Original Article

Effectiveness of Text Messaging and Face to Face Training on Improving Knowledge and Quality of Life of Patients undergoing Hemodialysis: a Randomized Clinical Trial

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ABSTRACT

Introduction: The quality of life of patients undergoing hemodialysis is lower; to improve their living conditions, patients need further training. This study conducted to compare the effectiveness of two methods of text messaging and face to face education on knowledge and quality of life of patients under hemodialysis.
Methods: Undergoing in a clinical trial study, 60 patients undergoing hemodialysis in Sina-teaching hospital of Tabriz, Iran were selected by convenience sampling and randomly allocated into three groups: two intervention groups: text massaging (P=20), face to face group (n=20) and one control group (n=20). Their knowledge and quality of life were assessed and compared by Chronic Hemodialysis Knowledge Survey (CHeKS) and Kidney Disease Quality of Life-short form (KDQOL-SF) questionnaires. Data were analyzed by SPSS version 13.
Results: After intervention, the knowledge of text messaging and face to face groups were significantly more than the control group, but the quality of life scores after intervention had not any significant difference among the three groups. Intra-group comparisons showed that quality of life in face to face group have been significantly increased.
Conclusion: Text messaging and face to face teaching were effective on improving knowledge of patients undergoing hemodialysis. However, the effectiveness of these methods on quality of life needs further evaluations in different setting for longer times in hemodialysis patients.

Introduction

One of the chronic diseases with high prevalence in middle-aged persons, is chronic kidney disease. The importance of this disease is due to its dynamic nature during the time. Chronic kidney disease progresses over the time and new problems emerge or intensify. However, some interventions can affect the progress of the disease. In this way, improving the awareness of policy makers of the health system and patients in coping with this disease has great importance.[1-3]

In the end stage of renal disease (ESRD), the patient must be treated with renal replacement therapies. The ESRD patients, in comparison with the general population, have lower quality of life. Dialysis and kidney transplantation are two common methods in the renal replacement therapy.[4] Hemodialysis is associated with many problems and low quality of life.[5] In order to increase the knowledge of patients undergoing hemodialysis, teaching can be an appropriate manner. In this regard, studies have presented the positive impact of training on reducing the patients' difficulties.[6]

Evaluating the patients' quality of life (QOL) helps nurses to deal appropriately with individuals whose QOL has been strongly affected.[7] Generally, patients' education improve treatment outcomes in complicated diseases.[8]

Education can promote health and prevent complications. Therefore, by training the patients under hemodialysis, we can help them to adhere a proper diet, self-care and reduce the incidence of mortality and the effects arising from the increase of toxins in the body.[9] Different methods such as lecture, discussion and films are used for teaching the patients. For training of adults the nurse must apply different visual, aural and tactile educational ways in order to facilitate the information and adjust them continuously based on the patient's response and positioning.[10]

Face-to-face education is one of the most common training methods in the health-care systems. Due to direct confrontation, the behavior change is more possible in this method, but for training it needs to spend more time and in the populated centers it wouldn't be efficient.[11]

Also, in recent years the use of mobile phone technology has created a new revolution in communications. Nowadays, mobile phones are considered as an integral part of everyday life. One of the most original services of mobile phones is Short Message Service (SMS).[12] The idea of using a phone text message as a communicating message and as a supportive device has been proposed to train and encourage patients, so that they can participate through it in planning their own

health.[13,14] The use of SMS for patient's education is one of the most important features of cell phone; without spending more time or any place limitation, the patients can access to more information in the field of chronic diseases.[15] Generally, in current century, the education plays an important role as one of the most basic factor in caring of chronic diseases for promoting patients' health and well-being.[16]

In this regard, studies show that nurses can play an important role on increasing patients' confidence in self-care behaviors and improve their QOL[17] and coping behaviors by providing appropriate education in hemodialysis departments.[18] The results of studies in this area show that educational programs such as face to face training,[19] educational pamphlet,[3,6] short messaging intervention[14] and interventional programs[20] had an useful impacts on patient outcomes in different domains. However there is no evidence that which one of the intervention methods is more effective on patient's health.

Despite the importance of training on hemodialysis patients, the studies on the impact of different training methods on these patients are limited or haven't compared together in the past related literature, specifically face to face with SMS education. So this study was conducted to evaluate the effectiveness of two text messaging and face-to-face training methods on knowledge and QOL of patients undergoing hemodialysis.

