CHAPTER 6 CONCLUSION

6.0 Introduction

This study explored patient knowledge on fluid and salt control and examined the effectiveness of patient education on fluid compliance among haemodialysis patients. Two hundred and ninety one participants were recruited from five hospital-based dialysis centers in Klang Valley. Two hundred and sixty one patients participated in the educational intervention phase, giving a 90% response rate. The participants were divided into two groups based on their dialysis schedules. Participants whose dialysis was scheduled on Monday, Wednesday and Friday were designated as the experimental group, and those coming for dialysis on Tuesday, Thursday and Saturday as the control group. A survey using a structured questionnaire was conducted to assess patient knowledge on fluid and salt control in both groups. The control group received standard care while the experimental group received an additional educational intervention for three months. The educational intervention included a single individual teaching session (20-30 minutes), followed by twelve sessions of weekly reinforced teaching (10-15 minutes), a patient information booklet as well as reading material.

There were two categories of outcome measures – knowledge and fluid compliance. Knowledge was assessed pre and 3-month post intervention. The fluid compliance indicators were interdialytic weight gain (IDWG),mean pre-dialysis blood pressure (MPBP) and rate of fluid adherence (RFA) which were assessed pre- and post-intervention. The post intervention data was collected after the completion of the educational intervention phase at one-month, three-month and six-month intervals.

The results demonstrated a significant difference in knowledge and fluid compliance post intervention between the experimental and control groups. The findings also showed significant improvement in knowledge and fluid compliance post intervention within the experimental group. The experimental group had a higher percentage of good knowledge levels (score of 6.48±0.86.) than the control group (score of 5.70±1.08) post-intervention (83.1% *versus* 60.0 %, $p<0.05$). In the post-intervention phase, participants from the experimental group who had no sources of information on fluid and salt control prior to the intervention showed a higher percentage of increased knowledge scores (from 33.3% to 88.9%) as compared to patients who had received the information previously (from 62.8% to 82.8%). Therefore, the knowledge levels was shown to be associated with availability of information source post-intervention ($p<0.05$).

The mean total knowledge scores by demographic and clinical characteristics showed a significant difference ($p<0.05$) between the experimental and control group post-intervention. The highest knowledge scores in the experimental group were from the 40-50 year age group (6.76 ±0.83) while the highest knowledge scores in the control group was from the subgroup of patients taking more than 1 type of antihypertensive medication (6.12±1.20). The mean total knowledge scores for the experimental group (6.48±0.86) were higher than control group (5.70±1.08), and there was a significant difference ($p<0.001$) in knowledge scores post-intervention.

Patient education was effective in improving knowledge in the experimental group post-intervention. The experimental group (29.2%) showed higher percentages in knowledge improvement than the control group (9.5%).The odds ratio indicated that experimental group had nearly four times (OR 3.94, 95%CI 2.20 to 7.69) increase in the proportion of participants with knowledge improvement, compared to the control group. The multivariate logistic regression identified the number of antihypertensive medication taken as a significant predictor, as participants who were not on any antihypertensive medication showed higher knowledge improvement than those taking more than 1 type of antihypertensive medication.

Compared to the control group, the experimental group showed improvement in fluid compliance status on the IDWG and RFA, but no improvement on the MPBP. Comparison between the experimental and control groups showed a significant reduction of 0.35kg on the IDWG (95%CI 0.25 to 0.45) at the 6-month post-intervention phase (p<0.001). There was no reduction on the MPBP at 6-month post-intervention. There was a significant increment on the RFA at 6-monthpost-intervention.

Comparison of the compliance level on the IDWG and RFA showed significant difference between the experimental and control group across three different intervals post-intervention. However, there were no significant differences found for MPBP compliance levels between the experimental and control group. The IDWG compliance level increased from 45% to 65.5% at 3-month but decreased to 62.8% at 6-month post intervention in the experimental group. The MPBP compliance level was similar from

34.5% to 35.2 at 3-month but increased to 39.3% at 6-month post-intervention. The RFA compliance level increased from 17.2% to 62.1% at 1-month, and maintained at 50.3% at 3- and 6-month post-intervention for the experimental group.

Patient education was effective in improving compliance as measured using the IDWG and RFA, but not for MPBP compliance improvement in the experimental group. The IDWG shows nearly five times (OR 4.89, 95%CI 2.46 to 9.72) an increase in the proportion of patients with compliance improvement at 1-month,ten times (OR10.30, 95%CI 4.47 to 23.70) at 3-month,and seven times the compliance improvement (OR= 6.95, 95%CI3.14 to 15.42) at 6-month.compared to control group. The MPBP compliance improvement was low with no significant improvement seen at 3-months (OR1.20, 95%CI 0.53 to 2.69) and 6-months (OR0.95, 95%CI 0.47 to 1.95)post-intervention as compared to the control group.

