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Comparison of the Effect of Training by Peers and Health Care Staffs on Adherence to Treatment in Patients with Hypertension

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ABSTRACT

Aims Hypertension is one of the major problems in the world. Adherence to treatment of patients with hypertension is insufficient, and there are conflicting results regarding the effect of peer education. Therefore, this study was conducted to compare the effect of training by peers and health care staff on adherence to treatment in patients with hypertension.

Materials & Methods This clinical trial was done on patients with hypertension in Yasuj, Iran, in 2017. Two hundred sixty-four eligible individuals were selected using convenience sampling and randomly assigned to three peers, health center staff, and control groups (88 people in each group). The data collection tool was a researcher-made questionnaire assessing adherence to treatment of patients with hypertension, psychometrically evaluated. The questionnaire was completed by three groups before, after, and two months after the intervention by participants. Five education sessions were conducted weekly by the peer group for intervention group 1 and the health care personnel for intervention group 2. Data were analyzed by SPSS 24, using Repeated Measures Analysis of Variance, Chi-square test, and Bonferroni test.

Findings Both educational interventions by peers and health care personnel effectively increased adherence to treatment of patients with hypertension ($p<0.05$). Although at the end of the intervention, education by peers and health care staff had the same effect on increasing treatment adherence, two months after the intervention, peer education on adherence to treatment was greater than education by health center staff.

Conclusion Peer education also increases adherence to treatment in patients with hypertension; thus, due to its cost-effectiveness and the lack of special equipment, peer education is recommended as a suitable approach.

Keywords Hypertension; Compliance; Education; Peer Group; Health Personnel

CITATION LINKS

[1] Clinical guidelines for the management of ... [2] Prevalence and incidence of pre-hypertension and ... [3] Essential hypertension: An approach to its etiology ... [4] Post-discharge evaluation of medication adherence ... [5] Nonadherence to antihypertensive drugs: A ... [6] Prevalence of medication adherence in patients ... [7] Brief intervention for stress management and ... [8] Level of adherence to lifestyle changes and ... [9] The effect of patient education and home ... [10] A study of professional nurses' perceptions of ... [11] The impact of peer support program on adherence ... [12] The effect of peer-led education on the life ... [13] The influence of peer group support on the compliance ... [14] Randomized surgical training for medical students ... [15] Comparative effectiveness of peer leaders and community ... [16] Diabetes control with reciprocal peer ... [17] Relationship between adherence to therapeutic ... [18] Diagnostic status of hypertension ... [19] Effects of the dietary approaches to stop ... [20] Lifestyle modification for resistant hypertension ... [21] Exercise training restores the endothelial ... [22] Benefits of intensive treadmill exercise training on ... [23] Adherence to antihypertensive medication ... [24] Effects of 8 weeks sustained follow-up ... [25] Effects of 8 weeks sustained follow-up after ... [26] Effectiveness of peer led intervention in ... [27] The effect of peer education on the mental ... [28] Peer education as a strategy for ... [29] Effects of peer and group education ... [30] Impact of diabetes education and peer support ... [31] Long-term effects of educational and peer ...

Introduction

Hypertension is one of the major problems in developed and developing countries and the most important cause of death due to coronary artery disease, stroke, heart failure, and kidney failure [1]. In a study in Iran, the prevalence of pre-hypertension was 28.5%, and the prevalence of hypertension was 19.2% [2]. Obesity, diabetes, aging, emotional stress, sedentary lifestyle, and reduced potassium intake are primary causes of high blood pressure [3]. Although regular use of antihypertensive drugs reduces the effects of high blood pressure, the status of blood pressure control is not appropriate in patients for whom medication has been prescribed; in the United States, 53.5% of patients had uncontrolled blood pressure despite taking medication. The effectiveness of antihypertensive drugs is achieved by regular use of these drugs, and the most important reason for the lack of blood pressure control is nonadherence [4]. In a meta-analysis, 45.2% of patients with hypertension and 31.2% of patients with hypertension and other comorbidities did not follow the medication, of whom about two-thirds (62.5%) were living in Africa and 43.5% in Asia [5]. The adherence rate of drugs in patients with hypertension in a meta-analysis study in Iran was 33% [6]. The risk of developing high blood pressure can be reduced by effective medication management and lifestyle modification. In this regard, physical activity, no smoking and no use of alcohol, following a balanced diet, especially low-salt, and stress management are recommended [7]. However, patients do not follow a proper lifestyle, as in a study by Elbor, only 23% of patients had full adherence to healthy lifestyle behaviors; the rate of adherence to physical activity was 20.1%, adherence to a healthy diet was 11.8%, and medication adherence was 34.7% [8].

