



Effects of Small Group Education on Interdialytic Weight Gain, and Blood Pressures in Hemodialysis' Patients

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ABSTRACT

Background: One of the most common problems in patients undergoing hemodialysis is interdialytic weight gain due to high liquid intake. Many patients are not fully aware of the fluid restriction. Group educations, such as small-group education, are among powerful methods to enable patients correct their behaviors, and enhance their capabilities, knowledge, and awareness.

Objectives: The purpose of this study was to determine the effect of small-group education on interdialytic weight gain, and blood pressures in patients undergoing hemodialysis.

Patients and Methods: This is a quasi-experimental study. Data collected from 42 patients undergoing hemodialysis. Before education, the mean of interdialytic weight gain during one week, and blood pressure were recorded. Then small-group education performed in 4 sessions. One week, and one month after the education, the mentioned parameters were recorded again. Repeated measure analysis of variances was conducted and pair-wise comparison was done using the Bonferroni test. Descriptive statistics were calculated for demographic variables.

Results: The mean, and standard deviation of interdialytic weight gain of participants was 3.64 ± 0.88 kg, before the education, and significantly decreased to 1.34 ± 0.61 kg, and 1.71 ± 0.72 kg one week, and one month after the education, respectively ($P = 0.001$). Also, the mean and standard deviation of participants' systolic blood pressure was 139.7 ± 16.45 mmHg before the education, and significantly decreased to 129.6 ± 12.16 , and 129.5 ± 11.51 mmHg one week, and one month after the education, respectively ($P = 0.001$). But, the mean and standard deviation of diastolic blood pressure of the participants was 81.4 ± 6.07 mmHg before the education, and decreased to 79.7 ± 5.51 and 81.7 ± 5.27 mmHg one week, and one month after the education respectively. However, no statistically significant difference was observed between the diastolic blood pressure in the three phases ($P = 0.061$).

Conclusions: Small-group education in patients undergoing hemodialysis leads to a decrease in interdialytic weight gain, and systolic blood pressure, but has no effect on diastolic blood pressure.

Keywords: Education; Population Groups; Weight Gain; Renal Dialysis

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► Implication for health policy/practice/research/medical education:

Nurses and hospital authorities are recommended to use small-group education method to educate patients. It is suggested to use this method to educate patients with chronic diseases.

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1. Background

Excessive interdialytic weight gain is seen in 10% to 95% of patients undergoing hemodialysis (1). One of the most important problems in patients undergoing hemodialysis is do not adherence to restriction of fluid intake which result in excessive interdialytic weight gain. Not paying attention to the daily fluid intake, causes fluid retention in body of patient, which could result in generalized edema, dyspnea, heart failure, pulmonary edema, and weight gain, and it seems that many of patients are not fully aware of their liquid consumption limitations (2). Although following a dietary plan, and limiting liquid intake are the complimentary for hemodialysis, yet there are evidences indicating that many patients undergoing hemodialysis do not obey their diets, and limitation of liquid consumption (3). So promotion of patients' information about controlling these problems is important, in which nurses role is extremely significant (4). One approach to decrease or even eliminate symptoms, and complications of renal failure and to increase these patients' life length is to enhance their self-care knowledge, which can be achieved by education. Patient education is one of the main nurse's responsibilities for knowledge promotion of their patients (2). Group education is a powerful tool for assisting patients to correct their behaviors, and to enhance their capabilities, knowledge, and awareness for good performance. In this method, both nurse and patients are mutually active, and patients use each other's experience under nurses' supervision, which saves time and cost, and is one of the best patient education methods (5). Group creates a chance to meet other individuals with the same problem, and provides a supportive network for patients to raise their self-confidence, intimacy, correct wrong beliefs, use others' experiences, and transfer information (6). Small group is the group in which each member has a face-to-face immediate communication with other members. The number of members in small groups does not exceed 15 (7). The results of a study conducted by Sharp et al. showed that this method properly affects liquid intake and decreases it (8). Besides, the results of a study performed by Rezaei-Dehaghaneh and Shafaghei, mentioned that patient's education about dietary plan has a positive effect on patient's weight loss (9). Abbasi et al., showed that patient education about adherence to dietary plan, and fluid restrictions by lecturing method is more efficient than booklets (10). Nowadays, group education is an ever-increasing process, since the current managed therapy is seeking for reducing the costs as well as enhancing the efficacy of treatments. Thus, experts and authorities are willing to conduct group education which not only reduces needed costs, time, and the number of experts but also, has higher efficiency than individual education or indirect education methods, due to patients and nurses communication, and effect of group on members' behavior and performance (7). An increase in patients' knowl-

