Quality of life and perceived health among CHD patients and in general population

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The objective of the study was to assess validity and reliability of the WHOQOL-100 questionnaire and to show differences in estimating quality of life and perceived health among CHD patients and in Kaunas population (control group).

Materials and methods. The study population was randomly selected 1347 Kaunas men and women aged 35–64 and stratified by age and sex (response rate 62%) examined in 2001–2002 by the self-administered WHOQOL-100 questionnaire. In the Department of Cardiology at the Kaunas University Hospital, in 2002–2003 over an 11-month period 204 men and women with myocardial infarction (MI) and 243 men and women with angina pectoris (AP) (age, 35–64) filled in the same questionnaire. Convergent validity and reliability were evaluated by Pearson's correlation coefficients and by Cronbach's α. The test–retest reliability was calculated from intraclass correlation coefficients. The direct method was used for age standardization, with European population as a standard. Identification of the domains associated with QoL (quality of life) and perceived health was accomplished by forward stepwise linear regression analyses. The mean β was computed for each domain. The values of $p < 0.05$ were considered significant in two-tailed tests.

Results. Positive significant correlations were found among the overall WHOQOL-100 domains among CHD patients and control groups. The highest significant correlations were found between quality of life and psychological ($r = 0.60$), environmental ($r = 0.65$) domains' scores, independence level and physical domains' scores ($r = 0.69$), environmental and quality of life scores ($r = 0.65$) both among patients with CHD and in the control group. The reliability estimate of internal consistency based on Cronbach's α was 0.77–0.92 in CHD and 0.77–0.91 in the control group. The highest inter-item correlations were revealed between items of the domain of independence level, both among patients with CHD and the control group (0.91). The highest homogeneity (0.55) was assessed in the quality of life domain in patients with CHD and in the spirituality (0.56) domain in the control group. The intraclass correlation coefficients showed a significant agreement among the repeated measurements. The domains having a significant impact on QoL ratings were environmental ($\beta = 0.4$), psychological ($\beta = 0.2$) domains and spirituality ($\beta = 0.1$) in patients with CHD; in the control group, a significant impact showed environmental ($\beta = 0.3$), psychological ($\beta = 0.1$) and social relationship ($\beta = 0.1$) domains. The results of ratings of perceived health were different as compared to QoL. These ratings were most strongly related to the psychological, physical, social relationships and environmental domains in the CHD group. Independence level, physical and psychological domains were more important than spirituality, social relationship domains and environmental level in the control group.

Conclusion. The WHOQOL-100 showed high levels of reliability and item domain correlations in patients with CHD and in the control group. To summarize the effects of the domains on the quality of life, the environmental, psychological, social relationship and spirituality domains were assessed in patients with CHD and in the control group; the psychological, physical, social relationship, environmental and independence level domains showed a major impact on perceived health both in patients with CHD and in the control group.

Key words: quality of life, perceived health, validity, reliability

INTRODUCTION

In Lithuania, information is lacking about the public's perception of the term "health-related quality of life". One of the key distinctions is the difference between health-related and non-health-related quality of life. Among the health-related definitions, well known is the World Health Organization (WHO) definition of health as a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity (1). The in-

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clusion of wellbeing in the WHO definition has led to a too narrow understanding of self-reported psychological wellbeing as the only aspect of quality of life. Wellbeing should be regarded as a narrower term, though as an important aspect of quality of life, however, it is not the only aspect that needs to be considered. The term "quality of life" is now widely used as the health indicator and health outcome in the literature. There is a considerable number of definitions of the term, but the definition that has been proposed by the WHO (WHOQOL Group 1995) is "the individuals' 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-ranging concept affected in a complex way by the persons' physical health, psychological state, level of independence, social relationships and their relationship to salient features of their environment" (2). Given the increasing use of the concept in all areas related to health, the WHOQOL-100 takes a consistently subjective approach to the estimation of QoL (Quality of Life), it considers both positive and negative aspects of items and has the major advantage of having been developed in several different cultures. The WHOQOL-100 was standardized and inquired into six broad domains of overall quality of life and general health, physical and psychological domains, level of independence, social relationships, environmental and spirituality/religion/personal beliefs. A complete definition of domains consists of conceptual definition, a description of various indicators or dimensions along which rating and listing can be made of some situations that might significantly affect that domain. The WHOQOL-100 is a key quality of life and health evaluation indicator that should be routinely assessed in health surveys.

