economic, social, structural, and infrastructural problems in terms of QoL. Thus, measuring QoL will help the decision-makers to better understand the complexity of problems and identify the potentials of QoL improvement in Tehran. Among the available tools to measure QoL, the SF-12v2, a general questionnaire, is one of the best-known instruments to measure QoL among different communities and among healthy individuals and patients.

Moreover, some researches were done on the QoL of the general population in Iran, which can be considered as baseline information. This study was conducted to evaluate QoL in the general population of Tehran using SF-12v2 questionnaire and determine some factors associated with it.

Methods

Design and sample

This study was conducted on the households of Tehran using the framework of Urban Health Equity Assessment and Response Tool (Urban Heart-phase2) Study in 2011. In Urban Heart Study, 33 865 households (118 452 individuals) were selected from all districts of Tehran using a multistage cluster random sampling method. Tehran was divided into 22 districts. In this cross sectional study, QoL information of the Urban Heart Study was used. Exclusion criteria were as follow: (a) all Individuals younger than 20 years, (b) more than 20% missing information in the questionnaires. Therefore, a total of 3056 individuals were excluded at baseline and the study was conducted on 30 809 participants. In Urban Heart Study, all participants were ensured of the confidentiality of their information.

Data collection tool

Data were collected using the Persian version of the SF-12v2 questionnaire. Questionnaires were completed by trained interviewers who interviewed 1 person from each household. The questionnaire was rated based on the Likert scale, included 12 items, and contained 8 QoL subscales. The SF-12v2 had been developed and tested among the Iranian population (15). The subscales of this questionnaire are as follow: (1) physical functioning (PF) (2 items), (2) role physical (RP) (2 items), (3) bodily pain (BP) (1 item), (4) general health (GH) (1 item), (5) vitality (VT) (1 item), (6) social functioning (SF) (1 item), (7) role emotional (RE) (2 items), and (8) mental health (MH) (2 items). Subscales 1 to 4 included the physical component summary (PCS) and subscales 5 to 8 contained the mental component summary (MCS). According to the guideline, the scores of items are computed from 0 to 100, with 0 indicating the lowest and 100 the highest level of QoL (16).

Study variables

In this study, 8 subscales and 2 summary components (PCS and MCS) of SF-12v2 questionnaire were considered as dependent variables. Also, variables such as sex (male, female), age (≤42, >42 years), education (<12 years, ≥12 years), marital status (married, single), household size (≤3, >3), smoking (no, yes), presence of chronic disease in household (no, yes), having insurance (no, yes), and local residence (22 districts in Tehran) were considered as independent variables in this study.

Statistical analysis

Statistical analyses were performed using SPSS Version 20.0 statistical package. Descriptive analysis (frequencies, percentages, ranges, means, and standard deviations (SD)) of the demographic variables were reported. Pearson's correlation was used to investigate the relationship between different subscales of QoL. T-independent test (univariate analyses) was used to investigate the association between participants' QoL with independent variables in the first step. Finally, multiple linear regression model (with backward method) was used to assess the independent effect of surveyed variables of the participants on their QoL. $P< 0.2$ in univariate analyses and $p< 0.05$ in multiple analyses were considered statistically significant.

Results

In total, 30 809 people of Tehran were included in this study and their QoL were evaluated by SF-12v2 questionnaire. The characteristics of the study population are presented in Table 1. The mean age of the study population was 44.5±15.9 (females: 43.0±14.9 and males: 47.1±17.2).

Table 2 demonstrates the correlation coefficients between 8 subscales of SF-12v2. According to the results of this table, there were statistically significant correlations between all subscales ($p < 0.001$).There was also a significant correlation between PCS and 8 subscales, in addition to MCS and 8 subscales of SF-12v2.