edge decreases health care costs. Moreover, it reduces the economic pressure to the society, and has an important role in lowering patients' problems. Therefore, through reducing these patients' problems it is feasible to help patients and their families to conceive the illness for playing a more active role to maintain their health level, as well as a saving in costs (11). The incidence of chronic renal disease is 260 per one million of world population and increases 6% annually (12). At the end of 2008, there were more than 26152 patients with chronic renal disease in Iran, from them 11576 patients were under treatment by hemodialysis, and it increases 15% annually (13). There is not any available research which assesses the effect of small group education on weight gain of patients undergoing hemodialysis.

2. Objective

This study was performed to determine the effect of small group education on interdialytic weight gain, and blood pressures in patients undergoing hemodialysis, to suggest an effective educational-supporting package to prevent interdialytic weight gain and hypertension in these patients.

3. Patients and Methods

This is a quasi-experimental study which was conducted on 49 patients undergoing hemodialysis (all the patients who referred to the hemodialysis units of Be'sat and Shahid Beheshti hospitals of Hamadan city, and had the research inclusion criteria) using a pretest and post-test design. The inclusion criteria were: Persian language, willingness to participate in the study, having writing and reading literacy, interdialytic weight gain more than 1.5 kg in the last three dialysis sessions, hemodialysis history from six months to three years, and lack of any mental problems such as dementia or delirium. The excluding criteria were: receiving official educations about dietary plans, and fluids consumption during the study, absence in more than one session in education, and having blood transfusion or serum infusion during the data collection. These participants were divided into five groups (four groups with 10 members, and one group with nine members). Among them five members were eliminated from the research due to being absent, and two members were excluded due to renal transplantation. So, the final sample size was 42. After getting permission from the authorities of educational hospitals, and hemodialysis units in Hamadan city, and getting informed consent from participants, the data collecting process was performed from March to July 2010. First, the interdialytic weight gain, systolic blood pressure, and diastolic blood pressure were measured three times per week, and the mean values of them were considered as the pre education values. Then, educational program was performed based on small group method in 4 sixty-minute sessions

which were held twice a week in days in which patients were not under dialysis treatment. During the sessions, the patients negotiated and discussed about a predefined subject. The aim of the first session was patient's orientation, and description of CRF, and its complication in patients undergoing hemodialysis. In this session a brief description about group principles was presented by the researcher. In the second session, the role of fluid in the body, the routes of fluid input to the body, and complications of excessive fluid intake were discussion. In the third session the routes of fluid output from the body, controlling fluid intake and output, and daily allowance of fluid intake in these patients were discussed. The aim of the third session was discussion about the causes of fluid retention, and interdialytic weight gain in patients undergoing hemodialysis, also presenting procedures to control fluid intake. In the fourth session, the mechanism of controlling blood pressure, and effect of fluid retention on blood pressure were discussed, and researcher reviewed all items, and answered to the patients' questions. Then, one week, and one month after the educational sessions, the mentioned variables were recorded again. During the research, the type of hemodialysis machine, the time of each hemodialysis session, the type of used filter (dialyzer), the number of dialysis sessions per week, the type of dialysis solution, and the blood flow rate during hemodialysis for each participants were constant. Data was collected by questionnaire, and checklist which their content validity were confirmed under the consensus of 10 academic members of Hamadan University of Medical Sciences, and their reliability were confirmed by inter-rater agreement method. We also used standard devices for measuring patient weight, and blood pressure and calibrated them each time before utilization.