Materials and methods

This semi-experimental study was conducted on patients with renal failure undergoing hemodialysis. The study population included patients undergoing hemodialysis in Sina teaching hospital affiliated to Tabriz University of Medical Sciences, Iran. The inclusion criteria included: age over 18 years; history of at least six months dialysis; at least two session dialysis in a week; to have a mobile phone and necessary information for how to use it and lack of vision problems for messaging group. Patients with mental or advanced chronic disease (such as severe heart failure) were excluded.

Study was approved by Ethics Committee of Tabriz University of Medical Sciences (code: TBZMED. REC. 1394.853), and was registered in Iranian Clinical Trial Registry (code: IRCT201508045665N6). The study was conducted during 12 months from July 2014 to July 2015. Based on Parvan et al., study[6], the sample size was estimated 15 patients for each group (G-power software: mean= 0.737, α= 0.01, power=95% and the effect size of 0.73); by considering possible 30% sample attrition rate, the required sample size was calculated 20 patients in each group. The samples were allocated to three groups based on homogeneity of participants' characteristics such as sex, age and marital status. Regarding the inclusion criteria, 70 of 120 patients could participate in the study. But 10 patients were excluded due to decline to participation (n=3), vision problem (n=3) and advanced chronic disease (n=4). So, 60 patients based on medical record numbering were randomly allocated into three groups by 1:1:1 ratio (face-to-face group: n=20, SMS group: n=20, and control group: n=20).

After describing the aim of study and obtaining written informed consent from the participants, data were collected through a demographic form and two questionnaires were applied. The first was Chronic Hemodialysis Knowledge Survey (CHeKS) consisted of 23 multiple choice questions with one correct answer. This tool was developed by Cavanaugh, et al., in which scores ranged 0-23. It applied to assess hemodialysis patients' knowledge about disease.[21] The higher scores show higher awareness.

The second was Kidney Disease Quality of Life short form (KDQOL-SF) includes multi-item scales targeted at particular health- related concerns of individuals with kidney diseases and on dialysis: symptom/problem (34 items), effects of kidney disease on daily life (20 items), burden of kidney disease (4 items), cognitive function (6 items), work status (4 items), sexual function (4 items), quality of social interaction (4 items), sleep (9 items), social support (4 items), dialysis staff encouragement (4 items) and patient satisfaction (2 items). Each item is put on a 0 to 100 range. Higher number reflects a more favorable health status.[22,23]

The Validity of (KDQOL-SF) questionnaire was done through content validity method and was confirmed by faculty members and some experts from Tabriz Medical Sciences University. The reliability of this questionnaire was calculated by internal correlation method and Cronbach's alpha coefficient. The reliability of this instrument has already been confirmed by Anees et al., and they reported that the internal consistency reliability coefficient (Cronbach's alpha) for overall scale was 0.84.[24]

The participants of face-to-face group were educated for a month (a 10 to 15 minutes session per week for 4 weeks) through the face-to-face training during his hemodialysis time in his or her bed. The text message group was trained via mobile phone in the form of three SMSs (in line with educational goals) during 10:30 to 11:00 am, 16:30 to 17:00 and 21 to 21:30, overall 108 messages in a period of 36 days (approximately 5 weeks). The messages were in Persian at maximum 160 letters. The content of educational program through face-to-face and SMS groups included: kidney function, medication adherence, diet, exercise recommended by doctor and prevention of dialysis side effects.