The aim of this study was to validate the questionnaire WHOQOL-100 and to reveal differences between quality of life and perceived health among CHD patients and the general population in Kaunas.

MATERIALS AND METHODS

The study cohort comprised randomly selected 1347 Kaunas men and women aged 35–64 and stratified by age and sex (response rate 62%), examined in 2001–2002 according to the self-administered WHOQOL-100 questionnaire. In the Department of Cardiology at Kaunas Medical University Hospital, in 2002–2003 over an 11-month period 204 men and women with myocardial infarction (MI) and 243 men and women with angina pectoris (AP), all aged 35–64, filled in the same questionnaire. Approval from the Ethics Committee was obtained and the participants gave a written informed consent prior to filling in the questionnaire. The convergent validity and reliability were evaluated by Pearson's correlation coefficients and by Cronbach's α (3). To assess the test–retest reliability of the questionnaire, respondents were requested to complete another copy of WHOQOL-100, three weeks after they had completed the first. Statistical analysis was performed according to the intraclass correlation coefficients. The direct method was used for age standardization, with European population as a standard. Identification of the domains associated with QoL and perceived health was accomplished by performing a series of forward stepwise linear regression analyses using QoL ratings or perceived health ratings as the dependent variable and individual domain scores as predictors. The stepwise procedure begins by identifying the domain that is mostly strongly related to the study rating. It then selects the next most strongly related domain after controlling for the first domain, and so on. Backward stepwise analyses gave results nearly identical to the forward method. The mean β was computed for each domain. Values of $p < 0.05$ were considered significant in two-tailed tests.

RESULTS

Positive significant correlations were found between the overall WHOQOL-100 domains among patients with CHD and in the control groups (Tables 1, 2). The highest significant correlations were found between quality of life and psychological ($r = 0.60$),

Table 1. **Convergent validity of the WHOQOL-100 domain scores in CHD patients**

WHOQOL-100 domains	QOL	PH	PS	IL	SR	ENV	S
QOL	1	0.44 [a]	0.6 [a]	0.38 [a]	0.28 [a]	0.65 [a]	0.51 [a]
PH	0.44 [a]	1	0.52 [a]	0.69 [a]	0.16 [a]	0.46 [a]	0.32 [a]
PS	0.6 [a]	0.52 [a]	1	0.47 [a]	0.48 [a]	0.6 [a]	0.63 [a]
IL	0.38 [a]	0.69 [a]	0.47 [a]	1	0.21 [a]	0.43 [a]	0.28 [a]
SR	0.28 [a]	0.16 [a]	0.48 [a]	0.21 [a]	1	0.4 [a]	0.43 [a]
ENV	0.65 [a]	0.46 [a]	0.6 [a]	0.43 [a]	0.4 [a]	1	0.57 [a]
S	0.51 [a]	0.32 [a]	0.63 [a]	0.28 [a]	0.43 [a]	0.57 [a]	1

[a] – correlation is significant at the 0.01 level (2-tailed).
QOL – quality of life, PH – physical, PS – psychological, IL – independence level, SR – social relationship, ENV – environmental, S – spirituality.

Table 2. **Convergent validity of the WHOQOL-100 domain scores in the control group**

WHOQOL-100 domains	QOL	PH	PS	IL	SR	ENV	S
QOL	1	0.47 [a]	0.61 [a]	0.50 [a]	0.53 [a]	0.61 [a]	0.42 [a]
PH	0.47[a]	1	0.56 [a]	0.69 [a]	0.36 [a]	0.40 [a]	0.24 [a]
PS	0.61 [a]	0.56 [a]	1	0.57 [a]	0.58 [a]	0.58 [a]	0.50 [a]
IL	0.50 [a]	0.69 [a]	0.57 [a]	1	0.40 [a]	0.43 [a]	0.33 [a]
SR	0.53 [a]	0.36 [a]	0.58 [a]	0.40 [a]	1	0.62 [a]	0.43 [a]
ENV	0.61 [a]	0.40 [a]	0.58 [a]	0.43 [a]	0.62 [a]	1	0.43 [a]
S	0.42 [a]	0.24 [a]	0.50 [a]	0.33 [a]	0.43 [a]	0.43 [a]	1

