Evaluation of Health-related Quality of Life in Iranian General Population during the COVID-19 Pandemic. A cross sectional study

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Abstract

Purpose

One of the most important questions is how the COVID-19 epidemic affects health-related quality of life (HRQOL) in the general population. This study aims to know about the impact of the COVID-19 epidemic on the HRQOL in the general population in Iran.

Methods

An online survey was developed and participants were recruited via social media (What's up, Telegram) from Fars province residences from 3th to the 20th of November 2020. Data of this cross-sectional study were collected by a researcher-made demographic, EuroQol-5 Dimension (EQ-5D), and Visual Analog Scale (VAS) questionnaires. The multivariate logistic regression model and CLAD Regression was used for the five health dimensions, and the factors associated with the EQ-5D Index were investigated.

Results

The mean EQ-5D Index and EQ-VAS of the respondents were 0.80 and 77.53, respectively. The most frequently reported problems were pain/discomfort (P/D) (44.17%) and anxiety/depression (A/D) (53.69%). Logistic regression models showed that the risk of P/D among old people, who were worried about getting COVID-19, and the risk of A/D among people with male, having hypertension and asthma diseases, unemployment, having insurance, and worry about getting COVID-19 were significantly high. The results of CLAD regression indicated that low income (very low and low income), having hypertension, and having asthma were inversely associated with the EQ-5D Index score. Data collection through an online questionnaire could be prone to selection bias.

Conclusion

According to the results, the mental health of people, especially those with chronic diseases and low-income must be considered during epidemics or other emergencies.

Introduction

In December of 2019, a new variation of respiratory infection with close resemblance to SARS emerged in the city of Wuhan, China [1, 2]. This new coronavirus infection termed Covid-19 quickly picked up pace in its prevalence all over the globe giving rise to a global pandemic infecting over 115,653,459 people and accounting for the death of over 2,571,823 people around the world according to statistics displayed by WHO as of 6th of March 2021 [3].

Amidst the ongoing crisis, the first case of infection in Iran was reported on 18th February 2020. By of 6th of March 2021, confirmed cases of Covid-19 were reported as 1,673,470 and the number of deaths resulting from Covid-19 was reported as 60,512 [3]. Various safety measures which were not tried before were proposed and undertaken around the globe to prevent and slow down the spread in the endeavor of bringing down the pressures and time constraints on the healthcare system which in turn imposed high economic and societal costs. Closing down schools, universities, and work places and propagating strict social distancing had high long-term psychological consequences. Moreover, the uncontrollable spread of this disease caused pessimism and toxic thoughts in peoples' minds giving rise to debilitating mental and psychological disorders like anxiety, distress, and panic attacks [4].

A post Covid epidemic study conducted in China revealed that the major problems were related to the domains of pain/discomfort (P/D) and anxiety/depression (A/D). Males suffered more mobility disorders than women and especially people older than 60 complained of mobility, usual activities, P/D and A/D. People who experienced high levels of anxiety with regards to Covid reported having a high chance of experiencing a low health-related quality of life (HRQoL) [5]. These measurements are made via specialized or general instruments [6]. Special tools focus on particular problems and are used in the scenarios of a certain disease or under special circumstances [6-8]. The general instruments are designed in such a way as to measure the main health domain common in all medical scenarios [9-11]. EQ-5D-3L is a well-known effective and practical general tool used to measure HRQoL [12-14]. This tool is used in a variety of health conditions and treatment strategies to evaluate clinical and economic scenarios [15]. Considering the detrimental impact that the pandemic of Covid-19 has on the HRQoL, this questionnaire serves as a suitable and compatible tool to

assess the HRQoL in the general population particularly in sick people. To date, there exists no evidence of the impact of the Covid-19 crisis on the HRQoL in the general population in Iran and there exists no response from the government with regards to this issue.

Hence, this study aims to investigate the status of HRQoL during the Covid-19 pandemic and also to investigate the association between socio-economic and demographic factors in relation to HRQoL in the general population of Fars province in southern Iran.

Methods

Study design

This cross-sectional research was conducted at Fars province south of Iran. From 3th to the 20th of November 2020, it was performed for the general population inhabitant in Fars province.

