INTRODUCTION

End-stage renal disease (ESRD) is a chronic disease with an annual incidence rate of 260 per million population (PMP). This incidence rate increases by about 6% each year (Harrison & Kasper 2005). There are more than 300,000 people with ESRD in the United States (Neighbors et al. 2007). The incidence rate of the disease in Iran has increased from 234.49 PMP in 2000 to 357.63 PMP in 2006. In 2008, there were 16,372 patients undergoing haemodialysis (HD) in Iran.

Patients undergoing HD suffer from different problems. One of the main difficulties for patients is adhering to reduced fluid allowances and weight control. Fluid adherence in patients undergoing HD is very important because if fluid allowances are not heeded, fluid accumulation in the body, which is manifested by generalised oedema, dyspnoea, cardiopulmonary disorders and weight gain, can occur.

Inter-dialytic weigh gain (IDWG), the weight gained between dialysis sessions, is the variable of choice for identifying fluid consumption in patients undergoing HD (Baraz Mohammadi & Boroumand 2005). IDWG results from the accumulation of water (consumed as pure water as well as water included in foods) and the inability of the kidneys to excrete excess fluid.

SUMMARY

Introduction: Haemodialysis is the most common form of medical management of patients affected by end-stage renal disease (ESRD). For haemodialysis to be successful, strict fluid and weight control is recommended. Education, in terms of self-care activities, is an important intervention for improving patients’ outcomes. A self-efficacy promotion training programme can be an effective strategy to bring about behavioural change. The aim of this study was to investigate the effect of a self-efficacy promotion training programme on the body weight changes in patients undergoing haemodialysis.

Methods: In this single-blind quasi-experimental study, we recruited a convenience sample of 63 patients undergoing haemodialysis from two teaching hospitals and allocated them randomly to the experimental or control group. Patients in the experimental group received a six-session self-efficacy promotion training programme while the control group received the routine care of the institute. Mean body weight gain and self-efficacy were measured before, immediately and two months after the study.

Findings: The groups did not differ significantly regarding the study variable before the study. However, immediately and two months after the study, the mean body weight gain and self-efficacy in the experimental group were significantly lower and higher, respectively, than the control group ($p < 0.05$).

Conclusion: Implementing a self-efficacy promotion training programme is effective in decreasing weight gain and increasing self-efficacy in patients undergoing haemodialysis. Nurses in haemodialysis units can use self-efficacy promotion training programmes as an effective intervention for improving patients’ outcomes.

KEY WORDS Education • End-stage renal disease • Haemodialysis • Self-efficacy • Weight changes
from the body. When the excess fluid is removed during HD, the resultant weight is called dry weight (Writers Group 2005). To determine the amount of fluid removed during HD, the post-HD weight is compared with the pre-HD weight. Each one-kilogram weight loss is equivalent to the elimination of 1,000 ml of fluid (Casey et al. 2002).

About 33–50% of patients undergoing HD have difficulty in adhering to the recommended fluid allowance. This makes the treatments ineffective and produces unpredictable complications and disorders (Tsay 2003). From a patient’s perspective, fluid allowances and weight control are among the most important concerns of patients undergoing HD (Richard 2006). Fluid retention, as a common problem in patients undergoing HD, increases the morbidity and mortality rate. Cardiovascular disease, secondary to high fluid intake and fluid retention, is one of the most important causes of mortality in patients undergoing HD (Lopez-Gomez et al. 2005; Stegmayr et al. 2006; Banerjee et al. 2007; Holmberg & Stegmayr 2009; Kalantar-Zadeh et al. 2009).

SELF-EFFICACY
Implementing interventions to improve concordance with fluid allowances can be critical (Tsay 2003). One of the most important interventions is patient education. Patient education is an important nursing role. Comprehensive education based on patients’ educational needs increases quality of care and decreases healthcare costs. Effective education helps patients live healthier and more independent (Potter & Perry 2007). One of the methods which can be utilised for effective education is a self-efficacy promotion training programme. Self-efficacy is a main construct of the social learning theory (Holloway & Watson 2002; Kohno et al. 2010). Self-efficacy is the judgment of an individual toward his own abilities (Cheraghi 2008) or his credence toward having the ability of performing special activities in certain situations (Perkins et al. 2009).