One of the reasons for nonadherence is the lack of knowledge about the disease. Studies have shown that poor awareness leads to low adherence to treatment and vice versa [4, 8]. In one study, 42.95% of patients with hypertension had poor knowledge, 52.27% had moderate knowledge, and only 4.77% had sufficient knowledge about the disease [4]. Educational interventions increase adherence to medication and a healthy lifestyle and resulting in lower blood pressure [9]. Training programs can be implemented using different methods and are usually offered by the health center staff. Nurses comprise more than 70% of the health care team and play a valuable role in educating patients because they have more access to the patient and his family and spend much time caring. As a result, there are frequent opportunities for training, and they can also evaluate the quality of training [10]. Studies have shown that a peer group may be useful in educating patients with chronic diseases. A peer is a person who is equal to another in position. Peer training is a process that provides peers with information and skills from relevant professionals and presents them to their peers along with their experiences. Peers can explore their peers' problems and concerns about the disease and help improve their knowledge and understanding of the disease and address their concerns and improve the psychological dimension of quality of life [11].

Numerous studies have confirmed the effectiveness of the peer group. In Sharif *et al*. study, peer group training caused a significant improvement in all functional aspects of quality of life and reduced symptoms in patients with breast cancer [12]. Aty also reported that education by a peer group led to drug adherence and improved lifestyle in patients with hypertension [13]. Graziano showed that students trained by peers had better and correct performance than students trained by assistants [14]. Tang *et al.* reported that educational interventions by both health center staff and peers reduced HbA1c, but this reduction was more persistent in the group trained by peers [15]. However, in a study by Heisler *et al.*, there was no significant difference between educational intervention by peers and nurses regarding drug adherence in patients with diabetes [16]. Also, Haidari *et al*. reported that training patients with hypertension by their peers resulted in more adherence to treatment, diet, and physical activity than the control group [11]. However, in this study, no comparison was made between the effect of training by the peer group and staff on adherence.

Contradictory results compare the effect of peer group training and other training methods, and no study was found comparing the effect of two educational methods by peer group and health center staff on adherence to treatment of patients with hypertension. Accordingly, this study was done to compare the effect of the educational program by peer group and health center staff on adherence to treatment in patients with hypertension.

Materials and Methods

This clinical trial was performed on patients with hypertension in 2017 in Shahid Madani Health Centers in Yasuj. A total of 284 people, based on a recent study [17] and using the below formula and considering 95% confidence, 5% error, and possible attrition, were selected:

$$n=\frac{2\times Z^2\times P(1-P)}{(P_1-P_2)}$$

To obtain 284 cases as the sample, 300 records of cases with hypertension in one of the rural health centers in Yasuj city, Iran, were analyzed, and 284 eligible patients willing to participate in the study were selected by available sampling method. Then, by simple random sampling method, they were divided into three groups: peer (training by peer group), staff (training by health center staff), and

control. Inclusion criteria were informed consent, the age of 35-65 years, chronic hypertension for at least six months, blood pressure higher than 140/90mm, and exclusion criteria were other acute disorders at the time of study and no cooperation, withdrawal, or other conditions affecting the study.

The data collection tool was a two-part researcher-made questionnaire, the first part was about demographic information, and the second part was about treatment adherence (24 questions related to diet, five questions related to physical activity, 11 questions related to drug use). To determine the reliability of the questionnaire, the test-retest method was used. The questionnaire was given to 20 eligible patients, and their scores were calculated. After two weeks, the questionnaire was completed again by the same people and was confirmed using Pearson correlation coefficient with a reliability of 0.85. Cronbach's alpha coefficient for this questionnaire was 0.88. In order to assess the validity of the content, the questionnaire was given to 11 faculty members, and the Content Validity Index (CVI) and Content Validity Ratio (CVR) were measured. Some questions were omitted due to content validity less than 0.70 and validity ratio less than 0.62, and a questionnaire consisting of 64 questions was developed. Ten patients were interviewed face-to-face to determine its face validity, and the level of difficulty, the degree of appropriateness, and ambiguity were examined. After modifications based on patients' opinions, in the next step, to reduce and eliminate inappropriate expressions and determine the importance of each expression, the quantitative method to determine the impact score of an item was used. For this purpose, selected questions to measure quantitative face validity were given to 10 members of the target population, and the impact factor was determined. The score of all items was above 1.5; therefore, informal validity assessment phase, no item was omitted