Setting and sample

Fars province, with a population of 4,851,274 people and an area of 122,608 square kilometers [16], is located in the south of Iran. And it is the fourth largest province in terms of population and extent. This province consists of 36 counties. The location of this province on the map of Iran country is shown in Figure 1. During the pandemic of Covid 19 until March 7, 2021, 180,522 cases of infection and 3,276 deaths due to Covid 19 were recorded in this province [17]. During this time, people were asked not to leave the house except in emergencies and to observe a social distance of 1.8 meters and avoid staying in busy places. And some unnecessary businesses (sports clubs, wedding halls, religious ceremonies, funerals, places of worship, recreational and tourist places) were closed.

$$n = \frac{z_{1-\frac{\alpha}{2}}^2 \sigma^2}{d^2}$$

The sample size of this study was estimated to be 1042 people by the formula at 95% confidence level ($\alpha=1$) and accuracy 1.2 (d). According to the possibility of losing the number of samples during the study, the original sample size was increased by 10%, and the final sample size for this study was calculated to be 1146 people. The convenience sampling method was used to collect the data.

Measures

The data collection tool was a questionnaire consisting of the following sections:

1. Demographic and socio-economic information of participants included gender, marital status, age (we divided age into four groups (≤ 30 , 31–40, 41–50, and ≥ 51 years)), educational level, employment status, insurance, place of residence, and level of household income. Patients with less than 25% of the national average income were classified as very low-income level, patients with between 25-50% of the national average income were classified as low-income level, and patients with between 50-75% of the national average income, were classified as the middle-income group. The remains were classified as the high-income group.
2. Health status: the variables of health status include chronic diseases and behavior associated with the Covid 19 pandemic. Chronic disease is defined by a physician as a chronic condition for those who have had symptoms related to the illness or who have been taking medications related to the chronic illness for the past six months. Chronic diseases studied included: hypertension, diabetes, asthma, cardiovascular disease, cerebrovascular disease, and pulmonary disease. The behavior related to the pandemic was also defined as the degree of concern about becoming infected by Covid 19; (responses were categorized into four states: "I'm never worried", "I'm not worried", "I'm slightly worried" and "I'm very worried").
3. The 3-level version of EuroQol-5 Dimensions Questionnaire (EQ-5D-3L) and Visual Analog Scale (VAS) (validated Farsi version of HRQoL Questionnaire). This questionnaire was used to determine the health status of patients. The EQ-5D 3L questionnaire consists of five questions, each measuring one of the five dimensions of HRQoL; Mobility (MO), Self-Care (SC), Usual Activities (UA), Pain / Discomfort (P / D), and Anxiety / Depression (A / D). The questions of each dimension are answered by a three-level scale, including (I have no problem, I have some problems, and I have extreme problems). The scales were given a score for each question from 1 (I have no problem) to 3 (I have serious problems). Eventually, a five-digit HRQOL code was obtained for each patient by putting the numbers of the scores together. In this method, it is possible to generate 243 different codes (five

to the power of three). The EuroQOL Group has performed strings of studies mainly according to statistical modeling to produce numerical values for the health states that can be obtained from the EQ-5D questionnaire. To obtain a score from this questionnaire, each dimension must be given a weight. The set of weights for all possible states is called a value set, which must be obtained by the standardized valuation of the questionnaire for the area and field of application [19].

In this study, the Iranian value set has been used, which was extracted based on the Time-trade off (TTO) method by Goudarzi et al [20]. EQ-5D scores indicate 243 possible self-rated health states, from -0.113 (most severe impairment across all five dimensions) to 1 (no problems in any dimension) [20]. The EQ-5D questionnaire also includes a Visual Analog Scale (VAS), which measures an individual's personal view of the quality of life on a scale of 0 (worst health state) to 100 (best health state). This tool can be used for the quantitative measurement of health outcomes in respondents [19]. The reliability and validity of the Farsi version of EQ-5D 3L and EQ-VAS have been presented as acceptable [21].

Data Collection Procedure

This research was conducted based on a web-based survey method, and respondents participated in the study through social networks (WhatsApp and Telegram). A statement containing the objectives of the research and informed consent to participate in the study were given in the questionnaire. And the participants entered the main stage of the questionnaire after confirming these statements. First, the administrators of the major public Telegram and WhatsApp channels of all the cities of the province were contacted, and they were asked to place the link to the online questionnaire of this study in their groups and invite the members of the group to complete the questionnaire. After completing this questionnaire, the participants were asked to send the link to other family groups and work groups, as well as their friends, family, and relatives. These general groups are a suitable reflection of the diversity of the population in terms of age, gender, education, and so on. Criteria for inclusion of respondents in the study included 1. Consent to participate in the study by confirming the online consent form; 2. Ability to access the online questionnaire; 3. Complete ability to answer all questionnaire questions. Therefore, 1198 questionnaires were completed and returned by the participants until 21st November 2020. In this study, 32 cases could not be used due to living outside Fars province. The remaining 1166 questionnaires were analyzed. This study has been approved by the ethics committee of Tehran University of Medical Sciences (IR.TUMS.MEDICINE.REC.1399.434).