As demonstrated in Table 3, the total mean score of SF-12v2 was 60.4±19.5 and among the different subscales of SF-12v2, the lowest and the highest mean scores were found for GH subscale (46.9±26.5) and MH subscale (64.1±24.7), respectively. The mean scores of the PCS, MCS, 8 subscales, and total of SF-12v2 according to sex, age, education, marital status, household size, smoking, presence of chronic disease in the family, and having insurance are presented in Table 3. Moreover, this table reveals differences between different states of all the variables in 8 subscales of SF-12v2 at the level of less than 0.2, except for marital status in RP, household size in MH,

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[DOI: 10.14196/mjiri.32.101]

Table 1. Characteristics of the study population (n = 30,809)

Characteristics	No.	%
Sex		
Male	10842	35.2
Female	19967	64.8
Age		
≤ 42 years	15540	50.4
> 42 years	15269	49.6
Education *		
< 12 years	13019	42.5
≥ 12 years	17609	57.5
Marital Status*		
Married	22954	75.6
Single, divorced, widowed	7398	24.4
Household Size		
≤ 3	15253	49.5
> 3	15556	50.5
Smoking		
No	23261	75.5
Yes	7548	24.5
Presence of chronic disease in the family		
No	11423	37.1
Yes	19386	62.9
Having insurance		
No	6700	21.7
Yes	24109	78.3

* Some data were missed

Table 2. Pearson correlation coefficients matrix for the PCS, MCS, and 8 subscales of SF -12

		PF	RP	BP	GH	VT	SF	RE	MH	MCS	PCS
PF	CC	1	.566*	.519*	.387*	.298*	.316*	.409*	.265*	.435*	.825*
RP	CC		1	.520*	.353*	.289*	.416*	.628*	.343*	.566*	.789*
BP	CC			1	.455*	.358*	.399*	.461*	.396*	.542*	.792*
GH	CC				1	.442*	.278*	.334*	.409*	.488*	.688*
VT	CC					1	.263*	.313*	.506*	.698*	.440*
SF	CC						1	.465*	.420*	.727*	.451*
RE	CC							1	.497*	.767*	.589*
MH	CC								1	.795*	.447*
MCS	CC									1	.649*
PCS	CC										1

*Correlation is significant at the <0.001 level (2-tailed).

smoking in PF, and having insurance in total.

Table 4 presents the results of backward multiple linear regression model. All variables (sex, age, education, household size, presence of chronic disease in the family, having insurance, smoking, and marital status) were significantly related to most subscales or summary components of QoL. In addition, Table 4 demonstrates positive and negative relationships in this study. For instance, positive relations were observed between PF, RP, BP, GH, SF, RE, PCS subscales and education, and household size. Moreover, VT, SF, RE, MCS subscales presented a positive relationship with having insurance. Some negative relationships were

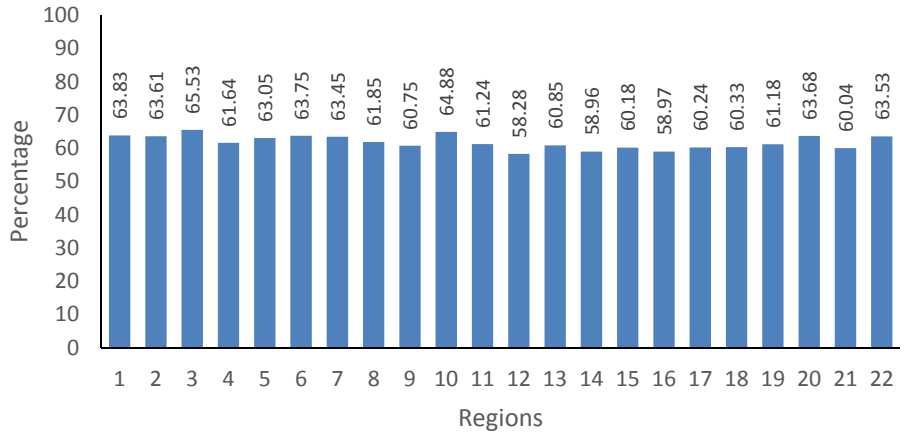

Fig. 1. Mental component summary of QoL in population of Tehran according to different districts