The RFA showed an increase of nearly eight times (OR7.94, 95%CI 4.02 to 15.68) in the proportion of patients with compliance improvement at 1-month,six times (OR 5.55, 95%CI 2.74 to 11.26)higher increment at 3-monthsand 6-months as compared to control group.

There were no significant factors associated with IDWG compliance improvement at 1-, 3- and 6-month post intervention for the experimental group. Factors associated with MPBP compliance improvement at 3-month post intervention was gender, but it was not a significant predictor. The multivariate logistic regression identified marital status as a significant predictor at 3-month, with single patients having lower compliance improvement as compared to widows/widowers. The significant factor associated with MPBP compliance improvement was duration of dialysis at 6-month post intervention, and no significant predictor was identified here.

Significant factors associated with RFA compliance improvement were the number of concurrent disease at 3- and 6-month post-intervention, while duration of dialysis was a significant factor 6-month post-intervention. The significant predictors for RFA compliance improvement were the duration of dialysis therapy, number of concurrent disease and number of antihypertensive medications at 3-month post-intervention.

6.1 Implications for practice

Our research results indicated that the educational intervention with individual teaching, reinforcement, encouragement and information booklets was effective in improving knowledge and fluid compliance among haemodialysis patients. Furthermore, results were found to be sustained for up to three months. The sustained effect of the developed educational program and information booklet after the educational intervention was completed indicated significantly better efficacy than the use of conventional unstructured patient education.

Knowledge deficits are an important barrier to noncompliance; education programs are among the important strategies that can be used to increase patient knowledge to improve compliance and maximize treatment adequacy. Education must thus form an integral part of daily care in dialysis units. As nurses provide direct care and often maintain the closest contact with patients, they are in a good position to influence positive fluid compliance behavior among haemodialysis patients. There is a need to adequately educate patients on dialysis therapy, particularly on fluid restriction, interdialytic weight gain control, blood pressure control and adherence to daily recommended fluid intake.

Patient education is provided predominantly by nurses and yet the majority of patients have insufficient information on fluid and salt restrictions, leading to excessive interdialytic weight gain, uncontrolled blood pressure and nonadherence to fluid intake. Prior to this study, haemodialysis patients in our settings did receive information on fluid

and salt control; however this was largely unstructured and inconsistent. Inadequate documentation on teaching has also resulted in some patients missing these teaching sessions.

6.2 Recommendations

6.2.1 Practice

- An effective way to increase consistency of teaching and to optimize patient knowledge is to develop a structured teaching program. All new patients who start their dialysis therapy with the dialysis unit should be given a teaching session on fluid compliance by nurses aside from dietician advice on diet restrictions and modification. The teaching session should be conducted on a regular basis, ideally every month to strengthen knowledge retention. Records of teaching schedules and patient outcomes should be well documented while patient knowledge assessments should be evaluated every three months during clinic appointments.

- Guidelines on fluid compliance are needed in order for nurses to standardize the education process and promote effective dissemination of information. The current teaching plan as developed by the researcher can be utilized to provide the necessary information to patients. A patient information booklet developed in this study will be forwarded to the Malaysia Society of Nephrology to supplement the existing diet guidelines. The booklet contains information on renal disease, the purpose of dialysis, the complications of volume overload, fluid and salt control as well as weight control.

Patients are required to write down their dry weight (patient's weight after dialysis after removal of all extra fluid) and made to understand the importance of achieving dry weight. Maintaining dry weight is essential to control volume-dependent hypertension. Nurses also need to liase with patients on their daily fluid serving allowance. A daily fluid allowance of 500-750ml in addition to urine output from the previous day is usually sufficient to prevent excessive interdialytic weight gain in haemodialysis patients (Thomas, 2002). A review of the information should be done at least once a week to reinforce the information and the targeted behavior. Educational efforts are one of the strategies to improve patient compliance.

- Pre-dialysis education program should be an integral part of care for patients with end stage renal disease (Goovaerts *et al.* 2005). Through this program, information can be disseminated to early stage to patients and family members on the disease process, dialysis modalities, medications, diet and fluid restrictions. The purpose of this education program is to decrease myths on dialysis treatment, provide objective information on end stage renal disease treatment, promote self-care and help patients to accept and adapt to a dialysis lifestyle. This may promote treatment and fluid compliance. Findings showed younger patients and shorter dialysis therapy patients showed less compliance. Pre-dialysis education may prove to be most beneficial for this group of patients.