Statistical Analysis

The continuous variables were expressed as mean $\pm$ standard deviation and categorical variables as frequencies and percentages. The relationships of all factors and the EQ-5D index (According to the non-normal variable) were analyzed with nonparametric statistics (Mann-Whitney U test or Kruskal-Wallis test). A censored least absolute deviation (CLAD) regression model was constructed to find factors that affected the EQ-5D index as a dependent variable. The CLAD regression model suitable for the distribution of the dependent variable is skewed and non-normality and censored. The chi-square test was used to compare the five dimensions of health at different levels of qualitative variables that were significantly related to HRQoL. For all five dimensions of health in EQ-5D, the second and third levels were merged to create two broader levels of "no problem" and "some or extreme problems". Finally, we used multivariate logistic regression to obtain odds ratios (ORs) and 95% confidence intervals (95% CIs) for determinants of EQ-5D dimensions. Statistical significance was set at 0.05 using two-sided tests. All tests were conducted using the Stata14.2 (StataCorp, College Station, TX) and SPSS 16 software.

Results

According to the described executive method, a total of 1166 people participated in the study (Figure 2). The demographic and socio-economic characteristics of patients are shown in Table 1. In general, 55.6% of the participants were women. The age group of 31 to 40 years old had the highest number of participants in the study, and 67.6 participants were married. 82.8% of participants were urbanite, and 65.2% of the participants had higher education. The mean and median of the EQ-5D Index and EQ-VAS of the participants were 0.80, 0.82, and 77.53, 80, respectively.

Table 2 also compares the summary statistics for participants' EQ-5D-3L indexes based on their socio- demographic and clinical characteristics. There were statistically significant differences in patients' utility scores based on the following characteristics: Education ($p = 0.01$), occupation ($p = 0.006$), income ($p < 0.001$), and worried about Covid ($p < 0.001$), having hypertension ($p = 0.01$),

having cerebrovascular disease ($p = 0.005$), having pulmonary disease ($p = 0.04$) and having asthma ($p < 0.001$). No significance was found among the other variables with scores ($p > 0.05$).

The factors associated with participants' EQ-5D-3L indexes extracted through the Censored Least Absolute Deviation (CLAD) regression model are shown in Table 3. The model confirmed that Lower income level (very low income, $\beta = -0.085$, $p < 0.001$; low income, $\beta = -0.07$, $p = 0.04$) and having hypertension ($\beta = -0.075$, $p < 0.001$) and having asthma ($\beta = -0.075$, $p = 0.04$) were significantly associated with EQ-5D-3L scores. Other variables did not show any significance association with EQ-5D-3L indexes ($p > 0.05$).

Each dimension of EQ-5D has been dichotomized, and dependent variables have been used. Sex, age, marital status, employment status, insurance, supplementary insurance, education level, family income level, worry about getting COVID-19, disease condition (Hypertension, pulmonary disease, Asthma, diabetes, cardiovascular disease, and cerebrovascular disease), have been included as independent variables (Table 4). Multivariate logistic regression models were conducted, only those variables which exerted a significant relationship with any dimension from EQ-5D were reported in Table 4 and other variables were empty.

The results showed that, for age, younger than 30 years (OR = 0.36, 95%CI: 0.20–0.65) and Between 30 and 40 years (OR = 0.45, 95%CI: 0.25–0.80) and for family income level, very low income (OR = 2.78, 95%CI: 1.09–7.08), and for worry about getting COVID-19, slightly (OR = 0.40, 95%CI: 0.25–0.65) and yes (OR = 0.68, 95%CI: 0.49–0.94) showed a significant relationship in MO dimension; for age, younger than 30 years (OR = 0.31, 95%CI: 0.12–0.81) and for employment status, Housewives+ students (OR = 3.10, 95%CI: 1.02–9.44), insurance (OR = 2.17, 95%CI: 1.28–3.70) and supplementary insurance (OR = 0.17, 95%CI: 0.04–0.71) showed a significant relationship in SC dimension; sex (OR = 0.63, 95%CI: 0.45–0.88), for age, younger than 30 years (OR = 0.34, 95%CI: 0.18–0.61), between 30 and 40 years (OR = 0.31, 95%CI: 0.17–0.56), and between 40 and 50 years (OR = 0.39, 95%CI: 0.20–0.75), and for worry about getting COVID-19, never (OR = 0.43, 95%CI: 0.20–0.94), slightly (OR = 0.32, 95%CI: 0.18–0.57), and yes (OR = 0.59, 95%CI: 0.41–0.85) showed a significant relationship in UA dimension; for age, younger than 30 years (OR = 0.31, 95%CI: 0.17–0.57), between 30 and 40 years (OR = 0.29, 95%CI: 0.16–0.52), and between 40 and 50 years (OR = 0.38, 95%CI: 0.20–0.73) and for worry about getting COVID-19, never (OR = 0.43, 95%CI: 0.19–0.91), slightly (OR = 0.35, 95%CI: 0.20–0.61), and yes (OR = 0.61, 95%CI: 0.42–0.88) showed a significant relationship in P/D dimension; sex (OR = 2.08, 95%CI: 1.57–2.74), and for employment status, employed (OR = 0.59, 95%CI: 0.37–0.95); for age, younger than 30 years (OR = 0.36, 95%CI: 0.20–0.65) and between 30 and 40 years (OR = 0.45, 95%CI: 0.25–0.80) and having hypertension disease (OR = 0.47, 95%CI: 0.26–0.87) and having asthma disease (OR = 0.15, 95%CI: 0.04–0.51) showed a significant relationship in A/D dimension (Table 5).