[a] – correlation is significant at the 0.01 level (2-tailed).
QOL – quality of life, PH – physical, PS – psychological, IL – independence level, SR – social relationship, ENV – environmental, S – spirituality.

environmental domain, r = 0.79, spirituality, r = 0.64. Tables 4 and 5 represent the results of the stepwise linear regression analyses among CHD and control groups. All domains with β (standardized regression coefficients) and statistically significant levels are shown in these tables. The domains having a significant impact on QoL ratings were environmental and psychological domains and spirituality among patients CHD. All domains, except independence level, played a significant role in predicting QoL ratings in the control group. The results for perceived health were different from assessment of QoL. These ratings were

environmental (r = 0.65) domains' scores, independence level and physical domains' scores (r = 0.69), environmental and quality of life scores (r = = 0.65) among CHD patients and in the control group. Differences in associations between psychological and environmental (r = 0.6) and spirituality (r = = 0.63) scores were found among CHD patients, and correlations between environmental and social relationship scores (r = 0.62) were assessed only in the control group. The correlation was low between QoL and independence (r = 0.38) and social relationship (r = = 0.28) scores, physical and social relationship (r = = 0.16) and physical and spirituality scores (r = = 0.32) in CHD patients. The lowest relationship between physical and spirituality scores (r = 0.24) was found in the control group. The reliability estimate of internal consistency based on Cronbach's α was 0.77–0.92 in the CHD group and 0.77–0.91 in the control group (Table 3). The highest inter-item correlations were revealed between items of the domain of independence level both in CHD patients and is the control group (0.91). The highest homogeneity (0.55) was assessed in the quality of life domain among CHD patients and in the spirituality (0.56) domain in the control group. The intraclass correlation coefficients showed a significant agreement between initial and repeated measurements: quality of life, r = 0.74, physical domain, r = 0.86, psychological domain, r = 0.68, independence level, r = 0.89, social relationship, r = 0.76,

Table 3. **Inter-item correlations and homogeneity of the WHOQOL-100 domains scores in CHD patients and control group**

WHOQOL-100 domains	CHD group		Control group	
	Homogeneity	Cronbach's α	Homogeneity	Cronbach's α
QOL	0.55	0.83	0.45	0.77
PH	0.36	0.87	0.30	0.84
PS	0.23	0.86	0.27	0.88
IL	0.42	0.92	0.41	0.91
SR	0.25	0.91	0.28	0.82
ENV	0.23	0.78	0.20	0.89
S	0.46	0.77	0.56	0.83

QOL – quality of life, PH – physical, PS – psychological, IL – independence level, SR – social relationship, ENV – environmental, S – spirituality.

most strongly related to the psychological, physical, social relationships and environmental domains in

Table 4. **Effects of WHOQOL-100 domains on quality of life in CHD patients and control group**

WHOQOL-100 domains	Quality of life			
	CHD group		Control group	
	β	p	β	p
PH	0.065	0.211	0.072	0.019
PS	0.255	0.000	0.180	0.000
IL	–0.031	0.523	0.006	0.836
SR	–0.066	0.108	0.172	0.000
ENV	0.449	0.000	0.308	0.000
S	0.124	0.010	0.073	0.004

PH – physical, PS – psychological, IL – independence level, SR – social relationship, ENV – environmental, S – spirituality.

Table 5. **Effects on perceived health in CHD patients and control group of WHOQOL-100 domains**

WHOQOL-100 domains	Perceived health			
	CHD group		Control group	
	β	p	β	p
PH	0.184	0.004	0.184	0.000
PS	0.226	0.001	0.112	0.001
IL	0.085	0.154	0.342	0.000
SR	–0.159	0.002	0.027	0.375
ENV	0.124	0.036	0.045	0.149
S	0.110	0.061	0.008	0.761

PH – physical, PS – psychological, IL – independence level, SR – social relationship, ENV – environmental, S – spirituality

the CHD group. Independence level, physical and psychological domains, were more important than spirituality, social relationships and environmental level in the control group.

