



The Investigation of the Effect of Educational Interventions Based on Health Belief Model for Promoting Fistula Care Behaviors of Hemodialysis Patients

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Abstract

Background and purpose. Chronic diseases need to care for increasing and improving quality of life. The chronic kidney disease is increasing in all over the world and is a public problem for worldwide health and some hemodialytic patients need an arteriovenous fistula. Self-care with arteriovenous fistula has a long history and several studies have investigated it, but health belief model (HBM) has not been investigated. Seemingly, the HBM can improve it. This study aimed to investigate the effect of educational interventions based on NBM for promoting fistula care behaviors of hemodialysis patients.

Materials and Methods. Seventy hemodialytic patients with arteriovenous fistula were assigned into two groups of control and intervention. A questionnaire designed by the authors was prepared and included awareness, perceived susceptibility, severity, barriers and benefits and self-efficacy. Questionnaire was distributed before intervention (Pre-test), immediately and 2 month after intervention (Post-test). Instructional media and individual consultations were used as intervention period.

Results. The results showed that the educational intervention did not have significant effect on awareness ($P>0.05$), but increased perceived susceptibility, severity, barriers and benefits, and self-efficacy ($P<0.05$).

Conclusion. In sum, the educational interventions based on HBM promoted fistula healthcare behaviors among hemodialytic patients. It can be advised to apply educational interventions based on HBM for promoting fistula healthcare behaviors among hemodialytic patients.

Keywords. Fistula healthcare behaviors, health belief model, hemodialytic patients.



Introduction

The kidneys have important roles for regulating body fluids, electrolytes, and acid–base balance [1]. The chronic kidney disease (CKD) is increasing all over the world and is a public problem for worldwide health [2]. Kidney diseases influence over 750 million persons all over the world [3].

The CKD has a global prevalence of 5–15% all over the world [4]. The burden, detection, and treatment for kidney diseases vary in different countries. The magnitude and effect of kidney diseases are efficiently defined in developed and developing countries [5]. The CKD is associated with raised progression to end–stage renal disease, and reduced survival. Faulted renal function increases excretion products of the kidneys in the blood and leads to terminal CKD [6]. Patients with terminal CKD need replacement treatments. World Kidney Day 2019 suggests an opportunity for increasing awareness of kidney diseases and suggests to consider its burden and current state for prevention and management. Hemodialysis, peritoneal dialysis, and kidney transplantation are commonly used for the treatment of CKD [6]. Hemodialysis is a replacement treatment in which dialyzer removes blood from toxins, nitrogenous wastes, and excess water from blood and returns clear blood into body [7]. Hemodialysis commonly lasted for 4 hours and 3 times per week [8]. The patients need an arteriovenous fistula for conducting hemodialysis [6]. Arteriovenous fistula is an appropriate vascular access for hemodialysis method, because it has longer survival and low rates of complications [9]. However, arteriovenous fistula needs the management and self–care before, during, and after of hemodialysis [6]. It must be considered antiseptic solution before the hemodialysis. To maintain the best conditions for hemodialysis, patients must be aware of self–care behaviors in association with arteriovenous fistula [10]. Patients must be educated in association with arteriovenous fistula, because it

can help to increase patients who perform hemodialysis by using fistula [11,12]. Self–care is commonly obtained in patients with enough information in association with fistula [12]. Self–care with arteriovenous fistula has a long history and several studies have investigated it [6,13,14], but health belief model (HBM) has not been investigated.

The HBM was developed to explain behaviors associated with tuberculosis screening during the 1950s. It comprises some concepts that helps patients to prevent, screen, and control illness conditions. It includes susceptibility, severity, benefits, and barriers to a behavior, cues to action, and self–efficacy [15]. Perceived susceptibility and severity are defined as feeling of patients from threat created by their current behavioral patterns [16]. Perceived benefit is defined as patients' beliefs that change their behavior to have more benefits [16]. Perceived belief is defined as tangible and psychological costs of the advised action [16]. Self–efficacy is patients' feeling for overcoming perceived barriers [16].

Using the education based on HBM may help hemodialysis patients for promoting fistula care behaviors, but no study has investigated it. The present study was conducted to investigate the effect of education based on HBM for promoting fistula care behaviors of hemodialysis patients.

