

CLINICAL STUDY

Using of the World Health Organization quality of life instrument, short form to patient after PCI or CABG surgery

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ABSTRACT

OBJECTIVES: This investigation aimed to estimate reliability of the WHOQOL-BREF questionnaire and quality of life of patients after PCI or CABG surgery.

METHODS: In this cross-sectional study, 268 patients after PCI or CABG surgery were studied in East Kazakhstan and Pavlodar regions of Kazakhstan from September to December 2019. The Russian version of the World Health Organization Quality of Life Instrument, Short Form (WHOQOL-BREF) was used to measure their quality of life. Cronbach's alpha coefficient, Pearson's correlation coefficient, paired t-test, independent t-test, and linear regression model were used to analyze the data.

RESULTS: The mean age of the participants was 60.8 ± 9.2 years, while most of them were male (75.0 %). The overall observed Cronbach's alpha coefficient for the WHOQOL-BREF was 0.842, ranging from 0.668 to 0.764 in its four domains. The total mean score of the respondents on the WHOQOL-BREF was 13.97. The highest and lowest mean scores were observed in the environmental domain (15.22) and the physical health domain (13.00), respectively.

CONCLUSIONS: The WHOQOL-BREF questionnaire has a good reliability in characterizing the quality of life of patients after PCI or CABG surgery. Patients after PCI or CABG surgery had a relatively moderate quality of life (Tab. 6, Ref. 23). Text in PDF www.elis.sk

KEY WORDS: PCI, CABG, quality of life, World Health Organization Quality of Life Instrument, short form, questionnaires, cross-sectional study, Kazakhstan.

Introduction

Coronary artery disease (CAD) is the most common type of heart disease and cause of mortality in the world (1). Due to aging of population and progress in medical science, the quantity of elderly patients with CAD undergoing percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG) has been increasing (2).

A lot of investigations were devoted to compare the outcomes of coronary revascularization between PCI and CABG surgery (3, 4, 5, 6, 7, 8). But beyond the survival benefit of CABG and PCI surgery, the functional recovery and expectations of patients who underwent CABG and PCI surgery for relief of symptoms are important outcomes for these treatments. Therefore, an importance of health-related quality of life (HRQOL) in clinical research has

been extensively discussed over recent decades and there is an increasing recognition among clinicians and researchers that the impact of chronic illnesses and their treatments must be assessed in terms of their HRQOL in addition to more traditional measures of clinical outcomes, namely morbidity and mortality (9, 10, 11).

Over the past 10–15 years, the Government of Kazakhstan has developed and implemented a targeted state program in the field of healthcare to reduce mortality from cardiovascular diseases, which is constantly being improved by new targets aimed at improving the effectiveness of preventive activities of medical organizations and increasing the commitment of citizens of the country to follow a healthy lifestyle. According to the implementation of the state program “Salamatty Kazakhstan for 2011–2015”, the population is provided with cardiosurgical care. Despite the constant development and improvement in cardiosurgical care in Kazakhstan, due to which it was possible to reduce mortality from these diseases, the indicators are still disappointing. PCI and CABG surgery have developed in Kazakhstan very quickly for many years. But there is no information about the outcomes of these operations, especially the HRQOL outcomes. Measurement of HRQOL in patients after PCI and CABG surgery could give a more comprehensive understanding of the problems of patients. One of the best way to study the quality of life is to use The World Health Organization Quality of Life Instrument, Short Form (WHOQOL-BREF) questionnaire

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that is used to measure the quality of life in healthy people and in different groups of patients (12, 13). The WHOQOL-BREF questionnaire is available in many languages and has been translated also into Russian language. In Kazakhstan, the patients who underwent PCI and CABG surgery mainly are in the age group older than 50 years. These generations of Kazakhstanis grew up in the Soviet Union period and most of them therefore speak and understand Russian very well.

This investigation aimed to estimate the reliability (internal consistency) of the WHOQOL-BREF questionnaire and quality of life of patients after PCI and CABG surgery in East Kazakhstan and Pavlodar regions of Kazakhstan with the use of the WHOQOL-BREF scale.