When implementing a self-efficacy promotion training programme, nurses need to know about the four main components or sources of self-efficacy. Bandura (1997), the developer of the self-efficacy theory, believed that our judgment about the level of self-efficacy depends on four information sources, including performance attainment, vicarious experience, verbal persuasion, and physiological feedback (Zinken et al. 2008). The performance attainment, the most influential source of self-efficacy, consists of successful experiences and experiences of successful performance of activities (Smith & Pizzi 2003). The second source, vicarious experience, is the observation of those people (models) who successfully perform an activity (Abdollahi 2005). The third source is verbal persuasion, which means persuading people that they have potentials for acquiring what they desire (Smith & Pizzi 2003). Physiological feedback, the fourth source of self-efficacy, is to exclude negative emotions such as fear, anxiety, unrest, as well as immorality, and to have positive emotions such as love, excitement, and competition.

Having the sense of self-efficacy can influence all aspects of one’s life (Schultz 1998). It also affects the perception of performance and adaptive behaviours as well as the selection of the setting and situations that people try to obtain (Staruser et al. 2002). Self-efficacy is the individual’s judgment about having the ability to perform special tasks and can enable people to engage in health-promoting behaviours and avoid health-threatening behaviours (Mazloumi et al. 2007). Based on this explanation, we can further define it as a constructive power which organises the individual’s cognitive, social, emotional and behavioural skills for effectively attaining different goals. Knowledge, skills, and previous achievements are not appropriate predictors of one’s future performance. Instead, it is the individual’s perception about his own abilities to perform future activities that affect his performance (Abdollahi 2005). Patient and family education is a safe and cost-effective intervention and can improve the quality of care. Therefore, implementing self-efficacy promotion programmes in chronic diseases is essential (Mohajer 2001).

Theoretically and clinically, patient education has many benefits. Moreover, a self-efficacy promotion training programme is an applied educational method, especially in patients with chronic diseases. As HD nurses are in continuous contact with the patients undergoing HD, they are in the best position to implement self-efficacy promotion programmes.

To the best of our knowledge, there is little evidence concerning the self-efficacy of patients undergoing HD in our country. Therefore, we conducted this study to investigate the effect of a self-efficacy promotion training programme on the body weight changes in patients undergoing HD.

METHODS
DESIGN
We conducted this single-blind quasi-experimental study in May and June 2010 in two teaching hospitals in Zanjan, Iran, affiliated to the Zanjan University of Medical Sciences.
PARTICIPANTS
There are only two hospitals with HD units and equipment in Zanjan province. All the patients in this province, who needed HD, are referred to these two teaching hospitals. The study population consisted of all the patients who were referred to these hospitals to undergo HD. All the patients meeting the inclusion criteria were eligible for the study.

The inclusion criteria were:
- age between 18 and 65 years (all the patients were younger than 65 years old);
- ability to speak the Persian or Turkish language;
- receiving HD for at least one year;
- having the physical ability to perform self-care activities;
- having three four-hour HD sessions per week;
- having no history of known mental disorder, congestive heart failure, and hepatic cirrhosis.

The exclusion criteria were:
- any incidence of acute emergencies during HD, which needed completion of HD and transferring to the intensive care or other units;
- any disturbance in the process of education;
- having no desire to participate in the study.

To prevent the contamination of the patients in the control group with the information of the experimental group, we assigned all the patients of one hospital to the experimental group and all the patients of the other hospital to the control group. As these two hospitals were affiliated to a same university, all the HD equipment, patient admission strategies, etc. were similar. We used the convenience sampling method for selecting the study sample.

PROCEDURE
During two subsequent weeks, we referred to the both hospitals and recorded the patients’ demographic characteristics, body weight (before and immediately after HD three times per week) and self-efficacy at the morning, evening and night shifts. We subtracted the before-dialysis body weight from the after-dialysis body weight to obtain the amount of body weight changes during HD. Accordingly we had three body weight change measures for each patient. Subsequently, the mean of these three measures was calculated. Hereafter, we use MBWG to refer to this mean body weight gain. The weighting condition was similar for all measurements, i.e. patients had light underwear and no shoes. We calibrated the digital weighing scales (manufactured by Burer Company, Germany) using a one-kilogram normal saline bottle.

