The effects of a therapeutic patient education program on the self-care of a patient undergoing hemodialysis

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Abstract

Objective: Hemodialysis (HD) can increase risks of health problems, such as fluid and electrolyte imbalances, malnutrition, and sepsis. Self-care is essential to help patients in maintaining fluid balances, enhancing compliance with treatment regimens, and managing psychological problems resulting from HD. Therapeutic patient education (TPE) programs represent an effective nursing intervention to improve patient self-care.

Methods: This is a case report analyzing effects of TPE on self-care in a patient lacking self-care and undergoing HD. The TPE program consisted of five sessions: assessment, motivation, awareness, education and training, and evaluation. The self-care agency scale (SCAS) was used for patient assessment, and program materials were adjusted according to patient needs identified during assessment. Evaluation focused on improving patient knowledge, SCAS score, and interdialytic weight gain (IDWG).

Results: The TPE program increased the patient’s SCAS score by 26%, an IDWG score improvement within the desired limit of 3%–5% of his dry weight was observed, and he was more knowledgeable about each education topic.

Conclusion: TPE is an effective method for increasing the self-care of patients undergoing HD. Our findings suggest that nurses should use TPE programs to improve self-care, enhance treatment compliance, and improve psychosocial well-being among end-stage renal disease (ESRD) patients undergoing HD. Quasi-experimental studies to explore effects of TPE programs on self-care among ESRD patients undergoing HD are required.

Keywords: ESRD, Hemodialysis, IDWG, Indonesia, Nursing Care, Self-care, Therapeutic Patient Education

Introduction

The only treatments for end-stage renal disease (ESRD) are renal transplantation and renal replacement therapy. Renal replacement therapy is classified as peritoneal dialysis) or hemodialysis (HD)¹. HD is the most common therapy used in Indonesia (78%)².

HD, a complex renal replacement strategy, is performed in combination with fluid restriction, diet modification, and pharmacotherapy³. Pharmacotherapy and diet modification help patients to overcome metabolic and chemical changes during the interdialysis period¹.

Patient compliance with treatment plays an important role in patient outcome. Patient nonadherence to fluid restriction and diet modification is associated with disability⁴. Nonadherence is also associated with prolonged dialysis time, which can lead to hypertension, pitting edema, pulmonary edema, congestive heart failure, and high mortality rates⁵. A prolonged dialysis time increases the duration of on-physiologival fluid removal, which can lead to unstable hemodynamics and the initiation of systemic inflammation, thus increasing the risks of mortality due to cardiac disability⁶. Treatment nonadherence among patients undergoing HD is also related to depression and increased illness perception⁷.

HD is also associated with frequent hospitalization. The most common causes of hospitalization in patients undergoing HD are fluid and electrolyte imbalances⁸. In addition, malnutrition such as decreased albumin levels, anemia, and decreased body mass index (BMI), are common causes of hospitalization⁹. Hospitalization is also caused by infection during vascular access, which can lead to sepsis¹⁰.
Self-care is effective in reducing hospitalization and treatment nonadherence. Some studies found that self-care, such as fluid restriction and vascular access care, can reduce morbidity associated with treatment nonadherence\(^1\), and self-care has also been associated with improved physical health and quality of life\(^12\). Self-care is also closely linked with the enhancement of interdialytic weight gain (IDWG), an indicator of fluid intake adherence\(^1,13\).

Self-care among patients undergoing HD can be evaluated using IDWG assessments and the self-care agency scale (SCAS). IDWG charts are used to monitor patients’ fluid and sodium intake\(^14\). It is commonly used for fluid restriction management\(^3\). Recently, some studies used IDWG as a clinical indicator of self-care improvement\(^3\). Conversely, SCAS is a screening tool that is specifically designed to evaluate self-care activity for patients undergoing HD\(^19\). Healthcare providers can use SCAS to identify areas of self-care requiring enhancement, thereby allowing them to design self-care improvement programs that mesh with patients’ needs.

Self-care can be enhanced through structured education programs. In patients with chronic kidney disease, especially those undergoing HD, structured education plays a significant role in improving self-care\(^16\). Structured education may also improve compliance with HD management including fluid restriction\(^1\). Structured education and coaching interventions have a positive relationship with increased self-care among patients undergoing HD\(^19\).

Therapeutic patient education (TPE) programs represent one type of structured education methods. The education materials are designed on the basis of patients’ interests and needs. The method used was demonstration and discussion. Thus, it was assumed that TPE would increase patients’ self-care ability. This study analyzed the effectiveness of TPE in enhancing self-care in a patient undergoing HD.

**Methods**

This case report study involved a patient with ESRD who was undergoing HD. The study evaluated the effects of TPE on self-care for this patient. Nursing care encompassed five sessions of a TPE program comprising assessment, motivation, awareness, education and training, and evaluation sessions. The patient assessment was performed using SCAS. The program materials were then adjusted on the basis of the patient’s needs identified during the assessment. The evaluation focused on improving patient knowledge, the SCAS score, and IDWG.

