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Association between the Effectiveness and Adequacy of Patient Education among Patients with Chronic Renal Disease

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Abstract

Background: Renal disease is an important public health problem. Patient education improves health and treatment adherence of patients with chronic renal disease. However, evidence about the sufficiency of patients' knowledge processed in patient education is limited. The study aims: to analyze the relationship between the sufficiency and usefulness of patient education among patients with chronic renal disease. Also, aims to discover whether both sufficiency and usefulness need to be analyzed in the quality evaluation of patient education. Methods: A descriptive cross-sectional study was conducted in the dialysis units of two hospitals in Makkah, KSA from January to March 2022. Patients undergoing pre-dialysis or hemodialysis care (N = 162) evaluated both the sufficiency and usefulness of patient education provided by nephrology nurses by using parallel structured questionnaires. Results: A strong relationship was found between the sufficiency and usefulness of patient education. The relationship was significant across all dimensions of empowering knowledge, but no systematic association was found between the sufficiency-usefulness relationship and background variables. Conclusion: Depending on the purpose of evaluating patient education, either aspect, that is, sufficiency or usefulness can be used, but it is not necessary to use both due to their strong inter-correlation. In terms of implications for practice, consideration of both sufficiency and usefulness is important when providing empowering patient education for people undergoing pre-dialysis or hemodialysis, but only one aspect needs to be evaluated.

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Introduction

Patients with chronic kidney disease (CKD) are high globally (1), and it is expected to increase in the future. CKD is a complex disease that changes people's lives and burdens societies (2). Living with CKD is a long-term challenge creating a need for sufficient knowledge via education for treatment adherence and patient empowerment (2-6). Sufficient knowledge can be defined as adequate amount and time of essential, multidimensional knowledge enabling patient empowerment (7-10). However, there is limited evidence about the sufficiency of knowledge among these patients despite the strategic emphasis to support the empowerment of long-term patients (11, 12).

Sufficient knowledge can be supported with patient education. It is necessary for patient empowerment, supports patient's self-management (13-15), treatment adherence (3), decision on treatment options (16), and improves both the medical (17, 18) and psychosocial outcomes (19) of patients with CKD. However, patients have reported insufficient knowledge by patient education concerning CKD (5, 6, and 20) and withholding of information about CKD and its care (5, 21). Patients with CKD expect more knowledge concerning the disease and its treatment (5, 20, and 22) as well as useful practical advice (5, 20-22). However, there is a research gap on the sufficiency of patients' empowering knowledge.

Patients with CKD face complex problems, symptoms, and treatments, which affect their lives comprehensively (23-25). Patient education can support people's knowledge of CKD, their self-management of the disease (26), and their life quality (24, 27). Patient education can also support slowing down the progression of CKD and increase the survival rate (24-28). In order to achieve good care outcomes, patient education has to be high in quality, which includes that it is sufficient and useful (25, 29). Sufficient patient education means that an adequate degree of essential knowledge is delivered to support patients' empowerment (8).

Sufficient patient education indicates that patients possess adequate ability, control, and resources to manage their health problems, to make informed decisions, and to implement and evaluate the decisions (8, 30). Patient-centeredness and starting the patient education in the early stages of CKD have been connected with the sufficiency of patient education (5, 31). Sufficiency evaluations conducted by patients themselves are subjective in nature and depend on patients' expectations. Furthermore, sufficiency does not necessarily inform us about the usefulness of patient education. Useful patient education refers to education that patients need for their use and can implement in their lives and care (32). People with CKD have reported that patient education is useful and fairly sufficient (29) but the education has also been found to be complicated, confusing, too detailed, or sufficient only in some aspects (6, 21).

The importance of both sufficiency and usefulness of patient education for people with CKD have been emphasized in some studies (6, 33). For people in pre-dialysis care, sufficient patient education involves crucial features, as these people are preparing to make a decision concerning the mode of dialysis (34-36). For people receiving peritoneal or home hemodialysis care, useful patient education is a precondition for the success of home dialysis (37). As the advantages of hemodialysis become more evident and its use increases, the importance of patient education becomes even more pronounced (37, 38). However, the amount of research in this clinical field is limited. The definitions of sufficiency and usefulness in patient education are equivocal, and the relationship between sufficiency and usefulness is not clear.

