

Reliability and Validity of the Kidney Disease Questionnaire Among Greek Patients Undergoing Hemodialysis

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Abstract: Disease related knowledge for patients undergoing hemodialysis is a crucial part for health related quality of life. Purpose To investigate the reliability and validity of the knowledge scale “The Kidney Disease Questionnaire”. Methods Between October 2016 and April 2017 a group of patients undergoing hemodialysis (N=321) completed the Greek version of “The Kidney Disease Questionnaire”. Test-retest reliability and internal consistency were tested. Construct validity was checked through discriminant and convergent validity using the scales GR-Simplified Adherence Questionnaire-HD and Missoula Vitas Quality of Life Index-15. The significance level was set up at 5%. Statistical analysis was performed using the IBM SPSS Statistics version 21. Results As far as the test-retest reliability an agreement was reached between the first and the second completion. The Index Cronbach's Alpha was equal to 0,85. The Kidney Disease Questionnaire was found to be associated with both the GR- Simplified Adherence Questionnaire-HD and Missoula Vitas Quality of Life Index-15. Finding differences in knowledge scores depending on age, if they were living alone, the educational level, years on hemodialysis, and vascular access suggest the discriminant validity of the questionnaire. Conclusions The “Kidney Disease Questionnaire” is a reliable and valid tool in order to explore the level of knowledge for patients undergoing hemodialysis.

Keywords: End Stage Renal Disease, Hemodialysis, Knowledge, Scale

1. Introduction

It is generally accepted that the patient has the right to be informed and to be an active participant on issues related to his health and health care. The general view is that the patient who is informed has the possibility to make choices which in turn will improve his state of health. Today, more than ever, the patient has access to information. However, a large number of patients continue to ignore or neglect recommendations that will help them maintain, improve their health or manage their illness. Despite the efforts, many patients remain reluctant or unable to follow the advice or recommendations given to them [1-3].

In the past, the amount and type of information provided to

the patient by the healthcare professional was mainly based on signs, symptoms and specific medical diagnosis, but not on specific psychosocial and cultural issues that may have influenced the quality of life of the patient. The patient's education was more focused on the information that the health professional thought was important than the information that the patient wanted or needed to learn. In addition, many health professionals believe that the patient does not have the necessary intellectual background to fully understand the information nor the interest in obtaining information about the state of his health. As a result, the healthcare professional determined the information that the patient would receive, so the type and amount of information was often limited [4-6].

The approach of providing patient information has been changed. Although many political and social factors have contributed to this, an important factor of the change was the publication of «Patients' Bill of Rights» on 1975. This file is based not only on the patient's right to decent care and the right to information about the diagnosis, treatment, prognosis but, also, on providing information in understandable terms that could make the patient able to take decisions on the recommended treatment and procedure [7-9].

In order to measure HD patient knowledge, self-report instruments such as reliable and validates questionnaires are often used.

The Kidney Disease Knowledge Survey (KiKS) is a self-completed questionnaire evaluating the knowledge of Chronic Kidney Disease (CKD) patients (CKD stages 1-5) about CKD, renal function, renal function substitution options, signs and symptoms of CKD progression and arterial hypertension. It consists of 28 questions [10, 11].

The Chronic Kidney Disease Knowledge Assessment Tool for Nutrition (CKDKAT-N) consists of 25 questions that study the patient's dialysis level on phosphorus (15 questions), sodium, proteins and potassium [12, 13].

The Life Options Hemodialysis Knowledge Test scale consists of 25 questions divided into 5 thematic areas related to hemodialysis, anemia, nutrition, medication, renal function, treatment and rehabilitation [14, 15].

The Chronic Hemodialysis Knowledge Survey (CHeKS) scale was developed to evaluate patient knowledge on hemodialysis issues such as hemodialysis, nutrition, anemia, vascular access, medication, and safety. It consists of 23 questions [16, 17].

None of the above questionnaires is adapted to the Greek population. Given the lack of such a questionnaire, the purpose of this study was to study the reliability and validity of the hemodialysis patient knowledge scale "The Kidney Disease Questionnaire" for Greek patients [18].

2. Materials and Methods

This study was a methodological study.

2.1. Data Collection

Participants were asked to complete the following questionnaires:

The Kidney Disease Questionnaire (KDQ) considers the level of knowledge of patients in eight areas of End-Stage Renal Disease: kidney anatomy, kidney function, hemodialysis, peritoneal dialysis, fluid intake, diet, transplant and medication. It is a self-completed questionnaire constructed by Devins *et al.* [18]. The tool was originally designed with 43 questions, but the final version consists of 25 questions. However, the researchers modified the last version and split it into two forms of the 13 questions each one (Form A and Form B). Each form consists of 13 multiple choice questions. The total score is calculated after adding the correct answers to 26 questions (0-26) with the higher values corresponding to higher levels of knowledge [18]. The

KDQ has been translated and cultural adopted in Greek hemodialysis patients [19].

The following scales were used as a criterion for the converging validity of KDQ.