We started the intervention at the beginning of the third week. The patients in the control group received no education. The educational intervention for the experimental group consisted of the educational materials pertaining to the four aforementioned components of self-efficacy. The educational materials related to the first component, i.e. performance attainment, included the anatomy and physiology of the kidney, complications of renal failure (RF), diet, fluid allowance and drug therapy. The content of the educational programme related to the second component, i.e. vicarious experience, and consisted of group discussion for role modelling and learning from other patients’ experiences (see Table 1). To implement the third component, we used persuasive strategies such as verbal encouragements and positive feedbacks. We emphasised to the patients that they have the potential to obtain what they want. We used the progressive muscle relaxation as a stress management strategy to meet the patients’ educational needs in the area of the fourth component, i.e. physiological feedback.

As the patients were not able to attend together before dialysis to receive the educational materials, we educated them in small groups (two or three patients in each group) using the face-to-face lecture method. We delivered the content of the educational programme half an hour before and during HD in six subsequent sessions. Totally, we educated four groups of three people and 10 groups of two people. Besides lecturing, we provided patients with a booklet containing a summary of the lecture and related pictures.
The intervention lasted for two weeks. The control group received the routine care of the HD unit in the control hospital. Immediately and two months after the completion of the education, we weighed the patients again, before and after three subsequent HD sessions and calculated MBWG for each patient. Moreover, the self-efficacy questionnaire was also completed immediately and two months after the last session of the education.

INSTRUMENT

The study instrument consisted of two parts: (1) the demographic questionnaire (age, gender, marital status, educational degree and housing) plus urinary output and (2) the strategies used by people to promote health questionnaire (SUPPH) to measure the level of self-efficacy. SUPPH included 29 items rated on a 1–5 likert scale. It consists of four subscales including adaptation (10 items), stress management (7 items), decision-making (6 items) and enjoying the life (6 items). The total score of the SUPPH questionnaire may vary between 29 and 145.

Tsay & Hong (2004) and Tsay & Holstead (2001) used this questionnaire and reported a reliability coefficient of 0.93. For determining the reliability of the questionnaire, we employed the test–retest method on the patients. The Pearson correlation coefficient was 0.95.

To develop the demographic questionnaires, we performed a comprehensive literature review. Thereafter, we asked 10 nursing faculties to check the validity of the developed questionnaires. As the patients were connected to the HD machine and therefore unable to move their hands freely, we completed the questionnaires using the interview method.

ETHICAL CONSIDERATIONS

Our institutional review board and ethical committee approved the study. We explained the aim and the method of the study for the patients. They were free to choose whether to participate, decline, or discontinue participation in our study. Moreover, we assured them about the confidentiality of their personal data. Finally, we asked them to read and sign the informed consent form.

DATA ANALYSIS

All data analyses were performed using SPSS 11.5 software. We used the Chi-square test to determine the difference between groups, the Fisher’s exact test for categorical variable and the independent samples t-test for continuous variables. The Exact Fisher test instead of a Chi-square test was applied when the expected values in any of the cells of a contingency table was below 5. We employed the repeated measures analysis of variance (ANOVA) test to determine the differences in MBWG and self-efficacy variables across the three assessment times in each group. The level of significance for all analyses was set at below 0.05 (p-value < 0.05) (Munro 2005).

FINDINGS

DEMOGRAPHIC CHARACTERISTICS

The total number of the patients undergoing HD in the two hospitals at the time of the study was 82 patients (42 patients in the intervention group and 40 patients in the control group). In the intervention hospital, four patients left the study as they did not want to participate, one patient transferred to the intensive care unit (ICU), one patient emigrated to another city, two patients were transplanted and two patients died. In the control group, these values were three, one, zero, four, and one, respectively. Sixty three patients remained in the study, 32 patients in the intervention and 31 patients in the control group. The results of the Chi-square test, the Fisher’s exact test and the independent samples t-test showed that there was no significant difference between the two groups regarding demographic variables (see Table 2).

MBWG AND SELF-EFFICACY

The results of the repeated measure ANOVA test showed that MBWG and self-efficacy in the intervention group differed significantly across the three measurement time points (p-value < 0.001). However, these differences were not significant in the control group (p-value = 0.57 and 0.64, respectively).

