https://dergipark.org.tr/tr/pub/ijhmt Doi Number: 10.31201/ijhmt.1300744

Int Journal Of Health Manag. And Tourism 2023, 8(2), 120-137

IJHMT Editorial

Internatıonal Journal Of Health Management And Tourism

The Predictors of Quality of Life of Coronary Heart Disease Patients: A Study in Türkiye

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Received: 22.05.2023
Accepted: 18.07.2023
Research Article

Abstract

Aim: The aim of this study was to examine the predictors of the quality of life of patients who have coronary heart disease in Turkey.
Methods: The sample consisted of 796 participants with coronary heart disease selected from a nation-ally representative 2019 Turkey Health Survey. The effects of individual-level, individuallevel healthy behaviors, household-level, and regional-level characteristics on quality of life were analyzed by using nested regression in STATA
Results: The majority of respondents were male (62.3%), relatively more aged (41.0%), married (70.5%), and primary school educated (50.6%). More than 18 percent of respondents (144 people) said that they were unable to pay for the needed medical care. The variables lessening the quality

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Cite This Paper: Çelik, Y., Senol Çelik,S. (2023). The Predictors of Quality of Life of Coronary Heart Disease Patients: A Study in Türkiye., Internatıonal Journal Of Health Management And Tourism, 8(2): 120-137

of life for patients with coronary heart disease were found to be as female gender, increasing age, decreasing education level, living with a person with bad health status in the same house, inability to pay for medical care and living in statistical region-8 of Türkiye.

Conclusion: The results of this study contribute to the debate concerning the expected and unexpected relationships between QoL and its predictors among respondents with patients who have coronary heart disease. The study suggests that appropriate local and national policies should be developed to improve quality of life of coronary heart disease patients.

Keywords: Patient, Coronary Heart Disease, Quality Of Life, Predictors, Türkiye

INTRODUCTION

Coronary Heart Disease (CHD) is a major public health problem worldwide due to being one of the most common diseases and substantially contributing to the loss of health and excessing health system costs. It also is the most common cause of death in Türkiye (TUIK, 2019; WHO, 2020; Vaduganathan et al., 2022). CHD, which is a chronic disease, causes various problems that are experienced by the patient and his/her family. It reduces the independence of the individual since it limits physical, mental, health and social activities. This disease also needs long-term care and causes physical, psychological, social and economic problems (Virtanen et al., 2017; Sawan et. al., 2022; MPhil et al., 2021). For this reason, while making a treatment and care plan for CHD patients, it is important to take necessary measures to improve their quality of life (QoL). The purposes of care and treatment of CHD patients, which including pharmacological therapy, coronary angioplasty and stent placement and coronary artery bypass, are to relieve symptoms, to maximize function in daily life, to decrease economic and physical problems, and to achieve the highest level of QoL within the specific limits imposed by CHD (Sajobi et. al., 2018; Meesoonthorn et. al., 2016; Morys et. al., 2016). QoL is an indicator of health outcomes in CHD patients. The World Health Organization defines QoL as an individual's perception 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. It is a broad concept incorporating the persons' physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships in a complex way to salient features of the environment (WHO, 2012). Assessment of patient-reported outcomes focuses on QoL, i.e., how physical, emotional and social well-being are affected by a disease or its treatment and her/his care. In addition, healthcare professionals should focus on not only the physical aspect of their patients but also they should consider the quality of life taking into account physical, psychological, mental, and social aspects of life (Morys et. al., 2016; Imam and Jitpanya, 2022; Endalew et. al., 2021).

The relevant studies on CHD reveal that CHD patients experienced numerous physical problems including pain, fatigue, dyspnea, sleep disturbances or edema (Imam and Jitpanya, 2022; Endalew et. al., 2021; Shukla, 2021). In addition to physical problems, socioeconomic problems, that are high cost of CHD treatment, inability to return to work, dismissal, insufficient household income, loss of income, and social problems, which are limitations in patients and their families' social life, social isolation, re-admission to hospital, lack of social support, changing in lifestyle, are other common issues that CHD patients have witnessed (Endalew et. al., 2021; Shukla, 2021; Moonaghi et al., 2014). Fear of death and surgical intervention, the stress of disease recurrence, anxiety and depression are also important CHD-related psychological problems (Shukla, 2021; Moonaghi et al., 2014). In studies on the QoL of CHD patients, it has been reported that CHD disease and the problems associated with this disease reduced the quality of life of patients (Endalew et. al., 2021; Davranovna et. al., 2022; Dou et. al., 2022; Soleimaniet. Al., 2022).