The GR-Simplified Medication Adherence Questionnaire-Hemodialysis [20]. It consists of eight questions about hemodialysis patient adherence to the treatment regimen. Specifically, it is referred to three domains of adherence: (a) Medication Adherence, (b) Attendance at HD session and (c) Fluid/Diet restriction.

The Missoula Vitas Quality of Life Index-15 (MVQoLI-15) consists of five dimensions (Symptoms, Functioning, Interpersonal Relationships, Wellness, Spirituality) and reports on the Quality of Life during an advanced disease. The internal consistency of the Greek version of MVQoLI-15 has been tested (Cronbach's alpha 0.74) [21].

2.2. Participants

The study included 321 patients undergoing hemodialysis and was conducted between October 2016 and April 2017 in four hospitals of Athens and province. The inclusion criteria were: (a) age > 18 years, (b) diagnosis of End Stage Renal Disease kidney on hemodialysis for at least 6 months (c) ability to write and read the Greek language. Patients with history of mental illness and serious eye problems were excluded from the survey.

2.3. Procedure

The reliability of KDQ was tested with the repeatability test on a sample of 17 patients who completed the questionnaire twice over a two week interval. The McNemar Bowker Index was used to correlate the results between the two measurements [22].

The internal consistency reliability was tested using the internal consistency reliability coefficient (Cronbach's Alpha) with acceptable values from 0.70 to 0.90 [23]. To study the reliability and validity, the scale was administered in 321 patients in total.

An educational intervention was carried out in order to test the sensitivity of KDQ in time. In particular, the scale was given to 321 patients twice: before and a month after an individualized educational intervention.

Finally, a questionnaire related to demographic and clinical data (gender, age, educational level, job, marital status, years on dialysis) was given to patients.

2.4. Ethics

In order to carry out the study, the permissions were obtained by the Data Protection Authority and Scientific Councils of hospitals. Participants were informed about the purpose of research, that their participation in the survey is voluntary and confidential and that he can withdraw from the study at any stage. All participants gave written consent.

2.5. Statistical Analysis

Absolute (N) and relative (%) frequencies were used to

describe the qualitative variables. Mean and standard deviations were used to describe the quantitative variables. The internal reliability of the questionnaire was tested using the McNemar Bowker Index to correlate the results between the two measurements and the use of the Cronbach's-Alpha coefficient. Linear regression analysis using the stepwise procedure was used to find independent factors associated with the scales of the study from which dependency coefficients (β) and their standard errors (standard errors = SE) were emerged. The analysis of variance for repeated

measures (ANOVA) was used in order to control differences in scales between groups and in time. Statistical significance was set at 0.05. The statistical program SPSS 19.0 was used for the analysis.

3. Results

The following table presents the demographic and clinical data of the participants (Table 1).

Table 1. Demographic and clinical data of the participants (N=321).

		N	%
Age, Mean (SD)		56,5 (10,0)	
Gender	Male	206	65,0
	Female	111	35,0
Family status	Unmarried	71	22,3
	Married	177	55,7
	Divorced	27	8,5
	Widow/er	43	13,5
Living alone	Yes	50	16,0
	No	263	84,0
Educational level	Illiterate	21	6,6
	Primary School	104	32,6
	Secondary School	71	22,3
	High School	72	22,6
	Student	11	3,4
	University Graduate	40	12,5
Occupation	Unemployed	50	15,7
	Household	35	11,0
	Self-employed	23	7,2
	Private Employee	17	5,3
	State Employee	11	3,5
	Retired	182	57,2
	Other	0	,0
Years on hemodialysis (SD)		6,5 (5,3)	
Daily number of pills (SD)		7,1 (5,4)	
Vascular access	Fistula	206	64,6
	Graft	45	14,1
	Central Venous Catheter	68	21,3

SD: Standard Deviation

To check the repeatability, the McNemar and McNemar-Bowker tests were performed. In all cases an agreement was reached between the first and the second completion. The index Cronbach's Alpha was equal to 0, 85 and above the acceptable limit of 0, 7, whereby there is an acceptable

reliability. In addition, the correlation coefficients of each question with the total score were high and above 0, 3.

The following table describes Cronbach's Alpha after deducting each question as well as the correlation coefficients of each question with the total score (Table 2).

Table 2. Cronbach's Alpha after removal of each question and the correlation coefficients of each question with a total score (N=321).

	Scale Mean if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1 Form A	12,1414	,317	,855
Q5 Form A	12,9966	,455	,848
Q6 Form A	12,9798	,479	,847
Q12 Form A	12,9360	,406	,848
Q3 Form B	12,7441	,641	,840
Q8 Form B	12,7744	,610	,841
Q10 Form B	12,6970	,632	,840
Q13 Form B	12,9327	,540	,845
Q7 Form A	12,4714	,347	,854
Q8 Form A	12,1549	,340	,854
Q10 Form A	12,8047	,426	,848
Q5 Form B	12,8788	,583	,843
Q4 Form A	12,6263	,321	,871
Q11 Form A	12,8013	,415	,848
Q13 Form A	12,4815	,533	,844

	Scale Mean if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q7 Form B	12,4007	,394	,849
Q2 Form A	12,2997	,339	,850
Q3 Form A	12,4007	,370	,850
Q9 Form A	12,1347	,396	,855
Q1 Form B	12,1987	,300	,851
Q2 Form B	12,2525	,403	,849
Q4 Form B	12,8586	,343	,854
Q6 Form B	12,7643	,699	,837
Q9 Form B	12,4512	,440	,847
Q11 Form B	12,5825	,430	,848
Q12 Form B	12,8451	,475	,846
<i>Q: Question</i>			

No question was found to increase Cronbach's Alpha after removing it from the questionnaire, which means that all questions measure knowledge with reliability.