The research was registered in the Research Ethics Committee of Yasuj University of Medical Sciences. Participants read the informed consent form in the research and completed it while providing explanations by the researcher. Also, permission from the officials of health centers was obtained to research these centers, the confidentiality of information was guaranteed, and the subjects could leave the study at any stage of the research, and no costs were imposed on participants. Subjects were asked to complete treatment adherence and demographic information questionnaires, and their baseline blood pressure was measured. In the next stage, for a maximum of one month, three patients with hypertension based on characteristics, such as better adaptation to control the disease, controlled blood pressure, appropriate social relationships, ability to conduct sessions, having higher education, and better score on the questionnaire and adherence to treatment were selected as a peer group to educate patients in intervention group 1. The selected health staff was also one of the clinic staff interested in participating in the study, selected according to the appropriate expression technique and familiar with the local dialect. Then, three one-hour training-supplementary sessions (based on the educational needs of peers and staff) were conducted by the researcher for peers and health workers to prepare them for educating patients in the intervention group. In these sessions, patients of the peer group and staff of the health center shared their experiences and knowledge about the disease, and their information was completed. In the next stage, 88 patients in the peer group were divided into seven groups of 10-15 cases, and the peer introduced the group training and shared his experiences with patients. Intervention group 2 was also trained by health staff through lectures one session per week in 4 groups of 20-22 people. For both groups, five training sessions were held for five weeks (one session per week). In the first session, the nature and symptoms of the disease; in session 2, dietary approaches to stopping blood pressure; in session 3, antihypertensive drugs, the effects and importance of regular drug use and how to use drugs properly, as well as the importance of seeing a doctor and measuring blood pressure; in session 4, the importance of physical activity and weight loss in hypertension, types of useful physical activity and ways to reduce and deal with stress, and in the fifth session, ways to reduce stress and deal with it were taught. The three groups completed the questionnaire before the intervention, at the end of the intervention, and two months after the intervention. In the control group, only blood pressure was measured, and they received the usual interventions of the health center.

Data were analyzed using SPSS 24 statistical software using descriptive and inferential statistics with an alpha of 0.05. Frequency, median, and mean were used to describe the data. The Kolmogorov-Smirnov test was used to investigate the normal distribution of data. Chi-square, Repeated Measures ANOVA, and Bonferroni post hoc tests were also used for intergroup and intragroup comparisons.

Findings

The mean age of the peer, health center staff, and control groups were 56.97±6.671, 57.31±6.661, and 58.18±6.44, respectively ($p=0.45$). Of 264 participants, 77.7% were female, and 22.3% were male. There was no significant difference between age, support, and education in the three groups ($p<0.05$). However, there was a significant difference in gender, marital status, occupation, and lifestyle (living alone or with family) between the three groups ($p<0.05$; Table 1).

Table 2 presents the mean of adherence to medication, diet, and physical activity between the three groups before, after, and two months after the intervention. In general, in the health center staff group, adherence to treatment between three different time points showed a significant difference ($p<0.0001$). In other words, the time trend was significant. According to Bonferroni's post hoc test, in the health center staff group, adherence before and after the intervention ($p<0.01$), before and two months after the intervention ($p<0.01$), and two months after the intervention ($p<0.0001$) showed a significant difference. In the peer group, adherence to treatment at three different time points showed a significant difference ($p<0.0001$). According to Bonferroni's post hoc test, adherence to treatment before and after the intervention ($p<0.0001$), before and two months after the intervention ($p<0.0001$), and two months after the intervention ($p<0.0001$) showed a statistically significant difference. In the control group, adherence to treatment before and after the intervention ($p<0.05$) and before and two months after the intervention ($p<0.05$) showed a significant difference, but two months after the intervention, it was not found with a significant difference ($p<0.05$; Table 2). Before the intervention, there was no significant difference in adherence to treatment between the three groups ($p<0.05$) because the three groups were homogenous before the intervention. After the intervention, the peer and control groups ($p<0.0001$) and the health center staff and control groups ($p<0.0001$) showed a significant difference in adherence to treatment; however, the peer and the health center staff groups showed no statistically significant difference ($p<0.05$). Two months after the intervention, the peer and control groups ($p<0.0001$) and the health center staff and peer groups ($p<0.01$), and the control and health center staff groups ($p<0.0001$) were found with a significant difference in the adherence score (Table 2).