It has been observed that there are studies examining the physical, socio-economic and psychological problems experienced by CHD patients. However, the number of studies investigating the predictors of QoL of CHD patients is limited in Türkiye. In addition to individual characteristics, household and regional-level characteristics might be important for QoL since these variables might disable CHD patients to access care and social support. In this study, the characteristics of the individual, the healthy living habits of the individual, the characteristics of the household and region in which the individual lives were grouped into four main groups and their effects on the quality of life were investigated gradually. The main aim of this study was to estimate more likely predictors of quality of life of respondents with CHD.

1. RESEARCH METHODOLOGY

1.1. Data and study population: This research was conducted in part at the national data source of the Turkish Statistical Institute (TUIK). The nationally representative Turkey Health Survey (THS-2019) is the source of data. THSs are conducted every two years to collect data on healthcare utilization and health status. THS-2019 was carried out among 8,166 households and more than twenty-three thousand (23,084) participants. As the present study focuses on QoL of respondents with CHD, total 796 respondents having CHD disease in the last 12 months, and aging 15 and more were selected and included in the sample of this study.

1.2. Study questions: What are the predictors for quality of life of CHD patients?

1.3. Study variables: It is an obvious fact that QoL is a broad concept and it is affected by various factors including individual and community characteristics. For that reason, THSs include several questions to measure QoL of participants, However, this study considers the dimensions of Euro QoL to select and construct the QoL variable for the purposes of this study. EQ-5D was developed by the Euro QoL Group, and it includes five dimensions that are mobility, self-care, usual activities, pain, and anxiety status. Each dimension has 5 levels: no problems, slight problems, moderate problems, severe problems and extreme problems (EUROQOL, 2021). The scores obtained from five dimensions is converted into a single score ranging 0 (death) and 1 (full health) by using of the composite time trade-off valuation technique. The questions about the mobility and pain dimensions in THS-2019 are almost similar to questions in EQ-5D, but there are more questions to measure the remaining three dimensions of EQ-5D. For this reason, the scores of dimensions of self-care, usual activities, and anxiety/depression in EQ-5D scale were constructed by taking the average of answers given to the questions under related dimensions in Table 2.

Many of the questions about QoL in THS-2019 are answered on a 4-point Likert-type scale while only answers to pain questions are obtained on a 6-point Likert-type scale. The estimated lower score based on the answers provided to the questions means better QoL while the higher score means bad QoL of CHD patients.

The independent variables were classified under four categories that are individual-level (age, marital status, education), individual-level healthy behaviors (walking, eating fruit and vegetable frequencies), household-level (general health status of 2nd person, inability to pay for medical care) and regions (Table 1).

1.4. Data analysis: Frequency, percentage, mean calculations, and standard deviation were used to describe variables. The effect of independent variables grouped under four categories on QoL of respondents with CHD was estimated by using nested regression in STATA. Nested regression fits nested models by sequentially adding blocks of variables and then reports comparison tests between the nested models (STATA, 2022).

1.5. Ethical considerations: The data used in this study was collected by the Turkey Health Survey (THS-2019) conducted by the Turkish Statistical Institute (TUIK). For this reason, official permission was obtained from TUIK for the use of these data.

2. ANALYSIS

2.1. Descriptive findings

Descriptive characteristics of respondents with CHD in the sample were provided in Table 1. The majority were male (62.3%), relatively more aged (41.0%), married (70.5%), and primary school educated (50.6%). The big majority (60.8%) stated that they walked less than one hour per day while 11.4% said they consumed fruit never or less than once a week. About 17% of respondents stated that there was another person in the household whose general health status was bad or very bad. More than 18 percent of respondents (144 people) said that they were unable to pay for the needed medical care. The geographic regions of Turkey in THS-2019 were classified under 12 categories according to Statistical Regional Units Classification. Almost one-fifth of respondents with CHD were living in Istanbul, which is the biggest city of Turkey.