Methods

Study population and sample

In this cross-sectional study, the data were collected between September and December 2019 from all patients who underwent percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG) in East Kazakhstan and Pavlodar regions of Kazakhstan. All participating subjects provided informed consent after being acquainted with the purpose of study.

In this study, the questionnaires were filled out in personal interviews, but before the interviews, all participants were informed that their responses would remain confidential. The validated Russian version of the WHOQOL-BREF was used in this study. This questionnaire contains two items assessing the overall quality of life and general health, as well as 24 other items divided into four domains: physical health (domain 1) with seven items, psychological health (domain 2) with six items, social relationships (domain 3) with three items, and environmental health (domain 4) with eight items. Each item is rated on a five-point Likert scale and scored from one to five on a response scale. According to the guidelines, the raw domain scores for the WHOQOL-BREF were transformed to a score between 4 and 20 (14). The scores of each domain are scaled in a positive direction (i.e., lower scores denote lower quality of life). The mean score of the items in each domain is used to calculate the domain scores, which are ultimately transformed linearly to a scale of zero to 100 (15, 16). The inclusion criteria applied in this study were as follows: (1) patients who underwent PCI and CABG surgery, (2) residence in East Kazakhstan and Pavlodar regions of Kazakhstan, and (3) agreement to participate in the study.

Dependent and independent variables

In this study, the four domains of the

WHOQOL-BREF questionnaire were considered dependent variables and other data (age, sex, marital status, place of residence, nationality, kind of operation, hospital) were considered independent variables. The participants were divided into two age categories, namely younger than 61 and older than 60 years of age. Their marital status was either single/divorced or married. Local residence

Tab. 1. Characteristics of study population (n = 268).

Characteristics	n	%
Sex		
Male	201	75.0
Female	67	25.0
Age		
≤60	121	45.1
>60	147	54.9
Marital status		
Single/divorced	75	28.0
Married	193	72.0
Local residence		
Urban	184	68.7
Rural	84	31.3
Nationality		
Kazakh	117	43.7
Other nationality	151	56.3
Kind of operation		
PCI	112	41.8
CABG	156	58.2
Hospital		
Pavlodar regional cardiology hospital	102	38.1
Hospital of Semey medical university	87	32.5
East Kazakhstan regional hospital	79	29.5

Tab. 2. Response pattern and missing items for each item (n = 268).

Items (items numbers)	Missing n (%)	Mean score	SD	Floor n (%)	Ceiling n (%)
Overall QOL (1)	0 (0)	3.76	0.72	17 (6.3)	28 (10.4)
Overall health (2)	0 (0)	3.79	0.73	18 (6.7)	30 (11.2)
Pain (3)	0 (0)	3.62	0.67	14 (5.3)	13 (4.9)
Dependence on medical aids (4)	0 (0)	3.75	0.83	19 (7.1)	47 (17.5)
Positive feeling (5)	0 (0)	3.77	0.83	15 (5.6)	53 (19.8)
Personal belief (6)	0 (0)	3.74	0.92	28 (10.4)	58 (21.6)
Concentration (7)	0 (0)	3.51	0.96	51 (19.0)	38 (14.2)
Security (8)	0 (0)	3.49	0.76	13 (4.9)	31 (11.6)
Physical environment (9)	0 (0)	3.64	0.87	1 (0.4)	36 (13.4)
Energy (10)	0 (0)	3.47	1.07	1 (0.4)	56 (20.9)
Bodily image (11)	0 (0)	3.36	0.86	3 (1.1)	22 (8.2)
Financial support (12)	0 (0)	3.56	0.90	1 (0.4)	35 (13.1)
Accessibility of information (13)	0 (0)	3.61	0.92	1 (0.4)	51 (19.0)
Leisure activity (14)	0 (0)	3.77	0.93	1 (0.4)	57 (21.3)
Mobility (15)	0 (0)	3.69	0.87	22 (8.2)	51 (19.0)
Sleep and rest (16)	0 (0)	3.71	0.96	35 (13.1)	59 (22.0)
Activities of daily living (17)	0 (0)	3.55	0.90	1 (0.4)	36 (13.4)
Work capacity (18)	0 (0)	3.66	0.89	35 (13.1)	40 (14.9)
Self-esteem (19)	0 (0)	3.71	0.85	1 (0.4)	51 (19.0)
Personal relationship (20)	0 (0)	3.76	0.94	36 (13.4)	58 (21.6)
Sexual activity (21)	0 (0)	3.70	0.89	20 (7.5)	58 (21.6)
Social support (22)	0 (0)	3.42	0.94	48 (17.9)	38 (14.2)
Home environment (23)	0 (0)	3.70	0.89	1 (0.4)	52 (19.4)
Health care (24)	0 (0)	3.91	0.98	23 (8.6)	94 (35.1)
Transport (25)	0 (0)	4.12	0.88	1 (0.4)	109 (40.7)
Negative feeling (26)	0 (0)	4.37	0.75	5 (1.9)	138 (51.5)