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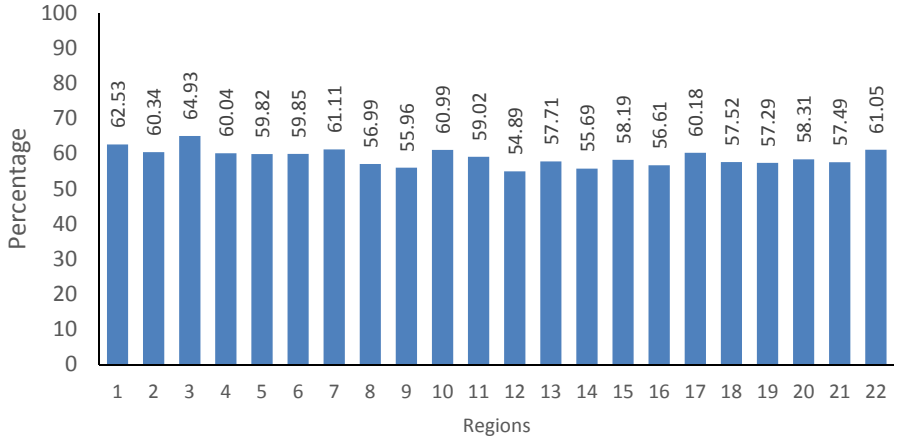

Fig. 2. Physical component summary of QoL in population of Tehran according to different districts

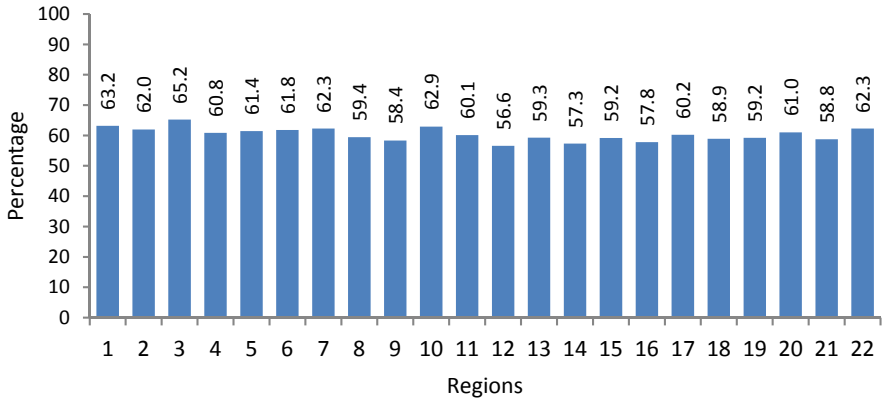

Fig. 3. Total QoL in population of Tehran according to different districts

found between PF, RP, BP, GH, VT, SF, RE, PCS, sex, and age. In addition, RP, BP, GH, VT, SF, RE, MH, MCS, and PCS had negative relationships with smoking. In general, the total QoL showed a positive relationship with education and household size, and a negative relationship with sex, age, smoking, marital status, and presence of chronic disease in the family. Based on Figs. 1 and 2, Districts 2, 3, 10, and 20 of Tehran had the highest mean scores in MCS and Districts 1, 3, 4, 7, 10, 17, and 22 had the highest mean scores in PCS. However, Districts 12, 14, 16, and 17 had the lowest scores in MCS and Districts 8, 9, 12, 14, 19, and 20 had the lowest scores in PCS. According to Fig. 3, District 3 had the highest mean score in the total QoL and District 12 the lowest mean score.