Table 1. Descriptive Characteristics of CHD patients (n:796)

Variables			Frequency	Percent
Individual-Level	Gender	Male	496	62.3
		Female	300	37.7
	Age	15-24	2	.3
		25-34	44	5.5
		35-44	78	9.8
		45-54	146	18.3
		55-64	200	25.1
		65-74	187	23.5
		75+	139	17.5
	Marital Status	Single	16	2.0
		Married	561	70.5
		Widowed	45	5.7
		Divorced	174	21.9
	Education	Non-literate	120	15.1
		No formal education	57	7.2
		Primary school	403	50.6
		Secondary School	80	10.1
		High school	70	8.8
		Vocational school and more	66	8.3

Individual-Level Healthy Behaviours	Walking	10-29 minutes per day	326	41.0
		30-59 minutes per day	158	19.8
		1 hour to less than 2 hours per day	72	9.0
		2 hours to less than 3 hours per day	12	1.5
		3 hours or more per day	13	1.6
	Eating fruit frequency	Once or more a day	351	44.1
		4 to 6 times a week	133	16.7
		1 to 3 times a week	221	27.8
		Less than once a week	74	9.3
		Never	17	2.1
	Eating vegetable frequency	Once or more a day	444	55.8
		4 to 6 times a week	146	18.3
		1 to 3 times a week	173	21.7
		Less than once a week	27	3.4
		Never	6	.8
Household-Level	General health status of 2nd person	Very good	19	2.4
		Good	186	23.4
		Fair	226	28.4
		Bad	118	14.8
		Very bad	15	1.9
	Inability to pay for medical care	Yes	144	18.1
		No	636	79.9
		No need for health care	16	2.0
Regional	Region	Region -1	106	13.3
		Region -2	78	9.8
		Region -3	51	6.4
		Region -4	39	4.9
		Region -5	28	3.5
		Region -6	66	8.3
		Region -7	114	14.3
		Region -8	65	8.2
		Region -9	154	19.3
		Region -10	16	2.0
		Region -11	40	5.0
		Region -12	39	4.9

2.2. Findings on main and subdimensions of quality of life

Table 2 describes QoL variables and their sub-dimensions used in this study. The respondents with CHD reported that their mean score for mobility was 1.68 on a four-point scale. In addition, the self-care mean score was estimated as 1.22 which means that the respondents with CHD did not have so much difficulty in doing their self-care activities. The respondents also stated that they had less difficulty for usual activities (1.49). The mean score of body pain was estimated as 3.47 in a six point-scale, while the mean score for overall anxiety/depression level was estimated as 1.78 in a 4-point scale. The overall QoL average was estimated to be 1.91, which can be interpreted as moderate level.

Table 2. Descriptive Statistics About Main and Subdimensions of Quality of Life (n:796)

Quality of Life Aspects	**Sub Dimensions**	**Min**	**Max**	**Mean**	**Std. D.**
1. Mobility	Mobility	1	4	1.68	0.86
2. Self-Care	Feeding	1	4	1.16	0.46
	Sleeping	1	4	1.24	0.57
	Dressing	1	4	1.22	0.55
	Using toilet	1	4	1.22	0.55
	Bathing	1	4	1.26	0.61
	Self Care (mean)	*1*	*4*	*1.22*	*0.51*
3. Usual Activities	Preparing food	1	4	1.34	0.80
	Using phone	1	4	1.27	0.68
	Shopping	1	4	1.50	0.94
	Using medicine	1	4	1.18	0.54
	Household work (light)	1	4	1.54	0.96
	Household work (heavy)	1	4	2.17	1.18
	Usual Activities (mean)	*1*	*4*	*1.49*	*0.70*
4. Pain/Discomfort	Pain/Discomfort	1	6	3.47	1.64
5. Anxiety/Depression	Having pleasure	1	4	1.81	0.94
	Bothered by feeling down, depressed	1	4	1.97	0.96
	Trouble falling or staying asleep	1	4	1.98	1.06
	Feeling tired or having little energy	1	4	2.11	1.02
	Poor appetite or overeating	1	4	1.66	0.93
	Feeling bad about yourself	1	4	1.65	0.95
	Trouble concentrating on things	1	4	1.59	0.90
	Feeling fidgety or restless	1	4	1.44	0.83
	Anxiety/Depression (mean)	*1*	*4*	*1.78*	*0.76*
Overall Quality of Life	General Quality of Life (Mean)	1	4.19	1.91	0.68

2.3. Findings on nested regression

The most likely predictors of QoL of CHD patients were estimated by using nested regression and the results were provided in Table 3. At the first stage, being female and increasing age were found to be statistically significant predictors decreasing the level of QoL of respondents with CHD while increasing education level was a significant predictor increasing QoL of respondents with CHD. These four individual-level characteristics explained 20% percent of total variation measured with R^2.