Materials and methods

Study design

The present study was an experimental and interventional study in dialysis units of different hospitals and in patients who used arteriovenous fistula for hemodialysis. This study was firstly approved by Ethics Committee of Shahid Beheshti University of Medical Sciences and then started.

Study setting and population

This study was performed in dialysis units of hospitals affiliated with Shahid Beheshti University of Medical Sciences. The criteria for participants to be eligible for the study were willingness to participate in the research, an arteriovenous fistula more than 6 months old on hemodialysis, performing dialysis three times a week, and having ability for reading and writing. The exclusion criteria were patient's mortality, unwillingness to participate, patient transfer to another section for dialysis, and having a transplant. The target population included hemodialytic patients referred to Shahid Modares, Ayatollah Taliqani, and Imam Hussain hospitals. Thirty-five patients referred to the dialysis center of Shahid Modares hospital (n=22) and Taliqani hospital (n=13) were selected as intervention group and 35 patients referred to Imam Hussain hospital were selected as control group.

Data collection and instrument

The data were collected from January to March 2018. The information for demographic characteristics (age, gender, education, and marital status) and clinical characteristics (dialysis period, history of hypertension, diabetes, and renal diseases) were collected by using a questionnaire designed by the authors. Information concerning awareness of self-care behaviors for hemodialysis was collected by a questionnaire designed by the authors and included 2 questions with 3-level and 4-level. A questionnaire was designed by the authors for the HBM and included variables of perceived susceptibility (2 items), perceived severity (2 items), perceived benefits (2 items), barriers (3 items), and self-efficacy (4 items). Responses were designed on the basis of Likert scale with five possible answers and higher scores indicated patients' higher frequency of variables.

Validity and reliability of the questionnaire

To validate the questionnaires, face and content validities were used. Content validity (CVI) is a common approach for investigating content validity

in instrument development. Content validity ratio (CVR) investigates are essential of an item. To investigate the validities of CVI and CVR of questionnaire, 10 experienced experts investigated the questionnaires and presented comments for improving the questionnaire. The comments were used and the questionnaires were revised. To test the reliability of the instrument, the questionnaire was distributed among 30 hemodialytic patients in Shohadaye Tajrish Hospital that was not studied in the current study. Cronbach's alpha values were 0.741, 0.760, 0.766, 0.71, 0.789, 0.776, and 0.779 for fistula care behaviors, awareness, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy. Values of 0.70 and higher show reliability of questionnaire. The questionnaires had reliabilities of 0.7 and the questionnaires are reliable.

Interventions

Self-made questionnaire was distributed between control and intervention group before interventions (pre-test) and during dialysis. Educational contents were prepared on the basis of the pre-test. With regards to condition and situation of patients during dialysis, the educational intervention was performed for the intervention group using personal consultation (face to face) and in some cases consultation sessions in pairs or triads that followed by Q & As. All the interventions were conducted on the basis of HBM constructs and self-care purposes. Educational session was held for 15–20 minutes and fistula care behaviors were educated. Instructional media were also used such as a guide to use fistula for hemodialytic patients. The questionnaires were collected from same patients in Modarres and Taliqani hospitals immediately after intervention and 2-months after intervention (post-test).

Data analysis

To analyze the effect of education on promoting hemodialytic patients' self-care behaviors, Chi-

squared test, independent-sample t-test and Mann–Whitney U-tests were used by SPSS16 software and repeated measure test was also used. A $P < 0.05$ was considered as significant. Scoring of the perceived barriers was the opposite of other structures, so the high score is the meaning of reducing perceived barriers.

Results

Patient characteristics

Most patients had an age mean of 55–65 years (31.4%) and 65 and 75 years (40%) in the intervention and control groups, respectively. There was no significant difference for age mean between the groups ($P > 0.05$). The groups did not show significant differences for gender, marital status, blood pressure, and diabetes ($P > 0.05$). Significant differences were found for education, kidney diseases history, and dialysis period between the groups ($P < 0.05$), so that education and dialysis period were significantly higher in the intervention group, while kidney diseases history was significantly higher in the control group.