QOL – Quality of life, SD – Standard deviations

was found to be either urban or rural. Nationality was either Kazakh or assigned as other. Patients are divided into two groups depending on whether they underwent PCI or CABG surgery. Patients were treated either at Pavlodar regional cardiology hospital, Hospital of Semey medical university or East Kazakhstan regional hospital.

Statistical analyses

Statistical analysis was performed using SPSS version 20.0 (IBM Ireland Product Distribution Limited, Ireland). The descriptive analyses included frequencies, percentages, ranges, means, and standard deviations (SD). The reliability of the WHOQOL-BREF domains and overall quality of life were assessed using Cronbach’s alpha, with scores of 0.70 and over deemed acceptable (17). We used Pearson’s correlation coefficient to determine the level of agreement between the four domains of the WHOQOL-BREF. The paired t-test was used to compare the mean scores of different domains of the WHOQOL-BREF. The independent t-test and a linear regression model were used to investigate the relationship between patients’ quality of life and their characteristics. Transformed scores were used for statistical analyses in all domains, and the level of significance was set at $p < 0.05$ for all analyses.

Results

In total, 268 patients who underwent PCI or CABG surgery filled out the WHOQOL-BREF questionnaire in this study. The baseline patients’ characteristics are presented in Table 1. The mean age of study population was 60.8 ± 9.2 year (Rang: 35–85 yr). Of these, 201 (75.0 %) were male and 67 (25.0 %) were female. Most of the patients, namely 184 (68.7 %) were urban residents.

Table 2 presents the missing responses, mean score, SD, and floor and ceiling effects for each item. The highest and lowest mean scores were observed in the negative feeling (4.37) and bodily image items (3.36), respectively.

Table 3 present correlations between four domains of WHOQOL-BREF. There is a statistically significant correlation between overall QOL (Q1) and scores obtained from domains 2, 3, and 4. Also, we observed a significant correlation between overall health (Q2) and domains 3, and 4. There is significant correlation between domains 1 and 3, and domain 4; significant correlation between domains 2 and 3, and domain 4; significant correlation between domains 3 and 4

The paired t-test was used to compare the mean scores of the four domains of the WHOQOL-BREF. As Table 4 shows, significant differences were found between all domains of the WHOQOL-BREF (except for the difference between domains 1 and 2).

Tab. 3. Correlation coefficients (CC) between the two overall quality of life items (Q1 and Q2) and the four domains (DOM) of WHOQOL-BREF.

		Q1	Q2	DOM 1	DOM 2	DOM 3	DOM 4
Q1	CC	1	0.506	0.103	0.254	0.213	0.189
	p		0.000	0.091	0.000	0.000	0.002
Q2	CC		1	0.059	0.032	0.153	0.178
	p			0.337	0.598	0.012	0.003
DOM 1	CC			1	0.023	0.125	0.223
	p				0.704	0.041	0.000
DOM 2	CC				1	0.394	0.156
	p					0.000	0.010
DOM 3	CC					1	0.277
	p						0.000
DOM 4	CC						1
	p						

Tab. 4. Paired t-test for the four domains of WHOQOL-BREF.