At the second stage, the results yielded that healthy behaviors behaved in an expected way but their effects on QoL were found to be statistically insignificant. However, adding these three variables improved the model indices, and R^2 increased. Two variables capturing household-level effects were entered into the model at the third stage. Both variables were found to be statistically significant determinants of QoL of respondents with CHD. The results indicated that the respondents' QoL decreased if there was another person in their household whose general health status was bad. Inability to pay for medical care, was a significant predictor decreasing QoL compared to those who did not need to use medical care or those who was able to pay for medical care when they needed. Adding two household-level variables changed R^2 from 0.224 to 0.2618, and improved the model indices.

At the last stage, the region where respondents with CHD lived in was entered to the model. The variable of region was entered to the model at the last stage, and it was seen that the model was improved by additional 0.0489 increase in R^2. The results indicated that those respondents living in statistical Region-8 were more likely to have lower-level QoL compare to those who were living in Mediterranean Region. At the end, the independent variables categorized under four categories explained 26.03% of total variance in QoL of respondents with CHD.

Table 3. The Results of Nested Regression for Determinants of Overall Quality of Life of CHD Patients (N: 339)

Block (R²; Change in R²)	**Variables**	**Coefficient**	**Std. Er.**	**t**	**P>t**	**95% CI (Low-Up)**	
Block 1 (0.2044; 0.2044)	Gender (Female)	0.330	0.078	4.230	0.000	0.176	0.483
	Age	0.004	0.002	1.970	0.050	0.000	0.009
	Marital Status (Single)	Ref.					
	Marital Status (Married)	0.005	0.189	0.030	0.979	-0.368	0.377
	Marital Status (Widowed)	0.240	0.229	1.050	0.295	-0.210	0.690
	Marital Status (Divorced)	0.179	0.216	0.830	0.409	-0.247	0.605
	Education	-0.058	0.022	-2.610	0.010	-0.102	-0.014
Block 2 (0.224; 0.0196)	Walking in hours	-0.016	0.026	-0.620	0.538	-0.067	0.035
	Eating fruit frequency	0.034	0.025	1.380	0.168	-0.014	0.083
	Eating vegetable frequency	0.048	0.030	1.620	0.107	-0.010	0.106

Block 3 (0.2618; 0.0378)	General health status of 2nd person	0.075	0.032	2.320	0.021	0.011	0.138
	Inability to pay for medical care (Yes)	Ref.					
	Inability to pay for medical care (No)	-0.216	0.075	-2.900	0.004	-0.363	-0.069
	Inability to pay for medical care (No needed health care)	-0.355	0.173	-2.050	0.041	-0.695	-0.015
Block 4 (0.3107; 0.0489)	Region -1	Ref.					
	Region -2	0.016	0.115	0.140	0.887	-0.210	0.243
	Region -3	-0.067	0.126	-0.530	0.599	-0.315	0.182
	Region -4	-0.209	0.159	-1.320	0.189	-0.522	0.103
	Region -5	-0.172	0.166	-1.040	0.301	-0.500	0.155
	Region -6	-0.216	0.118	-1.830	0.068	-0.449	0.016
	Region -7	0.078	0.110	0.710	0.481	-0.139	0.294
	Region -8	0.339	0.139	2.440	0.015	0.066	0.612
	Region -9	-0.072	0.095	-0.760	0.447	-0.259	0.114
	Region -10	0.031	0.223	0.140	0.891	-0.409	0.470
	Region -11	-0.048	0.131	-0.370	0.712	-0.306	0.209
	Region -12	0.065	0.123	0.530	0.596	-0.177	0.308
	Constant	1.372	0.262	5.240	0.000	0.857	1.887
Model Indices	**F: 6.17; Prob > F: 0.0000; R2: 0.3107; Adj.R2: 0.2603)**						