3.1. Ethical Considerations

The current study was approved by the research institutional review board, and the research ethics committee of Hamadan University of Medical Sciences. The aim of the study was explained to all the participants, and all of them signed the informed consent before participation, and were assured about the confidentiality and freedom to participate in the study. Data collection was performed after getting permission from the hospitals and units authorities.

3.2. Data Analysis

SPSS 17 software was employed to analyze the data using repeated measure analysis of variances, and pairwise comparison was conducted using the Bonferroni test. Also descriptive statistics were calculated for demographic variables. A P-value less than 0.05 were considered as significant.

4. Results

The mean age of the participants was 31.3 ± 10.8 years; 59.5% were male. In total, 26.2% of the participants had university educations, 28.6% had high school education, and others had lower education. The mean dialysis history of the participants was 1.5 ± 0.71 year, and 52.4% had less than one year of dialysis history. Also, 81% of the subjects routinely performed dialysis three times a week, and the others twice a week. The mean and standard deviation of interdialytic weight gain of participants was 3.64 ± 0.88 kg, before the education, and significantly decreased to 1.34 ± 0.61 kg, and 1.71 ± 0.72 kg one week, and one month after the education, respectively ($P = 0.001$). The mean weight gains were significantly lower after the education (*Table 1*). There were significant differences between all the three times weight gain in the post hoc analysis ($P = 0.001$) (*Table 2*). The mean and standard deviation of participants' systolic blood pressure was 139.7 ± 16.45 mmHg before the education, and significantly decreased to 129.6 ± 12.16 , and 129.5 ± 11.51 mmHg one week and one month after the education, respectively ($P = 0.001$) (*Table 1*). The Bonferroni test did not showed a significant difference between the mean of systolic pressures at one week, and one months after the education ($P = 0.93$), while these two measures were significantly different from the start of the study ($P = 0.001$) (*Table 2*). The mean and standard deviation of diastolic blood pressure of the participants was 81.4 ± 6.07 mmHg before the education and decreased to 79.7 ± 5.51 and 81.7 ± 5.27 mmHg one week, and one month after the education respectively. However, no statistically significant difference was observed between the diastolic blood pressure in the three phases ($P = 0.061$) (*Table 1*).

Table 1. The Comparison of Variables Before the Education, One Week and One Month After the Education

Variables	Before education, Mean \pm SD	1 week after education, Mean \pm SD	1 month after education, Mean \pm SD	P value
Weight gain	3.64 ± 0.88	1.34 ± 0.61	1.71 ± 0.72	0.001
Systolic BP	139.7 ± 16.45	129.6 ± 12.16	129.5 ± 11.51	0.001
Diastolic BP	81.4 ± 6.07	79.7 ± 5.51	81.7 ± 5.27	0.061

Table 2. Repeated Measure ANOVA Results–Pair-Wise Comparisons of the Effects of Treatment in Different Times

	t_1-t_2	Standard Error	P value	$t_1-t_3^a$	Standard Error	P value	$t_2-t_3^a$	Standard Error	P value
Weight gain	2.31	0.104	0.001	1.96	0.111	0.001	-0.371	0.078	0.001
Systolic BP	10.0	2.872	0.004	10.19	1.733	0.001	0.119	2.152	0.93
Diastolic BP	1.66	0.846	0.167	-0.357	1.042	1.0	-2.024	0.782	0.040

^a t_1 , before education; t_2 , one week after education; t_3 , one month after education