Table1) Demographic characterization of participants (n=88 in each group)

Variables		Peer group	Health personnel	Control	p-value
Sex	Female	59 (67)	72 (81.8)	74 (84.1)	<0.45
	Male	29 (33)	16 (18.2)	14 (15.9)	
Marriage	Yes	73 (83)	66 (75)	67 (76.1)	<0.005
	No	15 (17)	22 (25)	21 (23.9)	
Education	Illiterate	59 (60.2)	58 (65.9)	53 (60.2)	<0.86
	Under Diploma	20 (22.7)	26 (29.5)	35 (39.8)	
	Diploma and higher	9 (10.2)	4 (4.5)	0	
Job	No	8 (9.1)	4 (4.5)	0	<0.008
	Yes	80 (90.9)	84 (95.5)	88 (100)	
Insurance	No	12 (13.6)	16 (18.2)	8 (9.1)	<0.075
	Yes	76 (86.4)	72 (81.8)	80 (90.9)	
Living status	Alone	0	5 (5.7)	6 (6.8)	<0.03
	With family	88 (100)	83 (94.3)	82 (93.2)	
Smoking	No	68 (77.2)	71 (80.6)	64 (72.7)	<0.45
	Yes	20 (22.7)	17 (19.3)	24 (27.2)	
Alcohol	No	88 (100)	88 (100)	88 (100)	<0.05
	Yes	0	0	0	

Table 2) Comparison of the mean±SD score of compliance to treatment between and within three groups at different times

Intervention	Group			Source of change	F.
	Personnel	Peer	Control		
Adherence to diet					
Before intervention	82.37±7.67	79.37±8.41	77.94±7.34	Time	459.44
After intervention	88.86±6.38	87.43±7.61	77.72±7.10	Group	37.28
Two months after the intervention	87.76±6.61	88.98±7.67	77.71±7.13	Time-Group	147.88
F value	127.15	503.90	2.70	-	-
Adherence to physical activity					
Before intervention	3.36±3.30	3.03±3.02	3.35±3.42	Time	107.75
After intervention	4.12±3.74	6.70±3.26	2.98±3.22	Group	12.46
2 months after the intervention	4.12±3.74	6.70±3.26	2.93.22	Time-Group	85.87
F value	14.97	161.30	4.14	-	-
Adherence to medication					
Before intervention	19.86±5.25	20.11±3.97	20.10±5.43	Time	133.86
After intervention	22.52±5.77	23.67±4.27	20.15±5.50	Group	5.82
2 months after the intervention	21.55±5.24	24.34±5.58	20.11±5.51	Time-Group	45.63
F value	72.79	86.78	1.00	-	-
Adherence to treatment					
Before intervention	104.80±11.68	102.52±10.59	101.40±11.04	Time	604.16
After intervention	115.51±10.20	117.51±9.57	100.88±10.88	Group	36.73
Two months after the intervention	113.44±9.62	120.03±10.75	100.82±10.87	Time-Group	212.23
F value	161.35	635.20	6.28	-	-

In comparison between groups: $p<0.01$; in comparison in-groups: $p<0.01$ (except control group in medicine variable: $p<0.34$; Diet variable: $p<0.07$, and sport variable: $p<0.051$)

Discussion

This study aimed to determine and compare the effectiveness of training by peers and health center staff on adherence to the treatment of patients with hypertension. Adherence to treatment in this study also included adherence to diet, physical activity, and medication. The results showed that both peer group and health staff training effectively adhered to treatment, diet, physical activity, and medication in patients with hypertension.