3. DISCUSSION

It is clear that both CHD itself and the complications and problems that are associated with CHD negatively affect the quality of life. According to the results of this study, the general QoL of respondents with coronary heart disease in Türkiye can be described as close to moderate (x̄: 1.91 SD± 0.68) (Table 2). The scores obtained for sub-categories of QoL also indicate a mild or moderate level. For CHD patients in Türkiye and other countries, previously reported QoL scores obtained from EQ-5D range between 0.61 and 0,903 (Annac, 2018; Mert et. al., 2016). The results of a follow-up survey in Finland conclude that the respondents most commonly reported pain and discomfort while managing self-care was least likely to be an issue when the sub-components of EQ-5D were investigated separately (Kähkönen et. al., 2022). Smedt et al. (2016) conducted a study in 24 European countries to study validity and reliability of a tool measuring quality of life of stable coronary patients by using 14 questions under two sub-dimensions which are physical and emotional. They reported relatively bad score (2.30±0.72) for emotional dimension while better score (2.13±0.72) for physical dimension. It can be discussed that CHD patients in Türkiye have similar problems and QoL level when the results of other studies in other countries are considered.

The results of nested regression showed that increasing education level was a significant factor increasing QoL of CHD patients. It is common to see that patients having coronary heart disease with higher levels of education reported better QoL (Soleimani et. al., 2022; Mei et. al., 2021; Mandal et. al., 2016). Increasing education level might have a positive impact on disease management and self-care and coping with the problems caused by CHD since better educated patients are more likely to possess a decent job, earn a good income, and enjoy better social status. Furthermore, people with higher levels of education may be expected to have greater compliance with the disease and have better adherence with treatment plans (Soleimani et. al., 2022; Mandal et. al., 2016; Li et. al., 2016).

Aging is a complex process, typically associated with multiple losses in physical health due to functional disorders, chronic diseases and disabilities gradually increase with age. The reason for the decrease in QoL with increasing age can be explained by adding CHD-related problems with the above-mentioned limitations, changes and problems that occur with aging (Virtanen et. al., 2017; MPhil et al., 2021; Imam and Jitpanya, 2022; Dou, 2022; Mei et al., 2021; Zhang et. al., 2021).

The evidence related to the association of gender with QoL gives mixed signals. In current study, QoL was significantly lower among female. There are other studies indicating that QoL score of female CHD patients was lower than that of male patients (Mei et. al., 2021; Zhang et. al., 2021; Conradie et al., 2021; Lei et al., 2022). There are also some other studies in which there is no statistical difference between male and female gender in terms of QoL (Dou et. al., 2022; Mert et. al., 2016; Sudevan et. al., 2020). The gender-based difference in the current study could be due to the fact that the female could have been feeling more responsibility to deal with their own care as well as household responsibilities such as cleaning or cooking, and they might not get enough social support in Turkish culture (Çelik, 2020).

The income level was another important predictor of QoL in CHD patients. In this study, inability to pay for medical care was found to decrease the level of QoL significantly. This finding is supported by some other studies in developing countries (MPhil et. al., 2021; Shukla et. al., 2021; Moonaghi et. al., 2014). It should not be difficult to estimate how poor people feel when they are not able to access to the needed care, and the QoL would be bad due to financial and psychological burden.

The quality of life is affected by many factors stemming from the regional differences. People living in relatively poor regions are more limited to access to better education, health services, and economic opportunities, and all these poor indicators might have a negative effect on the quality of life. It is expected that these poor indicators may have more negative effect on people with chronic diseases and their QoL (Mei et. al., 2021; Şeker et. al., 2014; Zhou et. al., 2018; Çağlar, 2020). Türkiye, as a developing country, social and economic problems increase as a result of the inequality in the distribution of resources and the welfare and living conditions offered to the population masses, which is one of the main problems of developing countries, and this negatively affects the quality of life although Türkiye has a very generous health system. The current study showed that living in Region-8, which is one of the 12 statistically classified regions, caused to decrease QoL of CHD patients significantly. This study highlights the importance of the QoL of CHD patients in relatively less developed areas. This well-known fact is not specific to Türkiye. For instance, the study of Zhou et al. (2018) reported that rural people had have worse HRQoL than people living in urban areas of China.