Discussion

This study was conducted to evaluate QoL in the general population of Tehran using SF-12v2 questionnaire. According to the findings, the total mean score of SF-12 was 60.4, which indicated a nearly moderate QoL in the general population of Tehran. Among the different subscales of SF-12, the lowest mean score was found for GH subscale (46.9%), implying that more than 53% of the general population of Tehran believed that their health level was not acceptable. Moreover, the highest mean score was found for MH subscale (64.1%), indicating that less than 36% of the general population of Tehran thought they had imperfect mental health. According to this study, the mean score of MCS was more than that of PCS, implying that the participants in this study felt fewer problems in mental component compared to physical component. This result may be due to the more negative effects of sex, specifically age, in physical health than in mental health (17). In previous studies, it was indicated that in case of overall satisfactory living condition, aging does not have deleterious effect on mental health (17, 18, 19). Previous studies have also presented similar results with regards to PCS and MCS (17, 20-22). An investigation on determinants of HRQoL in the general population living in Bandar Abbas (Iran) was done in 2007 using SF-36 questionnaire (20). Many differences were found between the results of this study and the study conducted on the general population of Bandar Abbas. Values for all 8 items were lower in this study. Mean differences of the total scores, MCS, and PCS were about 22.4, 24.4 and 20.4, respectively, indicating that those living in Bandar Abbas had better HRQoL than those living in Tehran. Other studies conducted on the general population of China, Turkey, and Brazil (21, 23, 24) revealed a better score for HRQoL in all 8 domains, MCS, and PCS of SF-12 QoL. In

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[DOI: 10.14196/mjiri.32.101]

Table 3. Comparison of the mean scores in the 8 subscales and total of SF-12 according to the characteristics of the general population of Tehran

	PF Mean(SD)	RP Mean(SD)	BP Mean(SD)	GH Mean(SD)	VT Mean(SD)	SF Mean(SD)	RE Mean(SD)	MH Mean(SD)	MCS Mean(SD)	PCS Mean(SD)	Total Mean(SD)
Total	63.5(33.9)	61.4(28.5)	64.0(26.6)	46.9(26.5)	56.8(28.2)	62.7(28.4)	63.7(28.5)	64.1(24.7)	61.8(20.5)	58.9(22.4)	60.4(19.5)
Sex											
Male	66.9(33.4)	63.8(28.9)	67.1(26.5)	49.4(27.3)	59.3(28.2)	63.7(28.6)	65.9(28.8)	65.4(24.7)	63.6 (20.4)	61.8(22.3)	62.7(19.4)
Female	61.7(34.0)	60.2(28.2)	62.2(26.5)	45.5(25.9)	55.4(28.1)	62.2(28.3)	62.5(28.2)	63.4(24.6)	60.9(20.4)	57.4(22.4)	59.1(19.4)
P- value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Age											
≤ 42 years	73.1(30.9)	66.4(27.9)	69.1(25.5)	52.7(26.0)	60.4(27.4)	65.3(28.5)	66.3(28.2)	65.2(24.9)	64.3(20.4)	65.3(20.7)	64.8(18.6)
> 42 years	53.8(34.0)	56.3(28.2)	58.7(26.6)	41.0(25.6)	53.1(28.5)	60.1(28.1)	61.1(28.5)	63.0(24.4)	59.3(20.2)	52.5(22.3)	55.9(19.3)
P- value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.013	<0.001	<0.001
Education											
< 12 years	53.8(34.5)	55.2(28.4)	58.1(26.7)	40.6(26.1)	53.0(28.7)	58.8(28.3)	59.1(28.6)	61.3(24.8)	58(20.1)	53(22.3)	55.0(19.2)
≥ 12 years	70.8(31.5)	66.1(27.7)	68.3(25.7)	51.5(25.8)	59.6(27.6)	65.7(28.2)	67.2(27.9)	66.3(24.4)	64.7(20.3)	64.2 (21.1)	64.4(18.7)
P value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Marital Status											
Married	63.2(33.2)	61.4(28.0)	63.7(26.1)	46.3(25.9)	57.1(27.9)	63.1(28.1)	64.2(28.2)	64.8(24.4)	62.3(20.1)	58.7 (21.7)	60.5(18.9)
Single, divorced, widow/widowed	64.3(35.8)	61.3(30.1)	64.5(28.1)	48.1(28.1)	55.7(29.3)	61.7(29.5)	62.2(29.4)	61.8(25.6)	60.4(21.6)	59.7 (24.4)	60.0(21.1)
P- value	0.016	0.787	0.044	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.048
Household Size											
≤ 3	60.8(35.1)	60.2(29.0)	62.8(27.0)	45.5(26.5)	55.5(28.5)	62.2(28.6)	63.2(28.8)	64.1(24.5)	61.3(20.6)	57.3 (23.1)	59.3(19.9)
> 3	66.2(32.4)	62.7(27.9)	65.1(26.1)	48.2(26.4)	58.0(27.9)	63.2(28.3)	64.2(28.1)	64.1(24.8)	62.4(20.3)	60.5 (21.6)	61.5(19.0)
P value	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.001	0.952	<0.001	<0.001	<0.001
Smoking											
No	63.5(34.1)	61.8(28.5)	64.4(26.5)	47.8(26.3)	57.5(27.9)	63.5(28.2)	64.7(28.3)	65.5(24.1)	62.8(20.2)	59.4 (22.5)	61.1(19.4)
Yes	63.6(33.3)	60.4(28.6)	62.6(26.9)	44.1(26.8)	54.3(28.9)	60.5(29.2)	60.7(28.6)	59.8(26.0)	58.8(21)	57.7 (22.2)	58.3(19.6)
P- value	0.815	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Presence of chronic disease in the family											
No	68.6 (32.0)	64.8(27.7)	67.5(25.4)	50.9(25.7)	59.7(27.3)	64.9(27.8)	66.1(27.9)	66.1(24.0)	57.8(20.9)	52.1 (23.4)	63.6 (18.4)
Yes	54.8 (35.2)	55.8(28.9)	58.0(27.4)	40.0(26.4)	51.7(29.0)	59.1(29.2)	59.6(28.9)	60.8(25.4)	64.2(19.8)	62.9 (20.8)	55.0 (20.1)
P value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Insurance											
No	65.8(33.6)	61.9(28.3)	64.8(26.7)	47.4(26.8)	56.2(28.3)	61.7(28.8)	62.4(28.6)	61.6(25.2)	60.5(20.7)	60 (22.1)	60.2(19.4)
Yes	62.9(33.9)	61.3(28.6)	63.7(26.5)	46.7(26.4)	56.9(28.2)	63.0(28.3)	64.1(28.4)	64.8(24.5)	62.2(20.4)	58.6 (22.5)	60.4(19.5)
P- value	<0.001	0.104	0.002	0.042	0.059	<0.001	<0.001	<0.001	<0.001	<0.001	0.468