Patients with hypertension need to understand the nature of their disease; thus, training by peers and health professionals could affect the perception of the disease leading to an increase in patient's adherence to physical activity, diet, and medication. Dietary Approaches to Stop Hypertension (DASH) have been recommended as an effective diet set to prevent and control hypertension [18]. This diet emphasizes grains, fruits, vegetables, and low-fat dairy products, reducing red meat, sweets, and saturated fats [19]. When a diet following the DASH is combined with physical activity and reduced calorie intake, blood pressure is further reduced [20]. Fernandez *et al*. showed that endothelial progenitor cell number and function in hypertension is increased by physical activity and helps to treat hypertension by vasoconstriction [21]. In a study by Chan *et al*., intensive treadmill physical activity improved the quality of life and cardiorespiratory function of patients with hypertension [22].

In the present study, training by health center staff promoted adherence to treatment in general and adherence to medication, diet, and physical activity after the intervention. Implementing a structured training program by the staff of the health center for patients with hypertension in Russia has increased patients' knowledge and better acceptance of drug treatment and changes in their lifestyle [23]. In the present study, adherence to treatment, diet, and physical activity increased after the intervention and two months later in the health center staff training group, but after two months, the health center staff training had no significant effect on drug adherence. In the study by Chiu *et al*., although lifestyle counseling by nurses and counseling and nurse follow-up led to blood pressure control and adherence to physical activity, in the combined intervention group (counseling with follow-up), adherence to diet and drug did not improve significantly [24]. However, it was expected that counseling intervention would increase follow-up, which may be due to the absence of symptoms of hypertension or forgetting to take the medication. Also, in a study by Magadza *et al*., although educational interventions by health center staff increased patients 'awareness and understanding about hypertension, contrary to the present study results, it did not affect the mean score of patients' adherence to medication [25]. In this study, the reason for the lack of statistical significance of the drug adherence score was the long-term change in treatment adherence behavior; this study lasted six months, whereas in the present study, the intervention by the health center staff had an effect immediately, and two months after the intervention, no effect was found. Thus, time was able to increase adherence to drugs in patients, and patients may have concerns about using the medication or may not care about the medication due to the disappearance of symptoms.

Also, in Haidari *et al*., training patients with hypertension by peers resulted in more adherence to treatment, diet, and physical activity than the control group [11]. The difference between this study and the present study is that in the present study, a group was also trained by the health center staff. Although two training sessions were given to the control group by the researcher, it did not affect adherence in the above study. Similar to the present study results, Krishnamoorthy *et al*., in a meta-analysis and the systematic review, showed that a peer support intervention improved blood pressure in patients with hypertension and decreased HbA1c in patients with diabetes [26]. One of the advantages of using peer education is that they can better communicate with their peers and encourage them to choose appropriate health behaviors because they can share their common strengths, weaknesses, and experiences and come up with solutions.

Although at the end of the intervention, the effect of the educational intervention by the peer and the staff of the health center on the adherence to treatment, diet, and medications was the same, two months after the intervention, the effect of training by the peer group on adherence to treatment, diet and medications was greater than the effect of educational intervention by staff. Heisler *et al*. reported that peer support caused a greater decrease in HbA1c in patients with diabetes than the group trained by nurses, and the effect of education by peers and health center staff on the drug adherence of diabetic patients was the same [16]. Similar to the results of the above study, immediately after the educational intervention, in the present study, there was no significant difference in drug adherence of patients with hypertension between the two groups of peer education and staff. However, after two months, the effect of the peer group was better than the training of health center staff. In the above study, it was expected that after six months, the peer group would have a greater effect on adherence to the treatment of patients with hypertension, but the intervention in both groups trained by peers and nurses had the same effect on the treatment adherence of these patients. Nurse case management is a person who follows the patients and communicates with them; therefore, these nurses, like their peers, feel a sense of belonging and intimacy

with patients for six months, and consequently, patients, like their peers, follow their proposed treatment solutions. Khoshraftar *et al*. reported that peer education and training by community health nurses improved the quality of life in the elderly [27]. The elderly also follow their peer group according to their experiences and age conditions and easily accept to be educated. However, in the above study, the training effect was measured one month after the intervention, and perhaps if this follow-up time lasted, different results would be obtained.