Physical condition of house and characteristics of family also play a significant role for QoL (WHO 2012; Shukla et. al., 2021; Soleimani et. al., 2022; Zhang et. al., 2021). Having another household member with bad health status was found to be a significant predictor of QoL of CHD patients. According to the study results, having someone else with bad general health status in the family worsens the QoL of the CHD patient. In the literature review, no study was found on this predictor that could affect the quality of life. It is thought that this study will contribute to the literature with this aspect. While both the physical and psychosocial problems, limitations and obstacles caused by the chronic disease of the patient with CHD reduce the quality of life of these patients, at the same time, the poor health status of another member of the family may negatively affect the patient with CHD in this situation where they both need family support. Having more than one patient in the same household can cause problems to double since the burden of problems such as social, economic, patient care, housework, fear, anxiety, and depression are felt more by patients and other household members, and this may lead to a worsening QoL of the patients.

Three healthy life style behaviors were used in nested regression since their effect are examined frequently as predictors of QoL of CHD patients other studies in related literature (Mei et. al., 2021; Alaofè, et. al., 2022; Fanning et. al., 2022; Motton et. al., 2022). However, the results showed that regular walking and healthy eating behaviors did not have a statistically significant effect on QoL. Even the findings were unexpected, there are some studies finding there is no statistically significant relationship between QoL of CHD patients and health behavioral/promoting factors (Meesoonthorn et. al., 2022; Kähkönen et. al., 2022). It can be concluded that other set of variables might be more important in predicting QoL of CHD patients in this study.

4. CONCLUSION AND RECOMMENDATIONS

CHD causes the most of deaths in 2019, it has never allowed another disease to be at first rank for years (IHME, 2019), and it will continue to lead causing more death in the future of Türkiye. The burden of CHD in terms of physical, emotional and financial is expected to be more severe because Türkiye's population is getting older. Developing appropriate measures in lessening the expected burden of CHD will be critical to be ready for the health and social system of Türkiye. For that reason, this study purposed to estimate more likely predictors of QoL of CHD patients to allow decision makers take necessary measures in more likely areas that would improve the QoL of CHD patients.

As the results indicated, individual level patient characteristics, lessening the burden of women stemming from cultural factors and improving health literacy by dealing with daily care requirements related to CHD might be appropriate measures to be taken. Health care and social service problems caused by increasing age should be routed to somewhere else rather than the families. If the burden of CHD is left to the families, it lowers not only the QoL of CHD patients but also the QoL of other family member that might have other diseases. When the burden of other diseases in a family combines, the result would be catastrophic in terms of financially and emotionally.

Although Türkiye implements general health insurance scheme to cover health care costs of its citizens, and it is more generous to cover many medicine and health care costs, it is important to see that there are some CHD patients that are not able to access the needed care due to financial problems. The long-term effects of a chronic disease such as CHD may put more financial burden on people by meeting their needs to pay more from their out-of-pocket. If long-term financial effects of CHD are lessened, CHD patients may be less worried about their healthcare and medical costs. Therefore, they may experience less anxiety and higher QoL. Further, increasing ability to pay for medical care, or lessening financial burden of disease increases patients and their family' satisfaction and they experience a feeling of not being financially dependent on someone else (Soleimani et. al., 2022; Lapid et. al., 2016).

This study also highlights the importance of the QoL of CHD patients in relatively less developed areas, which should encourage the government to focus more on the systematic management of CHD patients in rural areas. The results of this study contribute to the debate concerning the expected and unexpected relationships between QoL and its predictors among respondents with CHD. Creating alternative social and care organizations that are expected to provide better social services and needed health care is necessary to improve QoL of CHD patients. This study suggests that appropriate local and national policies should be developed to improve QoL of CHD patients. These policies should be coordinated under the framework of national chronic disease management policies that bridge health, social, and economic issues. In addition, it is recommended that researches in the future is conducted to examine the effects of policy-related measures to increase QoL and to find the root causes of problems that are more likely to decrease QoL of CHD people.

This study has mainly three limitations. First, the study was a retrospective one, with the usual limitations of inaccurate recall of past events. Second, results of this study cannot be generalized to all CHD people in Türkiye due to including respondents with CHD in the last 12 months, and aging 15 and more in the sample of this study. Third, although this study used a nationally representative and rich data, it may not let the researchers test the effects of different predictors QoL.

Conflict of Interest: The authors have no conflicts of interest to declare.
Funding: The authors declared that this study had received no financial support.

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