some other studies (20, 22-26), woman and older people had a lower score in QoL, therefore, policy-makers and clinicians should consider age and sex as the most important non-modifiable risk factors for reducing QoL. To explain this finding, it should be pointed out that most elderly Iranian people do not have adequate income to cover their living expenses (27, 28). The result of the national census of population and housing in 2011 revealed an employment rate of 36%-68% for men older than 50 years old, while just 4%-6% of women were paid wages (29). While aging, the eye acuity decreases and the need for glasses increases, and skeletal chronic diseases, such as arthritis and osteoporosis, cause moving limitations and disability (30). Another reason for this finding might be attributed to the provision of poor health care to the older people than the general population in Iran (31). In general, Iranian women have less access to information resources and trainings and they are less engaged in a permanent work. Thus, they have a lower socioeconomic status compared to men (32).

In this study, a strong positive correlation was found between education and all domains of QoL. Poor social communication, unhappiness, poor self-health assessment, and sensory problems were issues that correlated with poor HRQoL on the one hand and associated with lower educational level on the other (33). Also, education is an important indicator that directly and indirectly influences HRQoL through socioeconomic status (34). This finding was also seen in other studies performed in developed (35) and developing countries (24).

In this study, marital status had a positive association with QoL. Married individuals attained a better score in all domains, except for PF, BP, GH, and PCS (Table 3). However, after adjusting for confounder variables, no negative association was found between aforementioned items and marital status, except for GH (Table 4). Lower QoL scores in single/ divorced/ widowed compared to married persons may be due to their lack of emotional support and felling of loneliness (36). There is controversy about how marital status is associated with QoL. Likewise, some papers showed that married people enjoyed better HRQoL (37), however, some studies did not find any significant relationship (20, 22, 38) and some observed various connections based on gender, age, and method of assessment (39).