Discussion

According to our best knowledge, this research is the first study to evaluate the HRQoL factor in the general population in Iran during Covid-19. Our findings showed that the general population of Iran has a lower HRQoL than the general population of other countries. Illiteracy and low education, low income, unemployment, worry about getting Covid-19, asthma, hypertension, cardiovascular disease and respiratory diseases played an important role in the low HRQoL of participants. Also, in all age groups, more than half of the participants are affected by anxiety/depression.

The mean of the EQ-5D Index of participants was obtained to be 0.80. This result is almost similar to the score (0.79) of the general population of Iran (using the Cross Walk method) before the Covid-19 pandemic [22]. And it was lower than the score reported in studies conducted before the Covid-19 pandemic in South Australia of 0.91 [23], Germany 0.92 [24], Poland 0.89 [25], Uruguay 0.95 [26], Italy 0.92 [27], and studies conducted during the Covid-19 epidemic in China 0.949 [5], Portugal 0.86 [28] and Vietnam 0.95 [29]. The difference in the value set generated by each country (due to differences in demographic characteristics as well as the type of calculation method) and differences in age and gender combination, and level of education, income, and type of study design can be reasons for differences in the utility scores in different studies.

There are contradictory results regarding the relationship between age and health status during the Covid-19 period. We did not find a significant difference in utility scores by age. Two types of research conducted in the same period reported a negative and significant relationship between the increase of age and utility score [5, 28]. A research in Italy showed that young people (18–34 years old) had the lowest level of mental health and middle-aged people had the lowest level of health in the dimension of the environment. And it did not report a significant difference in other dimensions. In explaining their findings, these researchers stated

that since the Covid-19 situation had the greatest impact on education and the job market, and as a result delayed youth projects (marriage, finding a job, graduation), the most negative impact on health was imposed to the youth [30].

Although we did not find a significant relationship between gender and utility score, some studies in Portugal and Iran have reported a significant relationship between women and a low utility score [22, 28]. However, Ping et al. [5] and Vu et al. [29] did not find a significant relationship between utility score and gender. The results of our analysis showed that unlike previous studies [5, 29] and like other studies [30], education level and utility score have a direct and significant relationship. People with higher education are more likely to have access to a better environment (for example, in terms of pollution, access to information, and skills) and more financial resources. On the other hand, it is expected that people with a low level of education, especially during the Covid-19 period, are more likely to have their well-being disrupted (due to the risk of their jobs as well as stable social relationships, especially marriage and reduced control over their lives). As a result, it increases psychological stress and physical problems and increases the level of dissatisfaction.

We did not find a significant difference in utility scores by marital status and place of residence. In the literature review, two studies were found similar to our study [5, 29], and one study was different [28]. While we showed that employed people had significantly higher utility scores, other studies were contrary to our results [5, 29], and various studies [28, 30] were similar to our results. Occupation is a major part of most people's lives. Occupation meets the physical needs (income security and social protection) and social needs (self-esteem and identity, and social interactions). During the Covid-19 period, due to the constraints imposed on many occupations, these needs were further threatened. This research revealed that there is a direct and significant relationship between income level (high and medium) and utility score. The increase in living costs such as food, housing, and family care are major concerns for Iranian households. These concerns affect both the psychological and physical dimensions and, consequently, the HRQoL of individuals. It is therefore obvious that people with a higher level of income are less concerned about these items, and therefore they are expected to have higher utility levels. However, other studies conducted in the same period of Covid-19 did not report a significant relationship between income level and utility score [5, 29].