Therefore, this study aimed to analyze relationship in order to investigate whether both sufficiency and usefulness need to be included in quality evaluations concerning pre-dialysis

and hemodialysis care. Thus, our main focus was to analyze the possible relationship between these two aspects of patient education. The concept of empowering patient education was used as a theoretical framework. Important aspects of empowerment involve the patient's development, growth, activeness, and control. Active collaboration, decision-making, and problem-solving are also emphasized (39, 40). In order to become empowered, patients require multidimensional knowledge. This study uses a division into six dimensions of empowering knowledge. The dimensions are bio- physiological (e.g., biological changes and symptoms), functional (e.g., functions of the body and mind), social (e.g., social interaction), experiential (e.g., experiences and self-esteem), ethical (e.g., feeling of being valued as an individual human being), and economical (e.g., costs and financial benefits) (41).

Methods

A descriptive cross-sectional study was conducted in the dialysis units of two hospitals in Makkah, KSA from January to March 2022. The participants were people with CKD, treated as patients in dialysis units. Adults (18 years or older) undergoing pre-dialysis care or hemodialysis (peritoneal dialysis and hemodialysis) were eligible to participate in the study (N = 322). Written informed consent was given by all respondents. The study received ethical approval from the Ethics Committee of the University.

In this study, patient education for patients in pre-dialysis, peritoneal dialysis, and hemodialysis care was provided by nephrology nurses. The education was aimed at supporting knowledge, engagement in care, and self-management of CKD. The content of the patient education varied based on patients' needs, expectations, and stage of CKD, but the importance of self-care in the home environment was a common feature for all the patient groups included. The nurses used check lists to ensure the consistency of the education. All the six dimensions of empowering knowledge were covered in the education for all patients (41). Educational discourse, demonstrations, and practical training with equipment were used, supported by written material. The education was structured, and it continued 1-3 months on average number of weeks.

Data were collected using a written, structured questionnaire aiming to evaluate the sufficiency and usefulness of patient education. The content of the questionnaire was informed by the Dialysis Patient Informational Needs scale (42), Expected Knowledge of Hospital Patients scale (43), Received Knowledge of Hospital Patients scale (44), and relevant studies of patient education (9, 26, 37), and it was negotiated in collaboration between researchers and clinicians. Permission to use and modify the copyrighted scales was obtained. The scales had been tested in earlier studies and their validity and reliability had been demonstrated to be satisfactory (9, 42).

Parallel versions of the questionnaire were used; the respondents were asked to respond to the same items to evaluate the sufficiency and usefulness of the patient education provided by nurses (34 items about sufficiency and 34 items about usefulness). The items in the questionnaire represented bio-physiological (9), functional (10), social (6), experiential (3), ethical (3), and financial (3) dimensions of empowering knowledge (41). Furthermore, both general sufficiency and usefulness were evaluated with one item. A Likert scale (from 1: strongly disagree, to 4: strongly agree) was used, with higher scores indicating higher sufficiency and usefulness. The questionnaire also contained nine structured background variables: age, gender, perceived current health, care phase, family members' participation in education sessions, written education material received, information searched by patients themselves, experience of safe care, and experience of confidential care.

Based on piloting with five CKD patients, the questionnaire was revised to make it clearer and more concise. Content and face validity were considered to be adequate by nephrology nurses and researchers. An acceptable level of internal consistency was also reached, with Cronbach's alpha ranging from 0.78 to 0.96 in the total scale and in the six dimensions of empowering knowledge. The respondents completed the questionnaire at the dialysis unit.

Data analysis, concentrated on the relationship between the sufficiency and usefulness of patient education. Statistical analysis was conducted using SPSS version 28. The sum variables were formed by calculating the mean of all items in the six dimensions of empowering knowledge. The relationship between the sufficiency and usefulness of patient education was analyzed with Pearson correlation on the level of the sum variables of the instrument. Correlations of sufficiency and usefulness between dimensions of empowering knowledge were compared using the Raghunathan, Rosenthal, and Rubin test. To compare correlations between the categories of background variables, the Fisher r-to-z transformation was used. Linear regression analysis was also used to reveal potential effects of background variables on the relationship between sufficiency and usefulness. P-values ≤ 0.05 were considered statistically significant.