		Paired differences				t-test	df	Sig. (2-tailed)
		Mean	Std. deviation	95% CI of the difference				
				Lower	Upper			
Pair 1	DOM1-DOM2	-0.78	15.6	-2.65	1.10	-0.82	267	0.415
Pair 2	DOM1-DOM3	-9.34	20.7	-11.9	-6.90	-7.42	267	0.000
Pair 3	DOM1-DOM4	-13.8	13.0	-15.4	-12.2	-17.3	267	0.000
Pair 4	DOM2-DOM3	-8.61	16.2	-10.6	-6.67	-8.73	267	0.000
Pair 5	DOM2-DOM4	-13.0	14.4	-14.8	-11.3	-14.8	267	0.000
Pair 6	DOM3-DOM4	-4.41	17.2	-6.48	-2.34	-4.20	267	0.000

CI – confidence interval; df – degree of freedom; DOM – domain

The total mean score of the WHOQOL-BREF was 13.97. Among the different domains of the WHOQOL-BREF, the lowest and highest mean scores of responses indicating satisfaction were found for domain 1 (mean, 13.00) and domain 4 (mean, 15.22, Tab. 5). The mean scores of the four domains and the total score of the WHOQOL-BREF according to independent variables (age, sex, marital status, place of residence, nationality, kind of operation, hospital) are presented in Table 5.

In this study Cronbach’s alpha coefficient was applied to examine the internal consistency of WHOQOL-BREF scale (26 items) as well as its four domains. The Cronbach’s alpha coefficient of WHOQOL-BREF was adequate (0.842) for all 26 questions and for each domain the values are as follows: 0.764 for physical health domain, 0.722 for psychological health domain, 0.668 for social relationship domain and 0.708 for environmental health domain.

The total mean score of the WHOQOL-BREF was 13.97 (± 1.21). Among the different domains of the WHOQOL-BREF, the lowest and highest mean scores of responses indicating satisfaction were found in domains 1 (mean, 13.00 ± 1.64) and 4 (mean, 15.22 ± 1.71) (Tab. 5). The mean score of the four domains and the total score of the WHOQOL-BREF according to independent variables (sex, age, marital status, place of residence, nationality, kind of operation, hospital) are displayed in Table 5.

As seen in Table 5, the means of responses indicating satisfaction in the total score and in domains 2 and 4 were higher in males than in females, but this pattern was reversed in domains 1 and 3, and the total score was the same in both groups. In the group, aged 60 or younger, the means of responses indicating sat-

Tab. 5. Comparison of the scores in the four domains of WHOQOL-BREF according to independent variables.

