Health-related quality of life in end-stage renal disease patients, using the Missoula-Vitas quality of life index: a multicenter study

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Abstract

Background and aims. Assessment of Health-related Quality of Life in chronic hemodialysis patients (CHD) is a predictive indicator of the outcome of the disease, including mortality and hospitalization. Regular surveys of the quality of life (QoL) in CHD patients have been conducted worldwide, using various, internationally validated and standardized tools, including the Missoula-VITAS Quality of Life Index scale (MVQOLI). The aim of this study was to examine the reliability and validity of the Bulgarian version of the Missoula-VITAS Quality of Life Index-15 (B-MVQOLI-15) and QoL in CHD patients using this instrument.

Methods. Our study was designed as multi-center cross-sectional. It incorporated 263 end-stage renal disease (ESRD) patients on CHD from across the country and applied the B-MVQOLI-15. Internal consistency and convergent validity of the index were assessed. Non-parametric methods were used to evaluate the impact of demographic factors on the different dimensions scores and on the total score. The relationship between the total QoL score, the total MVQOLI-15 score and dimensions scores were measured based on Spearman's rho Correlation Coefficient.

Results. The total MVQOLI-15 score in the study was 16.44, which is slightly above the middle of the index scale. The patients with higher education were less satisfied with the level of their symptom control compared to patients with lower education. However, high education patients seem to manage better with everyday life compared to those with low education. Men seem to feel more satisfied than women when fulfilling their daily activities (P=0.026). Retired patients and unemployed expressed more satisfaction, compared to the employed (P=0.021). Also, patients on dialysis for over 5 years had lower QoL scores (P=0.043).

Conclusions. B-MVQOLI-15 is a reliable instrument to measure QoL in Bulgarian patients with CHD. The majority of CHD patients rate their QoL as "Fair". Four of all five dimensions positively affect the QoL of CHD patients. The most important dimensions positively affecting the QoL of CHD patients were: interpersonal relationships and transcendent factors. Future studies are necessary to assess the adequacy of the delivered dialysis, the level of medico-social care and the needs of ESRD patients treated with CHD in order to improve their QoL.

Keywords: end-stage renal disease, hemodialysis, quality of life, Missoula Vitas Quality of Life Index

Background and aim

Maintaining optimal quality of life (QoL) in patients with End Stage Renal Disease on hemodialysis (ESRD) presents a serious challenge to healthcare [1]. ESRD is a debilitating illness with significant limitations in physical and psychosocial well-being and is associated with poor QoL [2,3] Patients, undergoing chronic hemodialysis (CHD) frequently have underlying medical conditions

such as: cardiovascular, lung, electrolyte and bone disorders as well as neuropathy, anemia, depression and anxiety etc. [1,4-6]. Moreover, it is known, that dialysis increases the patient's perception of fatigue, reduces mobility, affects sleep, daily activities and work capacity [7-11]. Incapacitation of CHD patients often results in social isolation and self-isolation from society – a condition known as "social death" [1,7,12]. Therefore, our society faces the issue of their social adaptation and re- socialization [13].

Quality of Life (QoL) is a broad multidimensional concept, including the individuals' perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns [14]. Assessment of Health-related Quality of Life (HRQL) in CHD patients is a predictive indicator of the outcome of the disease, including mortality and hospitalization. Moreover, it is as a valuable research tool, measuring the effectiveness of the therapeutic interventions, patients' survival and hospitalizations [15,16] Thus, in clinical practice, the QoL assessment is an integral part of chronic disease management. At present, worldwide, various techniques and tools are available to measure the level of social, physical and psycho-social adaptation in patients with ESRD undergoing hemodialysis [17]. A review of the specialized literature in Bulgaria reveals that only a few authors have studied the social adaptation and the QoL of patients with ESRD on CHD [12,18-21]. Actually, regular surveys on QoL in CHD patients are conducted on the basis of various, internationally validated and standardized tools like SF-12&SF-36. They reveal a relatively low level of QoL, particularly regarding the physical functioning and the social role [18-20]. Several studies have been conducted in Bulgaria in order to evaluate the QoL in patients with chronic kidney disease based on the Kidney Disease Quality of Life-Short Form-36 questionnaire (KDQOL-36) [6,22]. Besides the above-mentioned questionnaires, another measurement tool - the Missoula-VITAS Quality of Life Index scale (MVQOLI) - have been applied in ESRD patients undergoing CHD. Actually, the scale was designed and validated in the United States for evaluation of QoL in patients with advanced illnesses in a palliative care setting, however, its good psychometric properties have been verified in ESRD patients undergoing CHD as well [23-28]. In Bulgaria, to our knowledge, so far, results of QoL in ESRD patients on CHD on the basis of the MVQOLI-15 have not been reported.