Results

Respondent characteristics

Of 322 eligible patients, 162 (50.3%) completed the questionnaire. Of the respondents, 45.3% were undergoing peritoneal dialysis, 30.2% pre-dialysis, and 24.5% hemodialysis. The mean value of current health perceived by the respondents was 7.2 on a scale from 0: very weak, to 10: very good (range 2.7–10, SD 1.8). The mean age of all respondents was 61 years (range 24–85 years, SD 14.3). More men (n = 103, 63.6%) than women (n = 59, 36.4%) participated in this study. Family members did not participate in education sessions for the majority of the respondents (n = 102, 63%). Most of the respondents had received written information (n = 143, 93.5%) and searched for information by themselves (n = 126, 79.3%). The majority of the respondents experienced the care as fairly safe or very safe (n = 155, 98.7%) and as fairly confidential or very confidential (n = 145, 97.3%).

Relationship between sufficiency and usefulness of patient education

Patients undergoing pre-dialysis and hemodialysis care evaluated the patient education as both sufficient and useful. The mean value for general sufficiency was 3.273 (SD 0.544, scale 1–4). In the six dimensions of empowering knowledge, the range of mean values of sufficiency was 2.802–3.517. Usefulness reached the mean value of 3.279 (SD 0.573), with the values for the dimensions of empowering knowledge ranging between 2.817 and 3.464.

The sufficiency and usefulness of patient education had a strong relationship (Table 1): when patient education was considered on a general level, the Pearson correlation between sufficiency and usefulness was 0.889, which is a statistically significant ($p < 0.0001$) result. In addition, a statistically significant relationship ($p < 0.0001$) was discovered in all empowering knowledge dimensions between the sufficiency and usefulness of patient education (range 0.716–0.843). The highest Pearson correlations between the sufficiency and usefulness were observed in the ethical ($r = 0.843$) and experiential ($r = 0.838$) dimensions of patient education. In contrast, the lowest Pearson correlations between sufficiency and usefulness concerned the bio-physiological ($r = 0.716$) and financial dimensions ($r = 0.767$) of patient education. The difference was significant between the bio- physiological and ethical dimensions ($p = 0.002$) and between the bio- physiological and experiential dimensions ($p = 0.006$). The difference between ethical and financial dimensions was barely significant ($p = 0.049$).

Association of background variables with the sufficiency–usefulness relationship in patient education

Certain background variables were associated with the sufficiency-usefulness relationship in patient education in some dimensions (Table 2). It is, however, difficult to determine the underlying logic of these associations.

If respondents had not received written educational material, the relationship appeared to be stronger when patient education was considered on a general level (r = 0.976 vs. 0.881, p = 0.048) and in two dimensions as well (bio-physiological, r = 0.954 vs. 0.683, p = 0.013 and financial, r = 0.982 vs. 0.817, p = 0.008). The relationship was stronger in the ethical dimension in respondents who had not searched for information by themselves (r = 0.947 vs. 0.824, p = 0.004) and in respondents who had experienced the care to be slightly or fairly safe, compared to those who had experienced it as very safe (r = 0.908 vs. 0.757, p = 0.005). Furthermore, the relation- ship was stronger in the experiential dimension (r = 0.880 vs. 0.767, p = 0.046) in respondents whose family members had not participated in education sessions. Linear regression analysis did not reveal any further significant effects of background variables on the sufficiency-usefulness relationship.

Table (1): Relationships between sufficiency and usefulness of patient education in questionnaire's dimensions

Dimension Description of items	n	Sufficiency mean (SD)[a]	Usefulness mean (SD)	r [b]
Sufficiency and usefulness on general level	149	3.273 (0.544)	3.279 (0.573)	0.889
Bio-physiological	142	3.517 (0.486)	3.464 (0.525)	0.716
Functions of kidneys				
Symptoms of CKD [c]				
Medication				
Present condition and care plan				
Different dialysis types				
Kidney transplant				
Functional	151	3.285 (0.589)	3.285 (0.629)	0.791
Diet, liquids				
Medication at home				
Physical exercise				
Weight management				
Sexuality				
Alcohol and tobacco				
Complications and problems with				

Dimension Description of items	n	Sufficiency mean (SD)[a]	Usefulness mean (SD)	r b
dialysis care				
Social	145	3.233 (0.616)	3.241 (0.631)	0.781
Adjustment and arrangements for home dialysis				
Combining dialysis care and daily life				
Holiday trips				
Patient association				
Peer support				
Next of kin's participation in care				
Experiential	136	2.802 (0.881)	2.817 (0.932)	0.838
Feelings related to disease and its care				
Effect of disease and its care on appearance				
Ethical	148	3.339 (0.708)	3.403 (0.701)	0.843
Decision-making in care				
Right to information				
Responsibilities in care				
Financial	142	3.137 (0.855)	3.210 (0.815)	0.767
Expenses caused by disease and its care				
Social Security benefits				
Working while undergoing dialysis care				

Note: All correlations, $p < 0.0001$. a Standard deviation. b Pearson correlation. c Chronic kidney disease.