Baseline data of knowledge and QOL were gathered before the study and once again after completion of the intervention at the end of sixth week by the researcher via interview. It should be noted that the control group received the routine training of nurses in the ward during the study and the data of knowledge and QOL in this group also collected as in the intervention groups. The training package was provided for the control group after the completion of the study (Flowchart 1). It was not possible to blind the study since both control and intervention were conducted in the same environment. But to reduce the contamination of groups, they were selected from different shifts of dialysis. Also gathering data was performed by a person who was unaware of the type of groups.
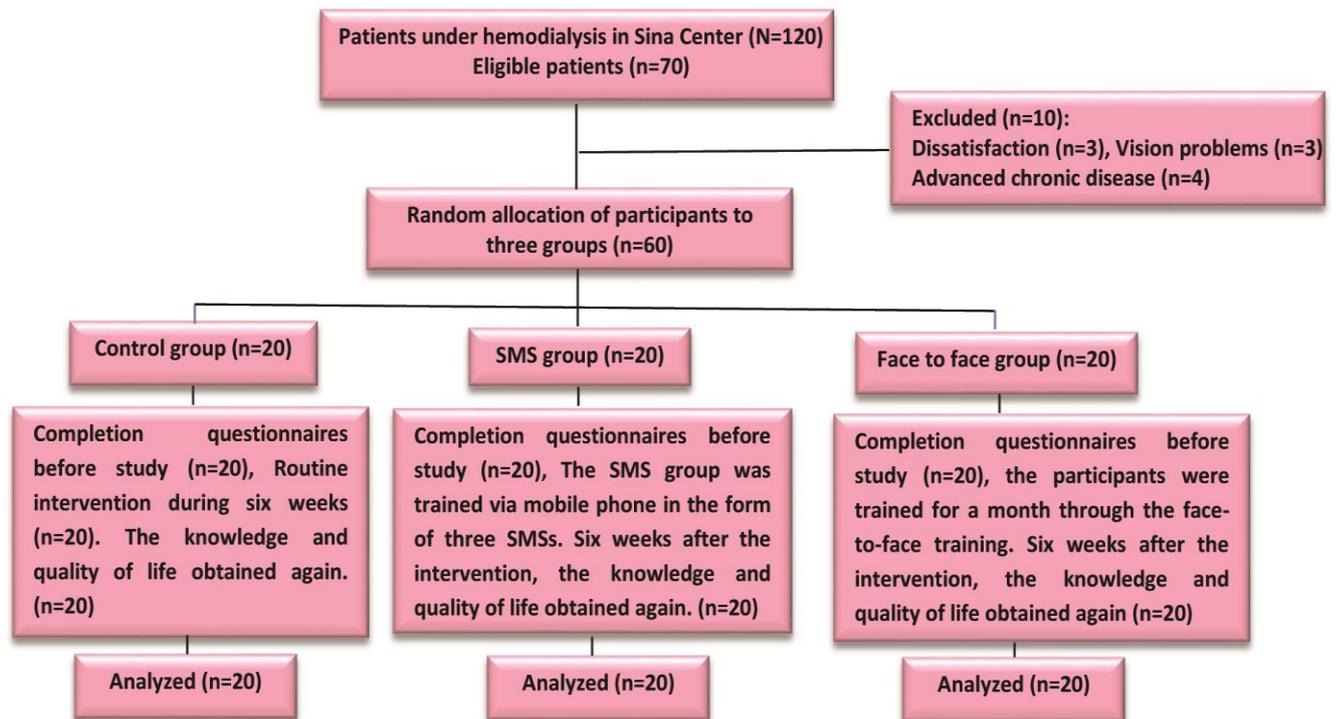
Figure 1. Flowchart of study

Data were analyzed using descriptive and inferential statistics in SPSS version 13 (SPSS Inc., Chicago, IL, USA). Categorical variables were presented as frequency, percent and continuous variables were shown as mean and standard deviation. Chi-square test was used for comparison of qualitative variables (such as gender, marital status, and education level) and ANOVA was used for comparison of quantitative variables (such as age, knowledge and Quality of life) between groups. Finally, intra-group comparison (pre and post-test means) in each group were analyzed by paired t test. For all statistical tests, $P<0.05$ was considered significant.

Results

Results showed that the mean age of participants was 41.65 (10.67) years. Most of the patients were male (60%), married (71.2%) and had a high school graduate. Also, most of them live in urban (91.5%). Table 1 shows the participants' demographic characteristics.

The results showed that the patients' knowledge scores among the three groups had not any significant difference at the beginning of the study (P=0.64); but after educational program in the intervention groups, the knowledge of participants in the face to face and text messaging group were significantly more than the control group (P=0.001). Also, in comparison to the intra-group changes, the scores of control group during the study had no significant difference (P=0.15), but the knowledge of the face to face group (P=0.001) and text message group (P= 0.001) both had been increased significantly (Table 2). The results in table 2 also showed that the total scores of quality of life among the

three groups had no significant difference at the beginning of the study (P=0.909); and after the intervention the quality of life among three groups had no significant differences (P=0.762), too. In comparison to the intra-group changes the scores of QOL of control group (P=0.184) and the text massaging group (P=0.135), had no significant differences during study .However, in face to face group, paired t-test showed significantly increase in QOL (P=0.015), although this increase was not clinically considerable. But it was not statistically significant in comparison to other two groups (P=0.762). Furthermore, in all areas of the general dimensions and in terms of the specific aspects of final kidney diseases on QOL, there were not statistically significant differences between three groups (P>0.05).