The aim of this study was to examine the reliability and validity of the Bulgarian version of the Missoula-VITAS Quality of Life Index-15 (B-MVQOLI-15) and QoL in CHD patients using this instrument.

Materials and methods
Design

The study was designed as an epidemiological, multicenter cross-sectional study, applying the B-MVQOLI-15 to ESRD patients on CHD. Patients were recruited from the hemodialysis centers across the country. Ethical approval was obtained from the Medical University of Plovdiv Research Ethics Committee (№03/31.05.2018.)

The study was carried out in the period May 01, 2018 to August 31, 2018 – the period included both distribution and collection of questionnaires.

Participants, questionnaire and data collection

A convenience type sampling was used. Three hundred ESRD patients undergoing CHD voluntarily participated in the study, which represents approximately 10% of the entire available population of CHD patients in the country. The sample originated from 9 public and private dialysis centers across the country (Table I). Participants were selected according to the following inclusion criteria: age - older than 18 years; on HD for at least 6 months; level of literacy (able to speak, write and read Bulgarian language). The exclusion criteria were: blindness or severe visual impairment, mental disorders or dementia.

Prior to conducting the study, the authors received an exclusive permission from I.R. Byock and M. Merriman to translate and use the questionnaire, according to the original methodology [23,24]. The original questionnaire contained: the overall QoL score ranging from 1 to 5. The B-MVQOLI-15 included five dimensions: symptoms, functioning, interpersonal relationships, wellness, spirituality or transcendent assess [23]. The semantic meaning of "transcendent" denotes the degree of experienced meaning and purpose in life. Within each dimension, three kinds of information were gathered from respondents in order to illuminate their overall experience: Assessment, Satisfaction and Importance. Questions within each single dimension expressing "assessment" were graded on a 5-point Likert scale: from -2 to +2. Questions expressing "satisfaction" were rated from -4 to +4 and questions reflecting "importance" were rated from 1 to 5. In order to

assess the overall score of each dimension of QoL, "assessment" and "satisfaction" scores were summed up. Subsequently, the sum was multiplied by the importance score, i.e. (assessment + satisfaction) x importance. The score of each dimension ranged from -30 to +30 and reflected the degree to which the particular dimension affected the overall QoL. The MVQOLI-15 total score was measured on the basis of the following formula: sum of dimension scores/10 +15. Thus, the QoL rating scale ranged from 0 to 30. The higher the total score, the higher was the level of QoL. The assessment process of the test-retest reliability and the linguistic validity of the B-MVQOLI-15 were described in a previous article [29].

In this study, the B-MVQOLI-15 was handed out to all participants. They had to complete it on their own. At each of the dialysis centers, a specially trained staff doctor was used as a contact person or mediator. The mediator was responsible for handing out the questionnaire forms to the patients. Patients who met the inclusion criteria gave their consent after being informed by the mediator about the purpose of the research. After completing, the forms were returned to the authors in a stamped sealed envelope by post. Each envelope contained: the B-MVQOLI-15 form, accompanied by a cover letter, explaining the purpose of the research. In order to encourage respondents to participate, the mediator, if asked, had to provide explanations, regarding the questionnaire without attempting to influence the answer.

Statistical analysis

Data were expressed as numbers and percentages, mean ± standard deviation and 95% confidence interval. The Omega total (ω_t) coefficient was used to assess the internal consistency and reliability of the questions. Unlike Cronbach's Alpha (α), this co-efficient evaluates variation reliability, attributable to both general and specific factors. Moreover, the Omega total has an advantage over Cronbach's Alpha as it produces no underestimates when tau-equivalence, uncorrelated errors, and normality assumptions are violated [30]. The Package Psych in R was applied to calculate the Omega total coefficient. The Shapiro-Wilk test was used to test the normal distribution of all continuous

(scores) variables. Non-parametric methods were used to test correlations and differences due to the statistically significant deviations in the distribution of total scores from the normal distribution. The Wilcoxon Test for Two-Related Samples was applied to test the presence of statistically significant differences between the dimensions scores (empirical value Z). The Mann-Whitney Test for Two-Independent-Samples (empirical value U) and Kruskal-Wallis Test for Several Independent Samples (empirical value H) were used to assess the impact of demographic factors on the different dimensions scores and the total score. Correlations between variables were evaluated using Spearman's RHO coefficients. IBM SPSS Statistics 24 was used for data processing. A value of $p < 0.05$ was considered statistically significant.