**Results**

The study subject was a 46-year-old male patient who had completed five sessions of HD. He was admitted to the hospital with complaints of nausea and vomiting. He also had eating problems.

Figure 1 presents the health history of the patient. He was diagnosed with diabetes mellitus in 2009 and hypertension in 2014. He developed diabetic retinopathy in 2014, resulting in vision impairment. During his previous hospitalization, he experienced pitting edema in both limbs and shortness of breath. His physician initiated HD accordingly.

The patient’s laboratory results were as follows: procalcitonin = 39.03 (high, a marker of bacterial sepsis), magnesium = 1.98 mg/dL (normal), hemoglobin = 8.3 g/dL (low), MCH = 29.0 pg/dL (microcytic anemia), leukocytes = 19,800 U/L, thrombocytes = 192,000 mg/dL, urea = 106 mg/dL, creatinine = 9.2, and eGFR = 6.1 mL/m²/1.73 m².

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<th>2009</th>
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<td>Eye operation</td>
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<td>Hypertension</td>
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**Figure 1. Disease prognosis**

DM, diabetes mellitus; CKD, chronic kidney disease; ESRD, end-stage renal disease; HD, hemodialysis

The patient’s vital signs were as follows: blood pressure = 173/104 mmHg (hypertension), pulse = 95 beats/min with weak regular pulsation, respiratory rate = 17 times/min, and temperature = 37.8°C. The patient complained of shortness of breath (Borg Dyspnea Scale = 4 [light]) and palpitation when moving his body.

The results of physical examination revealed some abnormalities. The patient had anemic sclera and dry mouth. Despite normal S1 and S2 heart sounds on cardiac examination, the patient reported heart palpitations. Lung sounds were vesicular throughout both lung fields. The patient complained of epigastric pain and nausea during the abdominal assessment. Skin turgor was decreased, and there was phlebitis on the lower right arm.

The patient’s weight decreased over the last 3 months from 88 to 66 kg. His height was 168 cm. His BMI was 23.4 (normal). His fluid intake was less than 600 ml/day. His IDWG 3 days before the assessment was 1.2 kg (<3% of dry weight).

The assessment of the patient’s characteristics illustrated that both the patient and his wife attended the university. They had high compliance with the treatment program, as evidenced by the success of the diabetic diet program. However, the patient was extremely dependent on his wife.

HD was a new treatment for the patient. Despite his compliance with fluid restriction, the patient had insufficient knowledge regarding fluid monitoring and other self-care activities related to HD. His SCAS score was 28, meaning that he had little to no knowledge and
ability regarding vascular access assessment as well as pulse, blood pressure, and daily weight monitoring. The patient also rarely felt alive, and he had problems concerning social function, roles, and employment after his illness.

Based on the assessment, the nurse concluded that the patient had self-care deficits related to HD care. The main data supporting this determination included the SCAS assessment, which revealed the patient’s inability and lack of knowledge concerning fluid status, pulse, blood pressure, IDWG, and vascular access monitoring. The patient was not knowledgeable regarding the purpose and function of weight measurement before and after HD. The patient also exhibited little understanding about self-care activities related to HD. In addition, the patient’s SCAS score revealed his social problems. His Barthel Index score was 20, meaning that he was partially dependent.

The indicators of successful interventions were as follows: (1) increased knowledge about HD management, (2) improved SCAS score, and (3) improved IDWG score.

The IDWG chart was divided into 3 zones: red, yellow, and orange. Red means that the patient’s IDWG score reached ≥5% of his dry weight, indicating a need to seek advice from healthcare providers and evaluate weekly fluid intake. Yellow denoted that the patient’s IDWG score approached 5% of his dry weight, indicating a need to intensively monitor fluid intake and evaluate the logbook. Orange means that the patient’s IDWG score was <3% of his dry weight, indicating a risk of malnutrition and the need to seek advice from healthcare providers.

**Implementation and Evaluation**

The aforementioned chart presented the TPE program performed by the patient, which consisted of five sessions, namely assessment, motivation, awareness, discussion and demonstration, and evaluation. The TPE program was initiated with an assessment of the patient’s readiness. We also performed an assessment using SCAS to identify areas of self-care that needed to be improved as mentioned in a previous section (clinical presentation), followed by targeted interventions. During each intervention, the nurse always requested agreement from the patient regarding the time and goals of the session to maintain a professional relationship.

The second session was started by motivating the patient. Furthermore, the patient was pushed to increase positive activities at home and maintain his social life. In this session, the goals were helping the patient regain his sense of life and improve his psychosocial condition. Improvement of the patient’s psychosocial condition could lead to improvement of his physical condition. Moreover, this improves the patient’s quality of life. The second session sought to create awareness. After conducting a motivation session, we explained the definition and importance of monitoring fluid status, vascular access, and vital signs. This was performed to create awareness for the patient and his family that HD must be accompanied by daily monitoring to prevent comorbidities associated with HD.