This study displayed a better QoL for those who lived in a larger household. MH and MCS were the only subscale and summary component that did not have a significant difference in household size. However, after adjusting for covariates, multiple linear regression model revealed a positive impact of the family size on QoL. Previously, it was argued that lower levels of social participation, poor psycho-social health, and loneliness are associated with poor HRQoL (40). However, some researchers believe that those living alone do not necessarily feel lonely (41). In a different population, household size largely depends on cultural factors and social environment. Therefore, differences in opinion are more reflected in the cultural

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[DOI: 10.14196/mjiri.32.101]

Table 4. Results of the multiple linear regression model analysis of the significant factors associated with QoL subscales and summary components

Variables	Unstandardized Coefficient		Standardized Coefficient	t	P-value
	B	SE	B		
PF Subscale					
Sex	-0.24	0.015	-0.084	-15.65	<0.001
Age	-0.55	0.016	-0.204	-35.04	<0.001
Education	0.45	0.015	0.162	28.94	<0.001
Household size	0.15	0.014	0.056	10.46	<0.001
Presence of chronic disease in the family	-0.33	0.016	-0.116	-20.89	<0.001
RP subscale					
Sex	-0.30	0.027	-0.063	-11.37	<0.001
Age	-0.50	0.028	-0.109	-18.06	<0.001
Education	0.64	0.027	0.138	23.65	<0.001
Household size	0.14	0.025	0.031	5.65	<0.001
Presence of chronic disease in the family	-0.48	0.027	0.102	-17.67	<0.001
Smoking	-0.08	0.029	-0.016	-2.86	0.004
BP subscale					
Sex	-0.21	0.012	-0.093	-16.85	<0.001
Age	-0.27	0.013	-0.128	-21.38	<0.001
Education	0.27	0.012	0.127	21.96	<0.001
Household size	0.06	0.012	0.028	5.03	<0.001
Presence of chronic disease in the family	-0.26	0.013	-0.117	-20.53	<0.001
Smoking	-0.06	0.014	-0.026	-4.63	<0.001
GH subscale					
Sex	-0.17	0.012	-0.079	-14.40	<0.001
Age	-0.30	0.013	-0.142	-23.70	<0.001
Education	0.28	0.012	0.129	22.46	<0.001
Household size	0.08	0.012	0.037	6.83	<0.001
Presence of chronic disease in the family	-0.31	0.013	-0.142	-24.69	<0.001
Smoking	-0.13	0.013	-0.054	-9.99	<0.001
Marital status	0.08	0.014	0.026	4.72	<0.001
VT subscale					
Sex	-0.17	0.013	-0.073	-12.90	<0.001
Age	-0.20	0.014	-0.090	-14.43	<0.001
Education	0.15	0.014	0.06	11.30	<0.001
Household size	0.08	0.013	0.035	6.29	<0.001
Presence of chronic disease in the family	-0.23	0.014	0.098	-16.51	<0.001
Insurance	0.06	0.016	0.018	3.54	<0.001
Smoking	-0.12	0.015	-0.047	-8.24	<0.001
Marital status	-0.05	0.015	-0.018	-3.06	0.002
SF subscale					
Sex	-0.07	0.014	-0.028	-4.88	<0.001
Age	-0.11	0.014	-0.050	-7.89	<0.001
Education	0.21	0.014	0.092	15.43	<0.001
Household size	0.03	0.013	0.012	2.09	0.037
Presence of chronic disease in the family	-0.16	0.014	0.067	-11.17	<0.001
Insurance	0.06	0.016	0.021	3.70	<0.001
Smoking	-0.10	0.015	-0.038	-6.72	<0.001
Marital status	-0.05	0.015	-0.021	-3.54	<0.001
RE Subscale					
Sex	-0.28	0.027	-0.06	-10.32	<0.001
Age	-0.21	0.028	-0.05	-7.36	<0.001
Education	0.52	0.027	0.11	18.83	<0.001
Household size	0.06	0.026	0.01	2.33	0.02
Presence of chronic disease in the family	-0.36	0.028	-0.08	12.88	<0.001
Insurance	0.13	0.031	0.02	4.08	<0.001
Smoking	-0.29	0.030	-0.05	-9.61	<0.001
Marital status	-0.16	0.030	-0.03	-5.19	<0.001
MH subscale					
Sex	-0.16	0.023	-0.04	-6.94	<0.001
Education	0.33	0.024	0.08	13.84	<0.001
Presence of chronic disease in the family	-0.32	0.024	-0.08	-13.19	<0.001
Insurance	0.21	0.027	0.04	7.760	<0.001
Smoking	-0.42	0.026	-0.09	-16.15	<0.001
Marital status	-0.21	0.026	-0.05	-7.77	<0.001

background of these societies.