Using the independent samples t-test, we found no significant difference between the two groups regarding the self-efficacy and MBWG before implementing the intervention (p-value = 0.10 and 0.83, respectively). The results of the test also showed that immediately and two months after the completion of the education, MBWG in the experimental group was significantly lower than the control group (p-value = 0.027 and 0.020, respectively). Moreover, the results of this test showed similar results for the self-efficacy variable (p-value < 0.001; see Table 3 and Figure 1).
EFFECT OF A SELF-EFFICACY PROMOTION TRAINING PROGRAMME ON THE BODY WEIGHT CHANGES

DISCUSSION

Nursing knowledge is developing progressively by the undertaking and publication of well-conducted research. In addition to clinical studies, nurses are also interested in educational research. We examined the effect of a self-efficacy promotion training programme on the body weight changes in patients undergoing HD. We found no significant difference between the groups in terms of MBWG and self-efficacy before starting the intervention, which confirmed the equivalence of the groups. The results showed that MBWG immediately and two months after the completion of the education decreased significantly in the intervention group. However, this difference was not significant in the control group.

These findings suggest that the self-efficacy promotion training programme in this study has been effective in significantly decreasing MBWG in the intervention group. Tsay (2003) also found a significant decrease in MBWG in an experimental self-efficacy training programme group. However, he did not report any significant decrease in the control group in terms of MBWG (Tsay 2003). Barnett et al. (2008) also reported a significant decrease in MBWG two months after their intervention (Barnett et al. 2008). Molaison & Yadrick (2001) in a study entitled ‘stage of change and fluid intake in dialysis patients’ found that the patients’ knowledge of appropriate weight gain increased significantly after a 12-week educational intervention. However, neither the experimental nor the control group differed significantly in terms of fluid intake in their study.
They concluded that the 12-week educational intervention produces no behavioural change (Molaison & Yadrick 2003). Although, Molaison & Yadrick's (2001) educational intervention produces no behavioural change, our study did show differences in self-efficacy. This discrepancy may be because Molaison & Yadrick's (2001) study only provided nutritional educations, while our intervention was a comprehensive self-efficacy training programme. As self-efficacy theory is an applied behavioural theory, it is possible that this produces behaviour change and as a result, improves patients' abilities in performing self-care activities.

We also found a significant difference in terms of self-efficacy immediately and two months after the completion of the education compared with the baseline measurement in the intervention group. However, this difference was not significant in the control group. Sagawa et al. (2002) also suggested that using cognitive-behavioural interventions is effective in increasing the patients’ concordance with fluid recommendations (Sagawa et al. 2003). Richard (2006) also reported that self-care education for meeting the patients’ educational needs could increase the level of self-efficacy. He concluded that bedside education by nurses based on behavioural theories and educational standards effectively improves patients’ outcomes (Richard 2006). Self-efficacy training programmes also adhere strictly to these standards.

**IMPLICATIONS FOR PRACTICE**

In patient education programmes, nurses should pay special attention to self-efficacy. Nurses can educate patients about the recommended diet and fluid allowance and medications, but at the same time must pay attention to Bandura’s (1997) explanation of self-efficacy theory, and put these theories into practice. These include helping people identify successful strategies that have helped manage their condition in the past, identify and observe other people (role-models) who successfully manage their condition, giving people confidence in their ability to self-manage and to exclude negative emotions such as fear and anxiety.

**RECOMMENDATIONS**

Further research to investigate the effect of self-efficacy promotion on patients’ outcome in other chronic conditions such as diabetes mellitus, multiple sclerosis and cerebrovascular accidents for more extended periods is recommended.

**LIMITATIONS OF THE STUDY**

As we completed the questionnaires using the interview method, the presence of the researcher might affect the patients’ responses. Following-up the patients for more extended periods, i.e. 6 or 12 months, would lead to better understanding of the effect of the intervention on the intended outcomes; however, our Institutional Review Board approved the study to be completed in a three-month time period. One may think that more nurses are needed for implementing such caring interventions; however, we recommend the nurses to provide self-efficacy trainings while performing their routine caring activities.

**CONCLUSION**

The implementation of a self-efficacy promotion training programme can be effective in decreasing weight gain and increasing self-efficacy in patients undergoing haemodialysis. Nurses in haemodialysis units can use self-efficacy promotion training programmes as an effective intervention for improving patients’ outcomes.

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**CONFLICT OF INTEREST**

Authors declare no conflict of interest.

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