Investigation of the effects of the intervention on care behaviors

The results for awareness and the HBM variables are presented in Table 1. The results for repeated-measure test showed that the awareness score did not have significant difference between the intervention and control groups in pre-test, immediately and post-test ($P > 0.05$). The interaction effect of time and intervention was not significant ($P = 0.06$). It means that intervention did not have significant effect on the awareness ($P > 0.05$). The results for repeated-measure test showed that the intervention significantly increased the perceived susceptibility. The score for perceived susceptibility was higher in control group compared to the intervention group in pre-test (3.45 vs 3.22). The results showed a significant interaction effects

between time and group for the perceived susceptibility ($P = 0.001$). The results showed decreased score in the intervention group, but it was significantly higher in the intervention group compared to control group ($P < 0.05$). It can be implicated that educational interventions significantly improved the perceived susceptibility ($P = 0.001$). The score for perceived severity was lower in control group compared to the intervention group in pre-test (3.78 vs 3.04). The repeated-measure test showed that the perceived severity score of fistula care behavior was significantly higher in the intervention group compared to control group ($P < 0.05$), immediately (4.57 vs 2.88) and after 2 months (4.50 vs 3.04). It means that the intervention significantly improved the perceived severity. A significant interaction between group and time was observed ($P = 0.001$) for the perceived severity. It means that educational interventions could increase the perceived severity and it was significantly higher after 2 months. The results showed that educational intervention increased perceived benefits immediately (4.85 vs 3.90) and after 2 months (4.82 vs 3.51) ($P < 0.05$). It means that educational intervention still improved perceived benefits after 2 months. It was observed that a significant interaction between time and group for perceived benefits ($P = 0.001$). In fact, the intervention increased the perceived benefits. Similar to previous parts, the educational interventions perceived barriers. The results showed that the perceived barriers were significantly higher after the educational interventions ($P < 0.05$). The results showed that values were 4.11 and 4.09 in the intervention group, while it was 3.37 and 3.33 in control group, immediately and 2 month after the intervention, respectively. It means that the score for the perceived barriers was same, but it was increased from pre-test to post-test in the intervention group ($P < 0.05$). The results showed that that self-efficacy was significantly higher in the intervention group compared to control group after educational interventions.

The results showed that scores were 3.80 in all the periods, but it was significantly increased in the intervention group, immediately and after 2 months ($P<0.05$). A significant interaction between group and time was observed for self-efficacy ($P=0.001$).

Table 1. The results for awareness, susceptibility, severity, benefits, barriers and self-efficacy scores of hemodialytic patients concerning fistula care behavior before, immediately and 2 months after intervention in the groups

Variable	Group	Pre-test	Immediately	Post-test	P-value
Awareness	Intervention	1.90±0.31	1.98±0.08	1.98±0.08	$P_{\alpha}=0.06$
	Control	1.58±0.46	1.62±0.45	1.58±0.46	
Perceived susceptibility	Intervention	3.22±0.53	3.68±0.54	3.58±0.54	$P_{\alpha}=0.00$
	Control	3.45±0.56	3.37±0.59	3.45±0.56	
Perceived severity	Intervention	3.78±0.38	4.57±0.50	4.50±0.58	$P_{\alpha}=0.00$
	Control	3.04±0.35	2.88±0.35	3.04±0.35	
Perceived benefits	Intervention	3.95±0.37	4.85±0.33	4.82±0.34	$P_{\alpha}=0.00$
	Control	3.90±0.33	3.90±0.33	3.51±0.33	
Perceived barriers	Intervention	3.12±0.68	4.11±0.65	4.09±0.55	$P_{\alpha}=0.00$
	Control	3.33±0.55	3.37±0.58	3.33±0.55	
Self-efficacy	Intervention	3.90±0.33	4.82±0.34	4.81±0.34	$P_{\alpha}=0.00$
	Control	3.80±0.33	3.80±0.33	3.80±0.33	

α =Interaction effect of group and time. The data were presented as mean±SD.

The results for fistula-care behavior score (Table 2) showed that the educational intervention improved fistula-care behavior ($P<0.05$). The results showed that educational interventions significantly improved fistula-care behavior score, immediately and post-test ($P=0.001$). The score was specifically higher after 2 months (1.79 vs 1.45). A significant interaction was observed between group and time for fistula care behavior ($P=0.001$). The fistula care behavior was improved during time in the intervention groups.