Like our study, other studies showed that there is a significant inverse relationship between the level of anxiety about becoming infected by Covid-19 and the utility score [5]. Some studies have recently suggested that daily physical activities help reduce the psychological burden and negative emotions caused by Coronavirus [31, 32]. There has been found a significant inverse relationship between hypertension, cerebrovascular disease, pulmonary disease, and asthma with the utility score. Having problems with access to health services, such as concerns about cancellations of visits, delays in care and surgery, etc., may justify this issue. This issue can lead to secondary health problems such as delayed diagnosis and critical health conditions. On the other hand, since the severity of Covid-19 disease in people with underlying diseases may be much more dangerous, this factor may make these people vulnerable and reduce their utility [33]. Other studies also reported a significant negative relationship between chronic diseases and utility score [5, 34, 35]. It should be noted that we found no significant relationship between diabetes, cardiovascular disease, and utility score. We also examined the variables related to participants' utility scores using the CLAD regression model. However, in regression tests performed in studies conducted during the Covid-19 period in other countries, there was a negative and significant relationship reported between women, unemployment, rural life, having chronic diseases, and the utility score [28]. However, our results showed only a significant inverse relationship between low income (very low and low income), having high blood pressure, and asthma with the utility score. Cultural and lifestyle differences may explain this difference.

Although the EQ-5D index indirectly measures HRQoL in five dimensions, the EQ-VAS directly measures a person's mental perception. Therefore EQ-VAS more clearly shows the severity of a particular condition that the individual is experiencing. The mean score of EQ-VAS of our study was 77.53. It is higher than the score reported in the general population of Iran 71.72 [22], and Taiwan (74.5) [36]. And it is lower than the score reported in studies conducted during Covid-19 in China 85.52 [5], and Vietnam (88.31) [29]. Various possible factors such as cultural, economic, and social differences can affect a person's perception and feeling of a particular situation.

Generally, 21.53, 7.20, 16.04, 44.17, and 53.69 percent of participants reported problems in the dimensions of MO, SC, UA, P/D, and A/D, respectively. However, before the Covid-19 period and using the same tool and in the general population of Iran, this statistic included 10.82, 1.27, 4.03, 34.41, and 33.37 percent, respectively [20]. A review of the literature also reveals that the most complaints were in the dimensions of P/D and A/D [5, 20, 22, 28], though in the study of Saarni et al. [37] as well as König et al. [38], the most problems were reported in the dimensions of P/D and MO. A remarkable point in our study is that in all age groups, more than half of

the participants reported the problem of 'reporting any problem' in the A/D dimension. The issue requires attention and purposeful measures by health policymakers. Using logistic regression, we determined that the possibility of reporting a problem in the dimension of MO enhanced significantly with the increase of age, decrease of income, and increase of concern about being infected by Covid-19. Other studies had similar results to our results, only about the impact of age [5]. We have indicated that the possibility of reporting a problem in the dimension of SC enhances significantly with the increase of age, among employed and housewife/student people, having basic insurance and not having supplementary insurance. Other studies had similar results to ours, only about the impact of the variable of employment [5]. We found that the chance of reporting a problem in the UA dimension increased significantly with the increase of age and concern about becoming infected by Covid-19. Other studies had similar results to our results, only about the impact of age [5]. Like other studies [5], this research showed that the chance of reporting a problem in the P/D dimension increased significantly with the increase of age and concern about becoming infected by Covid-19. Our results showed that the chance of reporting a problem in the A/D dimension increased significantly in unemployed persons, men, and who had supplementary insurance, who were concerned about becoming infected by Covid-19, and who had hypertension and asthma. Other studies had similar results to ours, only in terms of the impact of the variable of having chronic diseases and concern about becoming infected by Covid-19 [5].

There are some limitations that should be noted. Firstly, data collection through an online questionnaire (web survey) could be prone to selection bias. Because some people such as illiterate and elder individuals and ones with low socioeconomic status who did not have internet access could not participate in the study, most of our respondents were young and from the middle class. Thus, the first limitation is associated with the results' generalizability to the whole Iranian community. Secondly, the cross-sectional studies cannot demonstrate the causal relationship. Thirdly, it is also possible that the respondents were limited to only those who have the financial, emotional, and mental immunity which might have skewed all of the answers to those expected of a "healthier" population in this context. Lastly, worry about getting covid-19 was assessed by ourselves made one question in this study, while standard instruments to measure such psychological distress recently have developed by Ahorsu and Taylor[39, 40]. Therefore, it is necessary to use a valid and standard instrument to assess the impact of covid-19 on mental health in future studies. We do not expect to generalize the results of this research to all societies around the world, in societies analogous to Iranian society, in Asia and the Middle East, developing countries, and middle and low-income countries, we can use the results of our work.