In contrast to the above studies, in a study by Tang *et al*. on patients with diabetes, although HbA1c decreased in both groups trained by peer and community health workers, the persistence was greater in the peer group [15]. Peers can help patients follow the treatment more because of similar experiences with patients, more access to them, and more comfortable feelings. Therefore, in both studies, HbA1c was reduced in patients. Due to the long duration of the intervention (12 months) as well as the long follow-up time (18 months) and as a result of the continuous communication between patients and their counterparts, adherence to treatment in diabetic patients also increased such that after 18 months, the effect of the peer group on the reduction of HbA1c was greater than that of health workers. In the present study, similar to the results of the above study, immediately after the intervention, the effect of both health center staff and peer training on adherence was similar. However, after two months of follow-up, the peer training group increased adherence to treatment, medication, and diet than the group trained by the health center staff. The results of the mentioned studies and the present study show that the peer group can educate patients and change their harmful behaviors.

Similar to the present study results, it was shown that the effectiveness of breast self-examination training in students by peers is more than health workers [28]. Graziano also showed that students taught by peers performed the steps more correctly than students taught by assistants [14]. The similarity in obtained results may be due to being more comfortable with peers than higher education students or staff, and it seems that with more sense of security and, as a result, less stress, students have learned to learn practical skills better. Similar to the present study results, Karyurt et al. also reported that the mean scores of knowledge, practice, and health beliefs perceived by students of breast self-examination were improved evenly after training by peer group and training by peer group and training faculty members [29]. Despite the higher knowledge of faculty members, it was expected that the group under faculty training would be more successful, but the results showed that the effect of peer training was the same as faculty training. In the present study, except for adherence to physical activity, which was the same after two months in both intervention groups, adherence to treatment, diet, and medication in the peer education group was more than the health center staff. It can be said that this difference in results is because, in the above study, the measured outcome was learning skills in students, but in patients, this consequence is the individual's adherence to treatment, which is influenced by many factors and is not comparable. The results of these studies indicate that in education, professors can use mentorship to teach students.

Contrary to the results of the present study, in a study by Sachmechi *et al*., in the group trained by nurses, HbA1c, TC, and LDL-C significantly reduced at the end of the intervention, but in the group trained by health center staff and peer, only SBP and HbA1c improved compared with the control group and the group trained only by nurses showed a greater decrease in SBP, Tc, TG-C, LDL-C, and HbA1c than the combined intervention group. The difference between the results of the mentioned study and the present study may be due to the longer follow-up time in the combined intervention group than the staff training group in the mentioned study and the shorter follow-up time in the present study. In the long run, many confounding variables can affect the outcome of the study. On the other hand, the peers in the above study may not have been interested in sharing their experiences with diabetes or may not have a full understanding of the disease to present to patients [30]. Contrary to the present study results, in a study to determine the long-term effects of peer group training and interventions on breast cancer compliance, Helgeson *et al.* concluded that the peer group did not affect patients' quality of life. They attribute these results to negative interventions of family and friends, wrong comparisons of patients, and the presence of some inhibitory thoughts in patients, and long follow-up may also increase confounding variables [31]. In the mentioned study, the quality of life of cancer patients was measured, while in the present study, treatment adherence was measured in patients with hypertension, which are very different. Although in the study by Taleghani *et al.* conducted in Tehran, peer group training improved the quality of life of women with cancer compared with controls who had routine physical inactivity, in the same study in Isfahan, the intervention of the peer group did not improve the quality of life of women with cancer. Researchers believe that this difference was due to the lack of continuous communication between participants and peers.

One of the limitations of the present study was the intervention period as well as short-term follow-up. It is suggested that in subsequent studies, the intervention time and follow-up of treatment in patients be increased for at least six months. Most of the studies that have used the peer group for training have shown the positive effect of this training method. This may be because patients are influenced

by the techniques and experiences of people who have had conditions similar to their own. They are more confident and try to use methods that others with similar conditions have used. Therefore, according to the results of this study, the cost-effectiveness of peer education, and on the other hand, the limited number of health workers and patients with hypertension, peer group training can be used as an effective training method to increase adherence to treatment in patients with hypertension.

Conclusion

Training by both peers and health workers increased adherence to treatment in patients with chronic hypertension. However, peer training was more effective than training by the health center staff.

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Conflicts of Interests: The present study is part of the thesis by Salimeh Ranjbar, a Master's degree student in community health nursing at Yasouj University of Medical Sciences, Iran, and there is no conflict of interest.

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