The following table gives the correlation coefficients of the Kidney Disease Questionnaire with the other two scales of the study (Table 3).

Table 3. Correlation coefficients of the Kidney Disease Questionnaire with GR-SMAQ-HD and MVQoLI-15 (N=321).

		Knowledge score
GR-SMAQ-HD	r	0,20
	p	<0,001
Medication	r	0,15
	p	0,010
Attendance at HD session	r	0,08
	p	0,163
Diet/Fluid restriction	r	0,18
	p	0,002
MVQoLI-15		
Symptom	r	0,26
	p	<0,001
Function	r	-0,05
	p	0,391
Interpersonal	r	0,09
	p	0,112
Well being	r	0,11
	p	0,063
Transcendent	r	0,17
	p	0,003
Total score	r	0,21
	p	<0,001

The Kidney Disease Questionnaire was found to be associated with both the GR-SMAQ-HD scale, its subscales (Medication, Diet / Fluid Restriction) and the MVQoLI-15 scale and its subscales (Symptom, Transcendent, Total Score) indicating convergent validity.

In addition, finding differences in knowledge scores depending on age, if they were living alone, the educational level, years on hemodialysis, and vascular access suggest the discriminant validity of the questionnaire (Table 4).

Table 4. Multivariate linear regression of knowledge score with demographic and clinical data of participants (N=321).

		β +	SE++	P
Age		-0,05	0,02	0,030
Living alone	Yes			
	No	-1,81	0,72	0,013
Educational level	Illiterate/ Primary School			
	Secondary / High School	2,34	0,61	<0,001
	Student	3,65	0,81	<0,001
Years on HD		0,13	0,03	<0,001
Vascular Access	Fistula			
	Graft	-0,66	0,83	0,424
	Central Venus Catheter	-2,13	0,64	0,001
<i>SE: Standard error of the coefficient</i>				

Furthermore, finding changes in post-intervention knowledge suggests the ability of KDQ to change in time (Table 5).

Table 5. KDQ score before and after intervention.

Group	Knowledge score		Change Mean (SD)	P	P
	Before intervention Mean (SD)	After the intervention Mean (SD)			
Control group	15,96 (5,08)	17,56 (4,48)	1,6 (1,17)	0,005	<0,001
Intervention group	15,88 (4,76)	20,2 (3,75)	4,32 (2,98)	<0,001	
P	0,956	0,018			

4. Discussion

Trying to adopt the KDQ in Greek population of patients undergoing hemodialysis, we set up the following criteria as goals: validity, reliability.

The KDQ displayed high levels of reliability (Cronbach's Alpha 0,85). As far as validity is concerned, KDQ could differentiated the "well-informed" patients from those who were considered to be inadequately informed and also reflected the fact that patients know more about their own specific treatment methods than others who are less well acquainted.

A very important indication of validity is the fact that KDQ was sensitive to the changes in the knowledge of illnesses that arose from an educational program.

Also, an indication of the validity of the test is the fact that the demographic and clinical characteristics that could be taken as a possible precursor to the increased knowledge related to the disease among patients undergoing hemodialysis are associated with significantly higher scores: age, living alone, the educational level, years on hemodialysis and vascular access. Therefore, these findings are in line with the claim that KDQ is able to reliably and reliably measure the knowledge associated with the End Stage Renal Disease.

A possible problem with using KDQ is its high reading level. Although the precise level of reading is difficult to be determined due to differences between assessment methods, the clinical experience indicates that a level of secondary school is possibly necessary. In current study, the researchers gave assistance to participants in any case there was difficulty in understanding the terminology. On average, the KDQ takes 20-25 minutes to be completed.

At this point, it should be highlighted the fact that KDQ does not measure the consummate skills or adherence in therapeutic regimen. Moreover, the well-informed patient does not mean that he is well-adherent patient and vice-verca. The KDQ is designed in such a way to determine the relationship between knowledge and behaviors, such as adherence, or outcomes, such as domains of quality of life.

It is worth mentioning that this scale has not been translated into another language. In addition, the reliability and validity of the scale have not been studied in any other ethnicity population. Therefore, it is not possible to compare the results of this study with other similar studies.

5. Conclusion

The Kidney Disease Questionnaire is a tool that is easily

scored and evaluated, allowing health professionals of hemodialysis units to measure and evaluate the HD patient knowledge easily and incorporate appropriate interventions when providing care.

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