Conclusion

This study provides important insights on HRQOL during the COVID-19 pandemic. The risk of P/D among people with aging, worry about getting COVID-19, and A/D among people with male, having hypertension and asthma diseases, unemployment, having insurance, and worry about getting COVID-19 raised significantly. In all age groups, more than half of the participants are affected by A/D. Therefore, the mental health of people, especially those with chronic diseases and low-income should be considered during epidemics or other emergencies.

Abbreviations

HRQOL: Health-related quality of life; EQ-5D: EuroQol-5 Dimension questionnaire; VAS: Visual Analog Scale; CLAD: Censored Least Absolute Deviation; P/D: Pain/discomfort; A/D: Anxiety/depression; P/D: Pain/discomfort; MO: Mobility; SC: Self-Care; UA: Usual Activities.

Declarations

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Author contributions; Conceived and designed the experiments: HK SE MSH AA. Performed the experiments: HK SE MT MSH. Analyzed the data: MT HK MSH Contributed reagents/materials/analysis tools: HK SE MSH MT SA AA. Wrote the paper: HK SE MSH SA AA MT.

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Availability of data and material; the data sets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests; the authors declare that they have no competing interests.

Ethical approval; this study was approved by the ethics committee of Tehran University of Medical Sciences (IR.TUMS.MEDICINE.REC.1399.434).

Consent to participate; all subjects provided informed consent to participate in the study.

Consent for publication; before consenting, subjects were aware that their data may be published in a journal.

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Tables

Table 1 Characteristics of Study Participants

Variables	Number/Mean	Percent / SD
Gender		
Female	648	55.6
Male	518	44.4
Age		
Less than 30 years	423	36.3
Between 31 and 40 years	483	41.4
Between 41 and 50 years	195	16.7
More than 51 years	53	4.5
Marital Status		
Single	378	32.4
Married	788	67.6
Urbanization		
Urban	966	82.8
Rural	200	17.2
Employment status		
Employed	609	52.2
Housewives+ students	460	39.5
Unemployed	97	8.3
Education		
Illiterate	7	0.6
6 grade<	25	2.1
6-9 grade	85	7.3
10-12 grade	289	24.8
12 grade>	760	65.2
Family income level		
Very low	87	7.5
Low	317	27.2
Middle	716	61.4
High	46	3.9
Insurance		
No	221	19.0
Yes	945	81.0
Supplementary insurance		
No	763	65.4
Yes	403	34.6
Worry about get Covid-19		

Never	68	5.8
Slightly	205	17.6
Yes	597	51.2
Very worry	292	25.0
Hypertension		
No	1112	95.4
Yes	54	4.6
Diabetes		
No	1138	97.6
Yes	28	2.4
Cardiovascular disease		
No	1146	98.3
Yes	20	1.7
Cerebrovascular disease		
No	1161	99.6
Yes	5	0.4
Pulmonary disease		
No	1155	99.1
Yes	11	0.9
Asthma		
No	1138	97.6
Yes	28	2.4
EQ-5D 3L Index		SD: 0.17
		Median: 0.82
EQ-VAS		SD: 21.30
		Median: 80.00

SD, Standard deviation; EQ-5D 3L, EuroQol 5 Dimensional 3 Level questionnaire;

EQ-VAS, EuroQol - Visual Analogue Scale.

Table2: Summary Statistics for the EQ-5D 3L Index Score of Participants
by Socio-demographic and Chronic Conditions

Variables	Mean± SD	P-value
Gender		
Female	0.78±0.16	0.24
Male	0.81±0.16	
Age		
Less than 30 years	0.81±0.16	0.17
Between 31 and 40 years	0.80±0.16	
Between 41 and 50 years	0.78±0.16	
More than 51 years	0.73±0.18	
Marital status		
Single	0.81±0.16	0.14
Married	0.79±0.16	
Urbanization		
Urban	0.79±0.16	0.37
Village	0.80±0.17	
Education		
Illiterate	0.65±0.25	0.01
<6 grade	0.74±0.20	
6-9 grade	0.76±0.19	
10-12 grade	0.78±0.17	
>12 grade	0.81±0.15	
Occupation		
Employed	0.82±0.15	0.006
Student+ housewife	0.79±0.17	
Unemployed	0.75±0.18	
Income		
Very low	0.69±0.20	<0.001
Low	0.77±0.16	
Middle	0.82±0.15	
High	0.82±0.21	
Insurance		
Yes	0.80±0.16	0.76
No	0.78±0.18	
Supplementary insurance		
Yes	0.81±0.16	0.12
No	0.79±0.17	
Worry about get Covid-19		

Never	0.82±0.17	<0.001
No	0.86±0.17	
Yes	0.80±0.15	
Very worry	0.74±0.18	
Hypertension		
Yes	0.72±0.19	0.01
No	0.80±0.16	
Diabetes		
Yes	0.75±0.18	0.86
No	0.80±0.16	
Cardiovascular disease		
Yes	0.76±0.17	0.13
No	0.80±0.16	
Cerebrovascular disease		
Yes	0.66±0.08	0.005
No	0.80±0.16	
Pulmonary disease		
Yes	0.62±0.13	0.04
No	0.80±0.16	
Asthma		
Yes	0.68±0.13	<0.001
No	0.80±0.16	

EQ-5D 3L, EuroQol 5 Dimensional 3 Level questionnaire; SD, Standard deviation;
 Boldness: P value <0.05.