Participants were reported smoking habit significantly presented a higher QoL in all suscales of SF-12, except for PF and PCS. Multiple linear regression models controlling for some covariates reveled a negative association between smoking habit and QoL. In this study, it was fund that smoking decreased QoL by 3.62 units in MCS, 1.46 in PCS, and 2.62 overall, and this is compatible with previous studies (38, 42) that reported a worsen quality component of health status in active smokers compared to non-smokers and ex-smokers. However, some papers fund controversial results in PCS and MCS. While an improved HRQoL was

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[DOI: 10.14196/mjiri.32.101]

seen in the physical component for both cross sectional and longitudinal analysis, the downward association was observed for the mental component (43, 44). In a recent meta-analysis (45), it was observed that psychological QoL in quitters, compared to continuing smokers, significantly increased between baseline and follow-up.

Those who have an individual with chronic disease in the family expectedly showed a lower QoL. In a recent study that measured QoL of the family caregivers, the scores of PF and BP were significantly higher, while the scores of RP, GH, VT, SF, MH and RE were significantly lower (46). Most of the studies investigated HRQoL in association with current chronic disease in the individuals under study rather than in other members of the family (23, 24, 34, 46-49). Such studies found that individuals with a chronic disease reported a worse health status in all areas (23, 24, 46-49). Only in 1 study, no association was found between reporting chronic disease and MCS (34). This result may be due to the characteristics of the population under the study, factors related to patients and other members of the family as well as care giving factors (46), which were not assessed in this study. Other factors related to the QoL of family of the chronic patients are emotional impact, daily activities, family relationships, sleep and health, holidays, involvement in medical care, and support given to family members, work and study, financial impact, and social life (50), which needs to be investigated in future studies.

Insurance status was only significantly associated with the subjective subscale of QoL. Accordingly, VT, SF, RE, MH, and MSC scores were higher in insured people, but the univariate analysis of insurance status showed an inverse relationship with PCS, which was excluded from multiple analysis. Previous findings in the general population provided evidence that lower HRQoL in both mental and physical domains are strongly associated with absence of insurance (52). The study by Suliman Alghnam et al. (52) concluded that those with public insurance had a worse HRQoL outcome than those without insurance or with private insurance. Impact of insurance status may be, at least in part, confounded by socioeconomic status (53), which was not assessed in this study. Also, different types of insurance have various impacts on health outcome that may explain the surprising result of the present study.

This study had several limitations which could affect the study results. The cross sectional nature of the study and simultaneous data collection affected the ability of the study to properly establish temporality. Thus, the cause-effect relationship between explanatory variables and QoL outcome cannot be inferred as well as in longitudinal studies. Considering the amount of variance explained by independent variables (adjusted R^2 by 0.157 for PCS and by 0.027 For MCS) in the final models, QoL is largely represented as a complex and multifactorial outcome. Thus, excluding important explanatory variables from the analysis may yield a partial comprehension of these types of studies. Therefore, more studies should be conducted to better understand the effect of important variables on QoL.

Conclusion

According to the results of this study, it seems that the surveyed population of Tehran had a relatively moderate QoL, but the levels varied by district. Also, it was observed that age and education of the study population were important variables in relation to QoL. Focusing on the results of this study may be helpful in designing and executing effective programs with the goal of increasing QoL of individuals.

Acknowledgments

The authors would like to express their gratitude to all participants who contributed to Urban Heart Study (Phase 2).

Conflict of Interests

The authors declare that they have no competing interests.

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