5. Discussion

The findings of this study revealed that small-group education leads to a decrease in the interdialytic weight gain between two hemodialysis sessions in one week, and one month after the education. Fluid intake in patients undergoing hemodialysis is important. Not paying attention to the daily fluid intake, causes fluid retention in body, which may result in generalized edema, dyspnea, cardiopulmonary problems, and weight gain (2). The study of Baraz et al., indicated that the mean of extra weight gained between two hemodialysis sessions significantly decreased after education (14). In addition, the results reported by Salehi et al., showed that the mean of extra weight gained between two hemodialysis sessions decreased after education (3). Rezaei Dehaghani and Shafaghi also reported that the mean weight was 59.84 Kg before the education, while it was 58.93 kg after the education, which shows a decrease in interdialysis weight gain (9). The results of the study conducted by Durose et al., imply that educations in patients undergoing hemodialysis about their dietary, and liquid consumption can limit the amount of their fluid intake which in turn would lead to their weight decrease (15). Moreover, the results of a study performed by Sharp et al., showed that cognitive-behavioral treatments can change the attitude, and behavior of patients, as a result, decrease the interdialytic weight gain (8). The present study showed that the systolic blood pressure of patients undergoing hemodialysis significantly decreased after the education. The participants' systolic pressure decreased in one week, and remained stable till the one month post education. Perhaps, the education program could effectively affect the patients' dietary behavior which in turn could affect their systolic blood pressure. However, changes in the diastolic blood pressure were not significant. Blood pressure in patients with chronic renal failure is higher than healthy persons, and lack of its proper control is assumed as the main factor for left ventricular hypertrophy, and the main cause of death due to cardiovascular disorders in these patients (16). Hypertension is very common in patients undergoing hemodialysis. Water and sodium retention play a pivotal role; moreover, increased activity of vasoconstrictive systems, and impaired vasodilatation, hyperparathyroid-

ism, erythropoietin, salt intake, and dialysis prescription have also a role in blood pressure regulation. The primary goal should be a strict control of body sodium content, and extracellular volume by performing an optimal renal replacement therapy (17). It has been reported that liquid and salt retention, increased the activity of renin angiotensin system, and the sympathetic nervous system, decreased the activity of bradykinin and prostaglandin E2, decreased the sensitivity of baroreceptors, and disorders in mediators such as nitrite oxide, endothelin and L-Arginine which are responsible for the high blood pressure in patients undergoing hemodialysis (18). The results of studies by Baraz et al., (14, 19) and Rezaei Dehaghani and Shafaghi (9) have also reported that patients' blood pressure significantly decreased after the education, which is in agreement with the results of the present study. The research performed by Rocco et al., indicated that if fluid retention (weight gain) between two hemodialysis sessions be more than 2.5 lit/day, the control of patients' blood pressure would be a difficult task (20). The results of a research performed by Leyboldt et al., also implied that interdialytic weight gain causes an increase in the systolic blood pressure, and this pressure would increase about 3 mmHg for each 1 kg extra weight (21). Although the systolic blood pressures of our participants significantly decreased after the intervention, however similar changes were not observed in their diastolic blood pressure. This finding was consistent with what has been reported by Baraz et al., (14, 19). Perhaps factors other than the fluids and dietary intake such as patients' age, and overall health condition, and vascular tonicity have impacts on the diastolic blood pressure. The results of this study indicated that small-group education was effective on decreasing and controlling interdialytic weight gain, and stabilizing the systolic blood pressure in patients undergoing hemodialysis. As the education programs are low cost and effective, it is suggested that nurses use this suitable procedure to help patients undergoing hemodialysis. It is suggested to perform other studies to examine other effects of small-group education, and also in a longer period of time to find out its long-term effects.

5.1. Study Limitations

Participants may receive some informal information about diet and fluid intake during the intervention, which may affect the results and was not under the control of the researchers.

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Authors' Contribution

Khodayar Oshvandi (KhO), and Maliheh Adineh Fath-Abadi (MAFA) were responsible for the study conception and design, MAFA performed the data collection. Gholam Hossian Falahi Nia participated in the study conception and design, and prepared the first draft of the paper. Hossein Mahjub performed the data analysis. KhO prepared the draft of the manuscript and supervised the study. Mohsen Adib Hajbaghery made critical revisions to the paper for important intellectual content.

Financial Disclosure

The authors declare that they have no competing interests.

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