	Domain 1	Domain 2	Domain 3	Domain 4	Total
Total	13.00±1.64	13.14±1.79	14.52±2.67	15.22±1.71	13.97±1.21
Sex					
Male	12.97±1.69	13.21±1.74	14.43±2.68	15.29±1.71	13.97±1.17
Female	13.12±1.49	12.93±1.96	14.81±2.65	15.00±1.69	13.96±1.34
p	0.507	0.255	0.317	0.233	0.948
Age (years)					
≤60	13.02±1.70	13.18±1.83	14.54±2.74	15.40±1.68	14.03±1.20
>60	12.99±1.60	13.11±1.76	14.51±2.63	15.07±1.73	13.92±1.23
p	0.908	0.741	0.935	0.118	0.448
Marital status					
Single/divorced	12.95±1.70	13.20±1.81	14.78±2.79	15.23±1.75	13.79±1.06
Married	13.15±1.50	12.99±1.75	13.85±2.22	15.17±1.62	14.04±1.26
p	0.376	0.378	0.010	0.798	0.127
Local residence					
Urban	12.98±1.64	13.03±1.82	14.43±2.63	15.14±1.72	13.90±1.24
Rural	13.05±1.65	13.39±1.72	14.71±2.78	15.38±1.71	14.14±1.34
p	0.768	0.122	0.428	0.289	0.137
Nationality					
Kazakh	12.88±1.63	13.37±1.84	14.73±2.73	15.36±1.71	14.08±1.21
Other nationality	13.10±1.65	12.97±1.74	14.36±2.63	15.11±1.71	13.69±1.21
p	0.280	0.070	0.272	0.231	0.182
Kind of operation					
PCI	13.21±1.59	13.08±1.92	14.72±2.56	15.08±1.72	14.02±1.13
CABG	12.86±1.67	13.19±1.70	14.38±2.75	15.31±1.65	13.93±1.27
p	0.089	0.636	0.298	0.271	0.558
Hospital					
Pavlodar regional cardiology hospital	13.18±1.96	14.03±1.51	15.93±2.87	15.97±1.54	13.12±0.98
Hospital of Semey medical university	13.03±1.44	13.53±1.56	14.97±2.39	15.19±1.69	14.78±0.97
East Kazakhstan regional hospital	12.83±1.49	12.08±1.65	12.97±1.78	14.60±1.62	14.18±1.00
p	0.341	0.000	0.000	0.000	0.000

Tab. 6. Reverse multiple linear regression analyses of factors significantly associated with QOL.

QOL domains	Variables	Unstandardized coefficients		Standardized coefficients		t	p
		Beta	SE	Beta	t		
Domain 1	Kind of operation	-0.045	0.019	-0.151	-2.375	0.018	
Domain 2	Hospital	-0.146	0.025	-0.312	-5.730	0.000	
Domain 3	Sex	0.024	0.011	0.149	2.130	0.034	
	Hospital	-0.096	0.018	-0.305	-5.363	0.000	
	Kind of operation	-0.027	0.013	-0.146	-2.091	0.037	
	Marital status	-0.027	0.012	-0.162	-2.322	0.021	
Domain 4	Hospital	-0.086	0.026	-0.176	-3.278	0.001	
	Kind of operation	0.038	0.019	0.131	1.997	0.047	
Total	Kind of operation	-0.402	0.035	-0.579	-11.585	0.000	

QOL – quality of life; SE – standard error

isfaction in the total score and all domains were higher than in the group aged older than 60, but the difference was not significant. The means and percentages of responses indicating satisfaction were higher in domains 1, and 4 in married persons as compared to single persons, but this pattern was reversed in domains 2, and 3, where there was a significant difference between two groups in domain 3. In the rural residence the means of responses indicating satisfaction in the total score and all domains were higher than in the urban residence, but the difference was not significant. In the Kazakh population, the means of responses indicating satisfaction, in the total score and all domains were higher than in the other nationality, but the difference was not significant.

In patients who underwent PCI surgery the means of responses indicating satisfaction in the total score and in domains 1 and 4 were higher than in patients who underwent CABG surgery, but this pattern was reversed in domains 2, and 3, and the total scores in both groups was nearly the same. There were significant differences in the total score and domains 2, 3, and 4 according to hospital where patients underwent the operation except for domain 1, while in this pattern, there was no significant difference.

As Table 5 illustrates, differences were found between different statuses regarding certain variables (marital status, hospital) in total and in the four domains of the WHO QOL at the level of significance of $p < 0.05$.

From Table 6 illustrating the results of Backward Multiple Linear Regression, it is apparent that the “kind of operation” was significantly associated with total WHOQOL. The “kind of operation” and particular “hospital” were associated with three domains of WHOQOL, “sex” and “marital status” were associated with domain 3.