Table3: Censored Least Absolute Deviation (CLAD) Regression

Model: Factors Associated with the EQ-5D 3L Index.

Variables	EQ-5D 3L index		
	beta	beta(95%CI)	p-value
Very low family income level	-0.085	(-0.121, -.048)	<0.001
Low family income level	-0.070	(-0.139, -0.0005)	0.04
Hypertension	-0.075	(-0.111, -0.038)	<0.001
Asthma	-0.075	(-0.143, -0.006)	0.04

EQ-5D-3L, EuroQol 5 Dimensional 3 Level questionnaire; SD, Standard deviation; Boldness: P value <0.05.

Table 4: Frequencies (Percentages) of Participants with any Problems in Each of the Five Dimensions of EQ-5D 3L Stratified by Socio-demographic and Chronic Conditions.

	Frequencies (Percentages) with any problems: N (%)				
	Mobility	Self-care	Usual activities	Pain /discomfort	Anxiety /depression
Overall with problems	251(21.53)	84(7.20)	187(16.04)	515(44.17)	626(53.69)
Gender					
Female	138(21.3)	40(6.2)	87(13.4)	319(49.2)	400(61.7)
Male	113(21.8)	44(8.5)	100(19.3)	196(37.8)	226(43.6)
Age					
Less than 30 years	75(17.7)	25(5.9)	62(14.7)	169(40.0)	220(52.0)
Between 31 and 40 years	103(21.3)	34(7.0)	67(13.9)	205(42.4)	258(53.4)
Between 41 and 50 years	50(25.6)	18(9.2)	35(17.9)	98(50.3)	111(56.9)
More than 51 years	23(35.4)	7(10.8)	23(35.4)	43(66.2)	37(56.9)
Marital status					
Single	187(23.7)	60(7.6)	136(17.3)	372(47.2)	436(55.3)
Married	64(16.9)	24(6.3)	51(13.5)	143(37.8)	190(50.3)
Urbanization					
Urban	210(21.7)	70(7.2)	150(15.5)	419(43.4)	111(55.5)
Village	41(20.5)	14(7.0)	37(18.5)	96(48.0)	515(53.3)
Education					
Illiterate	3(42.9)	1(14.3)	2(28.6)	5(71.4)	5(71.4)
6 grade<	8(32.0)	3(12.0)	7(28.0)	17(68.0)	12(48.0)
6-9 grade	21(24.7)	11(12.9)	20(23.5)	41(48.2)	50(58.8)
10-12 grade	66(22.8)	27(9.3)	43(14.9)	149(51.6)	158(54.7)
12 grade>	153(20.1)	42(5.5)	115(15.1)	303(39.9)	401(52.8)
Occupation					
Employed	127(20.9)	44(7.2)	94(15.4)	243(39.9)	293(48.1)
Student+ housewife	98(21.3)	36(7.8)	67(14.6)	215(46.7)	270(58.7)
Unemployed	26(26.8)	4(4.1)	26(26.8)	57(58.8)	63(64.9)
Income					
Very low	29(33.3)	16(18.4)	23(26.4)	55(63.2)	61(70.1)
Low	74(23.3)	25(7.9)	59(18.6)	165(52.1)	194(61.2)
Middle	141(19.7)	38(5.3)	98(13.7)	279(39.0)	350(48.9)
High	7(15.2)	5(10.9)	7(15.2)	16(34.8)	21(45.7)
Insurance					
Yes	212(22.4)	60(6.3)	153(16.2)	403(42.6)	494(52.3)
No	39(17.6)	24(10.9)	34(15.4)	112(50.7)	132(59.7)
Supplementary insurance					