The third session focused on training and education regarding monitoring of fluids (intake, output, and balance) and IDWG using the IDWG chart and logbook. The patient appeared enthusiastic when discussing IDWG. This utilized chart was developed by Qiao et al.14 with modifications, namely the IDWG monitoring chart with complaint columns. The IDWG chart allowed the patient and his wife to see the IDWG data during each HD session and observe progress regarding IDWG every month, and the chart format made it easier to assess progress.

The logbook (Figure 3) was used to monitor daily outputs and inputs regarding meals and fluids for the patient. The logbook also contained daily measurements of fluid balance, daily weight, and the patient’s perceived condition. This logbook can provide information about the history of the patient during the interdialytic period. Thus, it can be used for evaluation and consultation when the patient visits his healthcare provider. The patient could also link the results from the logbooks to the IDWG charts, allowing him to evaluate his consumption patterns, complaints, and the resulting effects on the IDWG results. For example, with a water intake of 700 mL/day, the patient’s IDWG score remained in the green zone, indicating good fluid balance, and the patient had no complaints. Although the findings can be discussed with healthcare personnel, it appeared that the patient had achieved the target water intake.

The fourth session focused on training the patient to monitor blood pressure, pulse, and symptoms of electrolyte imbalance such as hypotension and hypernatremia. The patient also was educated regarding how to monitor daily weight gain.

In the fifth session, the patient was trained to monitor and maintain vascular access. In this section, we also educated the patient about possible infections that could threaten vascular access. In addition, we also trained the patient and his wife to monitor signs and symptoms of infection.
After the intervention was completed, the nurse evaluated the provided nursing care via a formative evaluation that assessed the patient’s knowledge and skills enhancement based on the materials of each session. The second evaluation was a summative evaluation that included SCAS and IDWG. The summative evaluation was performed 2 weeks after the intervention.

The formative evaluation revealed improvements in knowledge and skills related to self-care for the patient. The intervention increased the SCAS score from 28 to 41 (26% improvement). The implication of this improvement is that self-care was improved regarding the areas requiring improvement based on the SCAS results. These improvements included the ability of the patient to monitor blood pressure, pulse, fluid intake, and weight, as well monitor vascular access, enjoy life, and overcome social issues. The average IDWG in the two periods of dialysis was 2 kg. This means that the patient IDWG range was within the targeted limit (3%–5% of dry weight). This indicates that the TPE program successfully increased the patient’s self-care ability.

Discussion

The TPE program consisted of assessment, motivation, awareness, discussion and training, and evaluation sessions. The purpose of the assessment was to help the nurse identify the patient’s needs, allowing the nurse to design a program based on the patient’s needs and interests. This program also allowed the patient to participate in his treatment plan. Designing materials with relevance to adults has an important role in adult engagement with the education plan19. Adult learners tend to receive information better when the material is related to their current condition20. In addition, in the context of adult learning, involving the learner in material design increases the likelihood of success21.

In the TPE program, we used discussion and practice methods to deliver the material. These methods are suitable for an adult learner. This is based on the results of a study in Romania demonstrating that the most effective methods involve through interactive teaching-learning and practical skill teaching22.

Increased self-care through education is consistent with previous research indicating that education and motivation can increase the self-care of patients undergoing HD14. Other studies also illustrated that structured education can improve declining social function in patients undergoing HD11. This was also consistent with the results of a study in China that improving the client’s ability to perform fluid monitoring is associated with improved client compliance and improved patient satisfaction and strength to live14.

Increased self-care for our patient was also followed by an IDWG value corresponding to the desired limit of 3%–5% of the patient’s dry weight. This result was consistent with previous studies illustrating that self-care enhancement through an education program increased the IDWG to within the desired limits13. Other studies have also mentioned that self-care enhancement was positively correlated with improvement of IDWG22.

The findings of the study demonstrated that several factors were associated with the success of the TPE program. In our patient, TPE improved the patient’s self-care because of the health literacy of the patient and his wife. The results of previous reviews also found that our patient has high curiosity and a desire to be healthy. The success of an education program is determined by the material in accordance with the conditions and desires of the patient23.

The patient’s level of education also affects the success of a self-care improvement program, as the education level influences the ability to the patient to manage information24. Another study found that greater education attainment helps patients to understand health education and instructions25. This was consistent with our findings, as our patient held a bachelor’s degree, further supporting the hypothesis that the education level influences the success of TPE programs.

Social support and the educational level of the spouse also play important roles in the success of TPE. Our patient had excellent social support from his wife, who also held a bachelor’s degree. Knowledge and social support have positive effects on an individual’s self-care24. A study in the USA also found that the wife’s educational level has a positive effect on the husband’s health because of shared resources in marriage26.

Conclusions

HD is a complex treatment for patients with ESRD. This requires a high level of self-care to prevent poor outcomes. The TPE program effectively increased the self-care of our patient. We recommend that nurses, who have a significant role in maintaining the bio-psychosocial health of the patients, use TPE programs to increase...
patient’s self-care. The TPE program also indirectly improved the patient’s outcome. We further suggest additional studies of TPE programs to improve self-care among patients with ESRD who are undergoing HD with larger numbers of respondents or using a quasi-experimental approach.

Acknowledgment

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References