Table 2. The mean scores of fistula-care behavior in hemodialytic patients before, immediately and 2 months after the educational intervention in groups

Variable	Group	Pre-test	Immediately	Post-test	P-value
Fistula care behavior	Intervention	1.00±0.22	1.58±0.18	1.79±0.19	$P_{\alpha}=0.00$
	Control	1.45±0.22	1.44±0.26	1.45±0.26	

α =Interaction effect of group and time. The data were presented as mean±SD.

Discussion

The results showed that educational intervention did not have significant effects on awareness. Daniali *et al.*, [17] showed that educational interventions significantly improved awareness in patients with multiple sclerosis. Difference between findings for

present study and Daniali *et al.*, is due to disease and interventions type. Other studies also showed that educational interventions improved knowledge [18,19]. Other study showed that mean of knowledge was increased from 50% to 75%

following educational interventions for care of patient with central venous line [20]. It was expected that educational programs could improve awareness, patients with chronic diseases seek to have enough information for diseases and their treatments and giving information can increase their awareness [21,22]. The score was 1.90 in pre-test and increased to 1.98. The score 2 and lower is a low score and is need to improve in the patients.

The results for the perceived susceptibility showed that intervention increased it. Similarly, Nooriani *et al.*, [23] evaluated the nutritional intervention based on HBM for hemodialysis patients and showed that educational interventions improved the perceived susceptibility. Baghiani Moghadam showed increased the efficiency of designed educational messages in improving the perceived susceptibility of the diabetic patients [24]. Jahanlou *et al.*, [25] showed the ability of educational intervention for improving the perceived susceptibility. Perceived severity is a variable for the HBM construct. Perceived severity is a belief against serious threat and the attitude related to the deterioration of encountering an illness effects that is used for evaluating the possibility of social consequences [26]. The results show that educational interventions improve to know the consequences.

The educational interventions improved the perceived severity. The results showed that the interventions improved the perceived severity after 2 months. Similarly, Shabibi *et al.*, [27] evaluated the effects of educational interventions based on HBM for promoting self-care behaviors in patients with diabetes and showed that educational interventions improved the perceived severity. The score was higher 4.00 that show, educational interventions significantly increased the perceived severity. It was at mean (3.78) pre-intervention but it was increased after intervention. Other studies were reported similar results [28,29]. It was reported that the perceived severity has an important role in preventing behaviors [29]. High perceived severity has a close relation with self-care behaviors [27]. In

the current study, perceived severity was increased that confirms increased self-care behaviors as shown in Table 2.

The perceived benefits was increased from 3.95 in pre-test to 4.80 in post-test in intervention group that shows educational interventions increase the perceived benefits. Similar results were reported by others [27,30,31] who showed educational interventions based on HBM increased the perceived benefits. Increase in the perceived benefits increases the motivation and tendency for self-care behaviors and performing them. In sum, the educational interventions based on HBM increased motivation and tendency for self-care behaviors and the behaviors were increased as shown in Table 2.

The score for perceived barriers was 3.12 in pre-test (medium score) and it was increased to 4.09 (high score) in post-test. The results are the same with findings reported by others [32-34] who reported that educational interventions decreased perceived barriers. Perceived barriers is different from HBM construct and comprises physical, psychological, or financial barriers that prevent a person from conducting appropriate health behaviors [35]. An educational intervention is efficient when it could decrease barriers. The results showed that educational interventions did not decrease barriers but it increased barriers. It means that educational interventions does physical, psychological, or financial barriers for promoting fistula care behaviors of hemodialysis patients.

The results showed that self-efficacy was 3.90 in pre-test and it was increased to 4.81 in the intervention group. Similar results were reported by other studies [36-38]. Self-efficacy is an important variable for HBM construct and it is considered as a results for the educational program. It shows that educational interventions promotes self-efficacy in fistula care behaviors of hemodialysis patients. The results showed that fistula care behavior was increased from 1.00 in pre-test to 1.79 in post-test. The results were similar to those reported by

previous studies [39,40]. The results show that educational interventions improved perceived susceptibility, severity and benefits, and self-efficacy and improved the parameters can improve fistula care behavior.

Conclusion

In sum, this study showed that the educational interventions based on HBM improved perceived susceptibility, severity and benefits, and self-efficacy. Improved some variables in HBM education increases fistula care behavior. We suggest to educate the interventions based on HBM for promoting fistula care behavior.

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Conflict of interest

The authors declared no conflict of interest.

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