Results

Socio-demographic characteristics of the sample

Of the 300 questionnaires, 263 were returned and validly completed (response rate: 87.6%), with a mean age of 57.6 (±14.0).

Distribution of the dialysis centers in the country and characteristics of the sample are shown in Table I and Table II.

Table I. Distribution of the hemodialysis centers in the country and percentage of ESRD patients undergoing CHD.

Dialysis centers	Frequency (%)
Plovdiv city	
Dialysis center – 1	30 (11.4)
Dialysis center – 2	30 (11.4)
Dialysis center – 3	19 (7.2)
Dialysis center – 4	10 (3.8)
Dialysis center – 5	33 (12.5)
Sofia city	
Dialysis center – 6	62 (23.6)
Dialysis center – 7	32 (12.2)
Montana city	
Dialysis center – 8	36 (13.7)
Karlovo city	
Dialysis center – 9	11 (4.2)
Total	263 (100.0)

Table II. Demographic characteristics of the sample (n=263) and B-MVQOLI-15 Total Score for groups.

Demographic data	Frequency (%)	B-MVQOLI-15 Total Score Mean (SD)	p-value*
Sex			
Male	148 (56.3)	16.47 (4.32)	0.461
Female	115 (43.7)	16.40 (3.86)	
Age			
age ≤ 40	33 (12.5)	15.95 (4.11)	
40 < age ≤ 50	49 (18.6)	16.68 (3.69)	
50 < age ≤ 60	58 (22.1)	16.13 (4.96)	0.947
60 < age ≤ 70	74 (28.1)	16.52 (4.02)	
age > 70	49 (18.6)	16.76 (3.66)	
Education			
Primary	18 (6.8)	17.38 (3.69)	
Secondary	179 (68.1)	16.56 (3.93)	0.566
High	66 (25.1)	15.86 (4.69)	
Marital status			
Single	31 (11.8)	16.25 (4.69)	
Married	161 (61.2)	16.32 (4.02)	
Divorced	24 (9.1)	15.95 (4.61)	0.629
Widowed	34 (12.9)	16.92 (3.83)	
De facto partnership	13 (4.9)	17.76 (3.88)	
Social status			
Unemployed	10 (4.8)	15.61 (2.36)	
Public sector employee	12 (5.8)	13.55 (5.29)	
Private sector employee	21 (10.1)	14.84 (3.76)	
Self-employed	6 (2.9)	18.37 (1.88)	0.022
Retired	156 (75.4)	16.67 (4.20)	
Other	2 (1.0)	12.45 (7.00)	
Duration of hemodialysis treatment (HDT)			
HDT ≤ 1	45 (17.1)	17.47 (3.69)	
1 < HDT ≤ 5	112 (42.6)	16.65 (4.01)	
5 < HDT ≤ 10	72 (27.4)	15.72 (4.50)	0.192
HDT >10	34 (12.9)	15.90 (3.96)	
Accompanying other medical conditions			
Yes	182 (69.2)	16.32 (3.99)	0.353
No	81 (30.8)	16.70 (4.40)	

* Significant level for the Mann-Whitney test for 2 groups or Kruskal-Wallis test for 2+ groups

Reliability and convergent validity of the B-MVQOLI-15

The internal consistency of the B-MVQOLI-15, evaluated by the Omega total coefficient (ω_t=0.73), was satisfactory. The correlation between the total score for B-MVQOLI-15 and the scores for the different dimensions was satisfactory, thus indicating that the five dimensions had the same construct (Table III).

The average (mean) value of the total score (scores close to mid-scale averages) for the B-MVQOLI -15 (16.44, ranging from 0-30) and for the Global score of self-assessment of the QoL (3.24, ranging from 1-5), as well as the established moderate correlation (rho=0.385,

P<0.001) between the two scores, gives us the ground to consider that, overall, the B-MVQOLI-15 reproduces the quality of life self-assessment of patients on CHD.

Table III. Convergent validity of the B-MVQOLI-15.

Dimensions	Spearman's coefficient with Total Score (P value)
Symptoms	0.573 (<0.001)
Functioning	0.407 (<0.001)
Interpersonal	0.713 (<0.001)
Well-being	0.477 (<0.001)
Transcendent	0.603 (<0.001)
Overall QoL	0.385 (<0.001)

Table IV. Score of each dimension in B-MVQOLI-15.