Discussion

The aim of this investigation was to estimate reliability (internal consistency) of the WHOQOL-BREF questionnaire and quality of life of patients after PCI or CABG surgery in East Kazakhstan and Pavlodar regions of Kazakhstan with the use of WHOQOL-BREF scale. The WHOQOL-BREF questionnaire of our study showed an acceptable internal consistency (Cronbach’s alpha of 0.842) and that each of its domains exhibited a satisfactory consistency (Cronbach’s alpha >0.7), except for social relationship domain (0.668), which was the same as in other international investigations (18, 19, 20, 21). Lower internal consistency could be due to the small amount of questions (3 items) in social relationships domain. We observed a positive correlation between all domains of the WHOQOL-BREF. Statistically significant were the differences between Q1 and Q2; Q1 and domains 2, 3, and 4; Q2 and domains 3, and 4; domain 1 and domains 3, and 4; domains 3 and 4. It was nearly the same as many in international studies that revealed a positive correlation between all domains of the WHOQOL-BREF (18, 20, 21).

As shown in Table 4, the mean scores of the four domains were significantly different (except for domains 1 and 2), with the greatest difference observed between domains 1 and 4.

According to our study among the four domains of the WHOQOL-BREF, the lowest mean satisfaction rating was found in domain 1 (physical health; mean, 13.00). It means that patients after PCI or CABG have low daily activity, dependence on medical observation and medication, greater lack in energy and mobility, more pain and discomfort, sleeping disorders and low capacity for work. As opposed to the lowest, the highest mean satisfaction was revealed in the domain 4 (environmental health, 15.22). That means patients after PCI or CABG surgery do not have sleeping problem, and have very good financial resources, opportunities for acquiring new information and skills and leisure activities.

Most SD from mean (SD = 2.67) was observed in DOM3 (Social Relationships). Greater SD of mean obtained from DOM3 might be associated with different interpretations of the questions used in this domain and also small number of questions.

In the present study, a multiple linear regression model demonstrated that kind of operation significantly associated with the total WHOQOL-BREF score, meaning that patients after PCI had a lower quality of life. Several previous studies have compared the effect of CABG vs PCI surgery on health-related quality of life among patients with multivessel coronary artery disease. In general, these studies have tended to show that compared with PCI, CABG surgery results in superior angina relief over the first 1 to 3 years after initial revascularization (22, 23).

The Pavlodar regional cardiology hospital started to make cardiac surgery earlier than the other two hospitals. We hypothesized

that this factor may affect the outcomes. As seen in Table 5, there was a significant difference in domains 2, 3, and 4 between hospitals. The lowest mean in the domains 2, 3, and 4 was in patients of the East Kazakhstan regional hospital. The highest mean in the domains 2, 3, and 4 had patients who were treated in the Pavlodar regional cardiology hospital.

A multiple linear regression model demonstrated that the “kind of operation” was significantly associated with the total WHOQOL-BREF score, meaning that patients after CABG surgery had a better quality of life as compared with patients after PCI surgery. The “kind of operation” was also associated with domains 1, 3, and 4 and patients after CABG surgery were in better physical health and had better social relationships. But the environmental health was better in patients after PCI surgery. The “Hospital” category was significantly associated with domains 2, and 4, meaning that patients who were treated in the Pavlodar regional cardiology hospital were in better psychological health and environmental health. The categories of “sex” and “marital status” were significantly associated with domain 3, meaning that men and married patients had a greater quantity of social relationships.

Our study had some limitations. Firstly, as this was a cross-sectional study, the causality between compared variables cannot be established. Secondly, the surveyed population in this study was relatively small. Also unknown and unmeasured confounders may exist, and the results should be interpreted with caution. Despite these limitations, it is the first study in Kazakhstan where we analyzed the quality of life of patients after PCI or CABG surgery using the international questionnaire WHOQOL-BREF.

Conclusions

This study showed that the WHOQOL-BREF questionnaire has a good reliability in characterizing the quality of life of patients after PCI or CABG surgery. We also found that the surveyed patients after PCI or CABG surgery had a relatively moderate quality of life. In this study, it was observed that the kind of operation, sex, marital status, and hospital where the surgery had been done were important variables influencing the quality of life of patients after PCI or CABG surgery.

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