Yes	79(19.6)	24(6.0)	122(16.0)	341(44.7)	433(56.7)
No	172(22.5)	60(7.9)	65(16.1)	174(43.2)	193(47.9)
Worry about get Covid-19					
Never	13(19.1)	5(7.4)	9(13.2)	24(35.3)	31(45.6)
No	27(13.2)	11(5.4)	19(9.3)	61(29.8)	74(36.1)
Slightly	127(21.3)	36(6.0)	93(15.6)	266(44.6)	343(57.5)
Very worry	84(28.8)	32(11.0)	66(22.6)	163(55.8)	177(60.6)
Hypertension					
Yes	15(27.8)	7(13.0)	16(29.6)	34(63.0)	37(68.5)
No	236(21.2)	77(6.9)	171(15.4)	481(43.3)	589(53.0)
Diabetes					
Yes	8(28.6)	4(14.3)	7(25.0)	16(57.1)	17(60.7)
No	243(21.4)	80(7.0)	180(15.8)	499(43.8)	609(53.5)
Cardiovascular disease					
Yes	4(20.0)	1(5.0)	6(30.0)	13(65.0)	12(60.0)
No	247(21.6)	83(7.2)	181(15.8)	502(43.8)	614(53.6)
Cerebrovascular disease					
Yes	2 (40.0)	0(0)	1(20.0)	5(100.0)	5(100.0)
No	249(21.4)	84(7.2)	186(16.0)	510(43.9)	621(53.5)
Pulmonary disease					
Yes	4(36.4)	3(27.3)	6(54.5)	9(81.8)	10(90.9)
No	247(21.4)	81(7.0)	181(15.7)	506(43.8)	616(53.3)
Asthma					
Yes	9(32.1)	3(10.7)	5(17.9)	22(78.6)	25(89.3)
No	242(21.3)	81(7.1)	182(16.0)	493(43.3)	601(52.8)

EQ-5D-3L, EuroQol 5 Dimensional 3 Level questionnaire; Bold values are statistically significant, P value <0.05.

Table5: Multivariate Logistic Regression Analysis Results on the Relationships between 5 Dimensions of EQ-5D 3L And Influence Factors.

Variables	Mobility		Self-care		Usual activities		Pain/discomfort		Anxiety/depression	
	OR	CI (OR)	OR	CI (OR)	OR	CI (OR)	OR	CI (OR)	OR	CI (OR)
Sex										
Male	-	-	-	-	0.63	(0.45,0.88)	-	-	2.08	(1.57,2.74)
Female	Ref									
Age										
Less than 30 years	0.36	(0.204,0.650)	0.31	(0.12,0.81)	0.34	(0.18,0.61)	0.31	(0.17,0.57)	-	-
Between 31 and 40 years	0.45	(0.259,0.804)	0.44	(0.18,1.08)	0.31	(0.17,0.56)	0.29	(0.16,0.52)	-	-
Between 41 and 50 years	0.60	(0.326,1.112)	0.66	(0.25,1.72)	0.39	(0.20,0.75)	0.38	(0.20,0.73)	-	-
More than51 years	Ref									
Employment Status										
Employed	-	-	2.56	(0.85,7.65)	-	-	-	-	0.59	(0.37,0.95)
Housewives+ students	-	-	3.10	(1.02,9.44)	-	-	-	-	0.62	(0.38,1.01)
Unemployed	Ref									
Family Income Level										
Very low	2.78	(1.09,7.08)	-	-	-	-	-	-	-	-
Low	1.72	(0.73,4.08)	-	-	-	-	-	-	-	-
Middle	1.39	(0.60,3.22)	-	-	-	-	-	-	-	-
High	Ref									
Insurance										
Yes	-	-	2.17	(1.28,3.70)	-	-	-	-	-	-
No	Ref									
Supplementary insurance										
Yes	-	-	0.17	(0.04,0.71)	-	-	-	-	1.35	(1.04,1.77)
No	Ref									
Worry about get COVID-19										
Never	0.58	(0.29,1.13)	-	-	0.43	(0.20,0.94)	0.42	(0.19,0.91)	0.80	(0.46,1.39)
Slightly	0.40	(0.25,0.65)	-	-	0.32	(0.18,0.57)	0.35	(0.20,0.61)	0.42	(0.29,0.62)
Yes	0.68	(0.49,0.94)	-	-	0.59	(0.41,0.85)	0.61	(0.42,0.88)	1.02	(0.76,1.38)
Very worry	Ref									
Hypertension										
Yes	-	-	-	-	-	-	-	-	0.47	(0.26,0.87)

No	Ref								
Asthma									
Yes		-	-	-	-	-	-	0.15	(0.04,0.51)
No	Ref								

EQ-5D-3L, EuroQol 5 Dimensional 3 Level questionnaire; OR, Odds Ratio; ref, Reference; “- “: Not shown in the table (Multivariate Logistic Regression P>0.05).

Figures

Figure 1

Map of Iran, Showing the location of Fars Province.

Figure 2

Study Flowchart.

Supplementary Files

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