Dimensions	Minimum	Maximum	Mean	Standard deviation	95% confidence interval for mean	Median	Interquartile range
Symptoms	-30	25	3.52	12.11	(2.05, 5.00)	8	14
Functioning	-30	25	4.60	10.21	(3.36, 5.84)	8	6
Interpersonal	-30	30	8.23	16.31	(6.25, 10.21)	16	28
Well-being	-30	30	-8.89	12.60	(-10.42, -7.36)	-10	13
Transcendent	-30	30	6.92	14.18	(5.20, 8.65)	8	21
Total Score	0	27	16.44	4.12	(15.94, 16.94)	17	4.8
Overall QoL	1	5	3.24	0.88	(3.14, 3.35)	3	1

Domain analysis and influence of demographic characteristics on the QoL in CHD patients

Analysis for the B-MVQOLI-15 instrument demonstrated that all dimensions had a positive monotonic trace when plotted against the total score apart from the dimension of well-being (Table IV). The final ratings for the total MVQOLI-15 score in the study was 16.44, which is slightly above the middle of the index scale.

Our results revealed that regarding the QoL, most patients (46.0%) rated it as "Fair" and the mean Global score was 3.24 (Table V).

Table V. Self-assessment of the QoL by the CHD patients.

Overall QoL (How would you rate overall quality of life?)	Frequency (%, 95% confidence interval)
Worst possible	11 (4.2, 2.2 - 7.1)
Poor	30 (11.4, 8.0 - 15.7)
Fair	121 (46.0, 40.1 - 52.0)
Good	86 (32.7, 27.2 - 38.5)
Best possible	15 (5.7, 3.4 - 9.0)

In terms of the impact of demographic characteristic on the QoL, our analysis revealed that gender influenced only responses to items regarding symptom control – men (4.70±11.98) seemed to feel more comfortable and report less discomfort when fulfilling their daily activities compared to women (2.01±12.17), (U=7159, P=0.026). On the other hand, age seems to affect the dimension transcendent (U=7362.5, P=0.042). Younger patients (age ≤ 60) seem to cope with the usual difficulties in life better (8.49±14.23), compared to older patients (age >60) (5.15±13.96). Our study showed that education has an impact on respondents' assessment of how well symptoms are controlled (H=8.848, P=0.012) and how problems are overcome (H=6.397, P=0.041). Further, paired comparison analysis revealed that patients with higher education were less satisfied with the level of their symptom control (0.06±13.24), compared to patients with lower (secondary and primary) education (4.69±11.51).

However, secondary education patients (8.30±14.05) seem to manage better with everyday life compared to those with primary education (0.89±14.25). Another finding is that the level of satisfaction with symptom control depends on the duration of CHD treatment (H=6.956, P=0.031). Patients who have been on dialysis up to a year give higher ratings regarding their QoL in terms of symptom control (7.38±12.33) compared to patients who have been on dialysis for more than a year (2.73±11.94). The duration of hemodialysis also seems to impact the overall QoL ratings, based on the B-MVQOLI-15. Similarly, patients on dialysis for over 5 years give lower QoL scores (15.78±4.32) compared to those on dialysis for less than 5 years (16.88±3.93) (U=7094.0, P=0.043). On the contrary, patients without underlying medical conditions exhibit higher scores on well-being (-6.14±13.93), compared to patients with underlying medical conditions (-10.12±11.80) (U=6010.500, P=0.016). The results of the study showed that work status affected to a higher extent only the interpersonal relationships domain, (H=13,758, P=0.001), thus it impacts the overall QoL and the total B-MVQOLI-15 score (H=7,052, P=0.029). Retired patients were more satisfied with their relations with family, friends and relatives (9.92±16.10), compared to the other social groups – employed (civil servants or self-employed) (1.00±17.72) and unemployed (out of work and other groups) (-1.58±13.29). In general, on the base of total score, the retired patients (16.67±4.20) expressed more satisfaction, compared to the employed (14.98±4.30). The place of residence also has an impact on patients' satisfaction regarding symptom control (H=12.101, P=0.002), interpersonal relationships (H=18.962, P=0.000) and the overall QoL score (H=15.071, P=0.001). Patients, residing in Sofia (the country capital) tended to be less satisfied with their symptom control (-0.39±12.96), compared to those residing in Plovdiv (the second largest city of Bulgaria) (6.33±10.24). Regarding the interpersonal dimension and the overall QoL score, Sofia residents (2.19±17.66, 15.01±4.39) are less satisfied compared to Plovdiv (11.29±14.66, 17.17±3.55) as well as to other smaller cities' residents (12.38±14.24, 17.40±4.22).