Table (2): Association of background variables a with the sufficiency and usefulness of patient education

Background variable		n	Sufficiency / usefulness on general level	Bio-physiological	Experimental	Ethical	Financial
	Yes	58	-	-	0.767	-	-

Background variable		n	Sufficiency / usefulness on general level	Bio-physiological	Experimental	Ethical	Financial
Family member's participation in education sessions	No	92	-	-	0.880	-	-
	P [b]		-	-	0.046	-	-
Received written educational material	Yes	135	0.881	0.683	-	-	0.817
	No	9	0.976	0.954	-	-	0.982
	P [b]		0.048	0.013	-	-	0.008
Searched information by themselves	Yes	126	-	-	-	0.824	-
	No	33	-	-	-	0.947	-
	P [b]		-	-	-	0.004	-
Care experienced to be safe	slightly, fairly	45	-	-	-	0.908	-
	very	106	-	-	-	0.757	-
	P [b]		-	-	-	0.005	-

a Only statistically significant results included.

b Comparison of Pearson correlations between categories of background variables.

DISCUSSION

The aim of this study was to analyze the relationship between sufficiency and usefulness of patient education for patients in pre-dialysis and hemodialysis. Sufficient patient education provides adequate skills, control, and knowledge for the empowerment of patients (8), while useful patient education meets patients' practical needs (32). Both sufficiency and usefulness are essential for patient education that aims to support patients' self- management in the home environment (5, 37, and 45). This study showed that there is a positive relationship between sufficient patient education and useful patient education. In other words, when people undergoing pre-dialysis and hemodialysis care evaluate patient education as sufficient, it is also useful, and vice versa. This gives us a possibility to evaluate both aspects even when measuring only one of them. Information about these two aspects of patient education can be obtained by accessing either sufficiency or usefulness, a finding that can be used in research and practice.

People with CKD have diverse needs for patient education (6, 25). This study showed that the sufficiency and usefulness of patient education were related to various dimensions of patients' lives, which means that when patient education is evaluated as sufficient, it can also be

considered useful in that same dimension. The strongest relationships between sufficiency and usefulness were observed in the ethical and experiential dimensions. The sufficiency-usefulness relationship was weakest in the bio- physiological dimension, even though when assessed separately, the sufficiency and usefulness of the bio-physiological dimension had the highest mean values. Previous studies suggest that patients with CKD require more information about bio-physiological aspects of their health problem (5, 46). The same observation has been made with patients with cancer (40, 47). The findings suggest that even if patient education is sufficient in regard to bio-physiological issues, it may lack usefulness from the patients' perspective, or the other way around.

The data analysis further revealed that the relationship between sufficiency and usefulness was significantly strong across all empowering knowledge dimensions. This finding suggests that if patient education is sufficient in some dimensions, it can be useful for patients in other dimensions, too. Based on these results, we can assume that when evaluating the sufficiency and usefulness of patient education, it is not necessary to assess all dimensions with multiple items since there is a strong relationship across all dimensions. No systematic association was found between background variables and the sufficiency–usefulness relationship. Nevertheless, a stronger relationship between sufficiency and usefulness was observed in several dimensions when family members had not participated in education sessions, when respondents had not received written educational materials or had not independently searched information, or when they had experienced the care as slightly or fairly safe.

These findings indicate that if patients have less information, less support from family members, or have doubts about the safety of the care, they are more likely to experience sufficient patient education as useful. Although no clear logic was found, some reasoning might explain the results. For example, patients who have received written educational material may experience the relationship between sufficiency and usefulness of patient education as less strong. In other words, these patients might have more knowledge and thus feel that they have no need for patient education, and hence evaluate it as being less useful for them. As a result, even though patient education is sufficient, a weaker relationship between sufficiency and usefulness of patient education may be observed. However, this reasoning requires more research.

Conclusion

This is the study attempting to analyze the relationship between sufficiency and usefulness in patient education for people undergoing pre-dialysis, peritoneal dialysis, and hemodialysis care. There is a strong correlational relationship between the sufficiency and useful- ness of patient education. The relationship is strong in all dimensions of empowering knowledge regardless of respondents' background variables. This is an important finding for the evaluation of the quality of patient education. However, more research is needed to study this relationship more profoundly.

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