DISCUSSION

Quality of life has become a widely accepted concept in health care research. It is used as an outcome measure in population studies, in descriptive studies of patient groups and clinical trials. The WHOQOL-100 questionnaire has been accepted as a generic-multidimensional concept. The multiple dimensions may not only include the physical, psychological and social functioning, but also material consequences, cognition, spiritual wellbeing, structural functioning (4). There is a wide range of QoL instruments available; although this range is likely to be reduced, the purpose of evaluating QoL is considered. The aim of this study was to evaluate QoL among CHD patients and in general population in a wide range of physical, psychological, social, environment and spirituality domains. All measurements should satisfy basic properties if they are to be interpreted right (5). Validation of instruments is the process of determining for believing that the instrument measures what it is intended to measure. Convergent validity shows that some dimensions of the WHOQOL-100 are related and we expect the observed measurements to be correlated. We evaluated the convergence among the domains to determine to what extent this questionnaire measures the same construct. We found low to moderate correlations among the domains in CHD patients and mainly moderate correlations in the population group. Low correlations were assessed among social relationship, QoL, physical domain and independence level (r = 0.16–0.28) in the CHD group. The

convergent validity among population group showed mostly moderate correlations among the domains, except the relationship between the social domain and spirituality (r = 0.24). In the literature, the correlation between these scaling techniques was reported as being low to moderate and varied from 0.22 to 0.65 (6–8). Assessment of reliability consists in determining that measurement yields reproducible and consistent results. Repeatability reliability is based upon analysis of correlations between repeated measurements, where the measurements are repeated over time (test–retest reliability) and based upon item-to-item correlations. Cronbach's α coefficients were computed to estimate the internal-consistency reliability of each scale score. Measures with reliability of 0.70 or greater have been recommended for comparing the groups. Precision in analyzing an individual patient's score requires a reliability of 0.90 (9). In our study, all relationships among the items achieved a Cronbach's α more than 0.77. The test–retest stability was very high between the independence level (0.92) and social relationship (0.91) items in CHD patients, and between the independence level (0.91) and environmental items in the population group. Low homogeneity was found in psychological and environmental domains in CHD patients and in psychological and environmental domains in the population group. These findings suggest that the WHOQOL-100 has a high test–retest reliability in CHD patients and in the population group. According to McHorney et al. (8), the reliability coefficients ranged from a low of 0.65 to a high of 0.94 across scales (median = 0.85) and varied somewhat across patient subgroups. Westaway et al. (9) showed that the reliability coefficients were 0.77 for the 5-item life satisfaction scale and 0.82 for the 12-item EQoL measure (10). Fumimoto et al. (11) for patients with diabetes mellitus concluded that SF-20 instrument was reliable in both patient and control samples, as the internal consistency coefficients ranged between 0.79 and 0.94.

Nowadays there is an extensive discussion on whether QoL and health status are essentially the same constructs or they represent different constructs. The objective of this analysis was to reveal, in CHD patients and in the population group, whether Qol can be differentiated from health status. The results of our study indicate that from the patient's and population perspective they are evaluated as two different constructs. The WHOQOL-100 domain effects on quality of life showed that only environmental and psychological domains were significant among CHD patients and in population, but they differed on spirituality and social relationship. The WHOQOL-100 domain effects on perceived health displayed distinct constructs. The most

significant domains to have effects on perceived health were psychological, physical, social relationship and environmental domains in the CHD group and independence level, physical and psychological domains in the population group. Smith et al. (12) pointed out that domains that frequently appear in QoL instruments, such as social support or cognitive functioning, are relevant to QoL assessment only to the extent that they affect mental or physical functioning. Mozes et al. (13) findings were that questionnaires' domains explain a large degree of the variance in the rating of QoL, especially physical functioning, mental health and vitality, while socio-economic details and existence of disease are of additional marginal value. Bengtsson et al. (14) assessed that among patients after MI vitality was influencing mental health and recovery, and among patients with AP physical function influenced physical health.

CONCLUSIONS

1. The WHOQOL-100 questionnaire is valid and reliable for estimating quality of life and perceived health in CHD patients.