Discussion

For Bulgaria, this is the first study that uses the validated Bulgarian version of the MVQOLI-15 (initially designed for palliative care) with ESRD patients. Correlation analysis between the Overall QoL (the global score), and the B-MVQOLI-15 total score revealed a moderate positive relationship, indicating convergent validity (Table III). The reliability of the B-MVQOLI-15 was sufficient, using the Omega total coefficient.

Analyzing the five dimensions in the B-MVQOLI-15, it was established that four of them positively affected the QoL of CHD patients (Table IV). Interpersonal relationships and coping with difficulties (transcendent dimension) exert nearly similar impact on the score. Symptom control and functional abilities come second. In our sample, the well-being dimension was given the poorest QoL score (Table IV). According to our results, various coping strategies could be proposed to increase the respondents' well-being assessment. In order to socialize, younger patients (up to 50 years of age), following their consent, could be offered either part time occupation or training, which correspond to their health status and their free time between the dialysis procedures. Another strategy to tackle their low QoL (Table IV) and aid them feel more complete, confident and useful in society is: to involve patients in activities they love as: pet care, flower growing or other activities. Frequent sessions with a psychologist when needed, may also be an option.

The patients' mean score in all dimensions of B-MVQOL-15 (Table II) is close to that in other studies, which is likely due to the similar economic and social factors [2,25,31]. Moreover, the results of Zyga' S. study are also comparable, with the highest score in the "interpersonal" dimension, and the lowest score – in the "well-being" dimension [2,10,25,31]. Our findings give us the grounds to encourage a holistic and person-centered approach in medical care for this group of patients. Interestingly, the impact of the "transcendent" dimension seems to differ among studies – it has a positive impact in the study of Theofilou and ours, but negative - in the study of Tsiamis G. [25,31]. Our final conclusion is, that regarding the overall QoL score, no significant differences were present between our and other studies [25,30,31]. Based on the B-MUQOLI-15, most CHD patients in Bulgaria rated their overall QoL as "Fair", whereas it is "Good" in the Greek study [10,31]. Similar to other studies our research revealed correlation between the dimensions of the QoL and the demographics of the respondents [2,32-39]. In foreign surveys in HD patients, women showed higher scores in interpersonal relationships and seem to have a worse QoL than male patients in social relationship dimension. In our study, women were less satisfied and feel more discomfort fulfilling their everyday activities compared to men [10,40]. In similar studies age is positively related to the dimension of functionality and negatively - to the dimension of spirituality of CHD patients. Moreover, patients with lower education level, had a lower QoL [2,10,36-38]. In addition, our study proved that the duration of dialysis has an impact on the Overall QoL. Other authors report similar findings with average Overall QoL score higher in patients aged < 60 years [28].

Both, similarities and differences in the figures could be attributed to the fact that similar personal beliefs, values, mindsets and cultures exist, whereas factors related to socio-economic, legal, political and health care systems differ between Greece and Bulgaria. The thorough understanding of the cultural variety contributes to the better understanding of the complex and multilayer aspects of QoL in hemodialysis patients.

In our opinion, there are some important strengths of this study. The target population was well-defined and homogenous by the inclusion and exclusion criteria. The standardized questionnaire was applied to the target population in a multicenter cross-sectional approach. A multistage sampling of the ESRD patients undergoing dialysis in different administrative regions of Bulgaria was used in the research. The instrument demonstrated good reliability properties. However, the present study has potential limitations associated with the representativeness of the data and the nonrandom sampling of the participants. This is due to the convenience type sampling method we used.

Conclusion

The study revealed that B-MVQOLI-15 is a reliable instrument to measure QoL in patients with CHD in Bulgaria. It also documented that the majority of Bulgarian CHD patients rate their QoL as "Fair". The most important dimension positively affecting the QoL of CHD patients were: interpersonal relationships and transcendent factors. Future studies are necessary to evaluate and to monitor regularly the adequacy of the delivered dialysis the level of medico-social care and the needs of ESRD patients treated with CHD in order to improve their QoL. Therefore, it is necessary to extend the study of ESRD patients undergoing dialysis to the whole country population and regularly perform this in order to identify exactly the time when QoL in ESRD patients starts to deteriorate, so adequate measures could be taken.

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