Discussion

Phone communication are becoming increasing, however few studies have been conducted to evaluate the outcomes associated with these devices. A study by Som et al., in Washington University in 2017 highlighted the improving dialysis adherence for high risk patients by automated messaging. They also noted that it was associated with a decrease in missed treatment sessions.[18]

The present study demonstrates that face-to-face and text messaging education has a significant impact on increasing knowledge of patients with kidney failure treated with hemodialysis. In this regard, Estaji et al., showed that the education had a great impact on knowledge and health promotion of patients under going hemodialysis.[25] The results showed that all indicators in lecture group had decreased compared to the education

Table 1. The comparison of demographic characteristic between groups

Variables	Face to face N (%)[a]	SMS N (%)	Control N (%)	P
Gender				
Man	11(55)	13(65)	12 (60)	P=0.81[b]
Woman	9(45)	7(35)	8(40)	
Residence				
City	18(90)	19(95)	18(90)	P=0.80 [b]
Village	2(10)	1(5)	2(10)	
Marital Status				
Single	4(20)	4(20)	4(20)	
Married	14(70)	13(65)	16(80)	P=0.76 [b]
Divorced	1(5)	2(10)	00(00)	
Widow	1(5)	1(5)	00(00)	
Education				
Literacy	3(15)	1(5)	0(00)	
High school	4(20)	7(35)	4(20)	P=0.20[b]
Diploma	8(40)	5(25)	12(60)	
Bachelor	5(25)	7(35)	4(20)	
Age [d]	39.15(8.98)	42.30(10.2)	43.50(12.77)	P=0.426[c]

[a]: frequency (percentage), [b]: Chi-square test, [c]: ANOVA, [d]: Mean (Standard Deviation)

Table 2. Comparison of knowledge and quality of life between groups (n=20)

Variables	Control Mean (SD)[a]	Text message Mean (SD)	Face-to-face Mean (SD)	Comparison between groups
knowledge				
Pre intervention	12.35(3.15)	13.30(2.45)	12.30(2.99)	[a] P=0.646
Post intervention	12.80(3.15)	20.05(2.58)	19.90(2.29)	[a] P=0.001
Intra-group comparison	[c] P=0.154	[c] P=0.001	[c] P=0.001	
Quality of life				
Pre intervention	47.59(6.38)	47.32(4.95)	47.27(4.36)	[b] P=0.98
Post intervention	47.84(5.35)	47.99(5.13)	49.24(3.17)	[b] P=0.76
Intra-group comparison	[c] P=0.184	[c] P=0.135	[c] P=0.015	

Abbreviation: [a]: mean (Standard Deviation), [b]: ANOVA, [c]: paired t -test

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with pamphlets. This fact that educating patients by lecture promotes patients' diet and fluids intake is also consistent with other studies in our country, in which investigated the impact of self-care education by the face-to-face and video film. Furthermore, Ramirez et al., designed a study based on the text message that indicated the adherence of most of patients with diabetes for changing behaviors.[15] Also Zolfaghari et al., showed the positive effects of SMS on self-efficacy.[26]

The comparison of quality of life scores of the intervention and control groups after education revealed no significant difference between groups, but it was slightly increased in face to face group. It seems that face-to-face education has better effects compared to other methods. Regarding, studies indicate that the teaching has had a positive impact on reducing the problems of patients and improve their QOL.[25,27] Estaji et al., showed a positive effect of training via cell phones on the compliance of patients undergoing hemodialysis.[25] Also Kao, Lai et al.,[28] indicated high income had direct relationship with mental health. Moreover, people with more severe depression had a lower quality of life. In this study, the quality of life had no difference in two different genders. Baraz-Pardenjani et al., showed this training patients under hemodialysis improve the QOL and reduce the physical problems of these patients,[5] But

these studies are in conflict with the findings of present study. It could be due to status of disease or social and individual differences of participants in studies. Furthermore, it seems that for making changes it requires longer time or providing advanced systematic programs.[29]

The finding of this study indicates a positive effects of education on knowledge of patients undergoing hemodialysis, in the field of kidney function, medication, diet, exercise and prevention of side effects through face-to-face and SMS education. Therefore, these methods should be incorporated in routine care for the patients undergoing hemodialysis.

Conclusion

Based on the results of current study, the face-to-face and text massage are the effective methods for patients undergoing hemodialysis. In the conducted investigation to compare the results of present study, no similar relevant study was found; so it appears that future studies in order to make better decisions to be essential.

Totally we can conclude that both text massage and face-to-face education are effective in promoting hemodialysis patients' knowledge. But for improving their QOL, providing educational services and programs with longer period are needed. The limitation of this

study was including: the data collection process (using a self-report method), not having full control over confounding variables due to non-experimental methodology and psychological status of participants that could be influences on their answering manner. It is recommended to perform a similar study with full control on confounding variables and more sample size, in order to further generalization of results with greater power.

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Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

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