2. A significant impact on the ratings of quality of life and perceived health was shown by the environmental domain both in CHD and control groups; the rating of perceived health was influenced by the psychological domain in CHD patients and by the independence level in the control group.

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GYVENIMO KOKYBĖ IR SUBJEKTYVUS SVEIKATOS VERTINIMAS TARP SERGANČIŲJŲ IŠEMINE ŠIRDIES LIGA

S a n t r a u k a

Darbo tikslas – įvertinti Gyvenimo Kokybės (GK) PSO-100 klausimyno tinkamumą sergantiesiems IŠL ir Kauno 35–64 metų. gyventojams (kontrolinė grupė), nustatyti GK ir subjektyviam sveikatos vertinimui svarbias klausimyno sritis.

Medžiaga ir metodai. Tiriamasis kontingentas parinktas atsitiktinai ir suskirstytas pagal amžių ir lytį. 2001–2002 m. KMU Kardiologijos instituto Populiacinių tyrimų laboratorijoje ištirti 35–64 metų amžiaus 1347 Kauno gyventojai. Ištirtų asmenų atsako dažnis – 62%. KMUK kardiologiniuose skyriuose GK PSO-100 klausimyną 2001–2002 m. užpildė 204 ligoniai, sergantys MI, ir 243 ligoniai, sergantys AP (amžius – 35–64 metai). Konvergentinis pagrįstumas ir stabilumas buvo įvertinti Pirsono koreliacijos koeficientais ir Kronbacho α rodikliu. Testo-retesto stabilumas buvo įvertintas apskaičiavus koreliacijos koeficientus tarp pirmo ir kartotinio klausimyno sričių tyrimo. Atlikta tiesioginė standartizacija pagal amžių, standartu naudojant Europos gyventojų amžiaus struktūrą. Tie-

sine regresija (žingsniniu metodu) buvo įvertintas klausimyno sričių poveikis GK ir subjektyviam sveikatos vertinimui tarp sergančiųjų IŠL ir kontrolinės grupės tiriamųjų.

Rezultatai. Statistiškai reikšmingi ir teigiami koreliaciniai ryšiai buvo nustatyti tarp visų klausimyno GK PSO-100 sričių, tiek sergančiųjų IŠL, tiek ir kontrolinėje grupėje: tarp GK ir psichologinės srities (r = 0,60), GK ir aplinkos (r = 0,65), nepriklausomybės laipsnio ir psichologinės sričių (r = 0,69), GK ir aplinkos sričių (r = 0,65). Kronbacho α rodiklis tarp sergančiųjų IŠL nustatytas 0,77–0,92, o kontrolinėje grupėje – 0,77–0,91. Stiprus ir labai stiprus buvo testo-retesto stabilumas (0,64–0,89). Taigi GK PSO-100 klausimynas yra tinkamas sergančiųjų IŠL ir kontrolinės grupės GK įvertinti. Nustatyta, kad statistiškai svarbios GK yra aplinkos (β = 0,4) ir psichologinė (β = 0,2)

srities bei dvasingumas (β = 0,1) tarp sergančiųjų IŠL; kontrolinės grupės GK buvo reikšmingos aplinkos (β = 0,3), psichologinė (β = 0,1), socialinių santykių (β = 0,1) sritys. Subjektyviam sveikatos vertinimui statistiškai reikšmingos buvo psichologinė, fizinė, socialinių santykių ir aplinkos sritys tarp sergančiųjų IŠL; nepriklausomybės laipsnis, fizinė ir psichologinė sritys vertinant subjektyvią sveikatą buvo svarbios kontrolinės grupės asmenims.

Išvados. GK PSO-100 klausimynas yra tinkamas gyvenimo kokybei ir kitoms klausimyno sritims įvertinti. Tarp sergančiųjų IŠL gyvenimo kokybės ir subjektyviam sveikatos vertinimui statistiškai reikšmingos buvo aplinkos ir psichologinės sritys, o tarp kontrolinės grupės tiriamųjų – aplinkos ir nepriklausomybės laipsnio sritys.

Raktažodžiai: pagrįstumas, stabilumas, gyvenimo kokybė, subjektyvus sveikatos vertinimas