6.2.2 Education

- The role of dialysis nurses (as well as other health care personnel) as educators should be emphasized to promote compliance. In order to provide adequate and effective information, nurses themselves must have an adequate and wide range of knowledge on renal disease, dialysis therapy and other aspects related to haemodialysis. All nurses working in renal units should have specialist or post basic training in renal nursing. Courses should be organized continuously to keep nurses updated and abreast of their knowledge on renal disease and dialysis, with workshops on effective teaching to help nurses develop relevant skills. Nurses must seek to constantly update their knowledge through continued education and extend their role in health education to improve patient compliance.

- The interaction between nurses and patients is crucial to ensure patient education that is effective and efficient. Nephrology nurses especially those based in dialysis units often develop long lasting relationships with the same group of patients. Strategies like targeted attention, supervision, encouragement and support also help improve compliance (Batson & Schwartz, 2000). One to one interaction in delivering patient education is also more effective than group teaching although staffing is a limiting factor. Patient assignment methods can be used to overcome this problem. For example, if there are three dialysis session per day (with 20 patients per session) managed by four nurses, a single nurse should be able to take on up to five patients for individual teaching sessions. Teaching topics and patient responses should be

documented after each teaching session to assess outcomes, namely patients' knowledge improvement and fluid compliance.

6.2.3 Research

- The study findings showed that patient education had a positive effect on fluid compliance for the IDWG and RFA, but not on MPBP compliance. There is a need to identify factors that may contribute to noncompliance. The various factors can be broadly grouped into three categories, including psychological factors, socio-demographic factors and renal related issues.

i) Psychological factors:

The most common symptom among haemodialysis patients are depression, which may lead to a loss of interest and motivation, and possibly reduce compliance. Low tolerance for frustration, feelings of helplessness and loss of control are common among chronically ill individuals which may cause them to ignore restrictions in an attempt to regain control.

ii)Socio-demographic factors

The evidence shows that family support, younger age, and actively working patient are more compliant in their treatment.

iii) Renal related issues

Studies have documented a positive relationship between knowledge and compliance. A better understanding of treatment is more likely to ensure compliance. Staff behavior is also one of the factors that might influence compliance. Staff should not label patients as difficult or noncompliant as this will jeopardize the therapeutic relationship between staff and patient. Studies can be carried out to identify factors that contribute to noncompliance among haemodialysis patients.

- A similar study should be carried out in other dialysis centers, in both government and private hospital settings to assess patient knowledge on dialysis therapy as well as fluid restrictions and fluid compliance. The findings from various settings could be analyzed and the results submitted to the Malaysian Society of Nephrology for further action. A section on patient education may be added in the Clinical Practical Guidelines by the Ministry of Health with added information on haemodialysis treatment and its complications, fluid and salt restrictions, and weight control. However, this study has limitations that need to be addressed.

- A cluster randomized clinical trial is recommended to avoid contamination of the intervention within groups.

- Future study could be planned to evaluate the effectiveness after the implementation of the structured teaching programme as part of the nursing care of haemodialysis patients.

6.3 Limitations

- The limitation of this study was the use of convenience sampling in sample selection. The selection of samples based on availability of the sample. The findings might not be generalizable to all haemodialysis patients.

- There is some sample bias because the study recruited only patients who spoke English or Malay. However, as only two patients could not understand either English or the Malay Language from a total of 329 patients, this would not influence the results.

- Calibration of instrumentation played an important role in ensuring the accuracy of the result. The weighing machine was calibrated every time before the patient's weight was taken, but the automated blood pressure set was not calibrated regularly and no record of calibration was found. This might affect the results of the study.

- The retrieval of data from patients' records was handled singly by researcher, and the issue of validity and reliability was questionable. However, double-checking was done based on the standardized Patient Data Collection sheet(Appendix B) for each record to minimize the error and to ensure accuracy of the records

- The study should identify the noncompliant group and provide teaching, so that the findings reflect the actual effectiveness of the intervention.

- Although there was 4 times higher knowledge improved in the experimental group compare to control group, it may not indicate the knowledge improvement was clinically meaningful in view of a small difference in mean total knowledge scores pre and post intervention.

6.4 Summary

This study was carried out in dialysis units in public and teaching hospitals to assess fluid compliance among haemodialysis patients. An educational intervention was carried out on this group of patients, and their compliance were assessed again post intervention. The results indicated that educational intervention improved fluid compliance among this group of patients. The significant predictors for compliance improvement were number of concurrent disease, marital status, duration of dialysis therapy and number of antihypertensive medications.

Several implications have been drawn from this study. Nurses do give teaching to patients but due to the unstructured format used or inconsistent scheduling, some patients may miss the opportunity. Patients who did not receive the educational intervention were more likely to be non-compliant. In order to give effective teaching, nurses should empower themselves through continuing education before he/she can empower patients towards self-care and comply in their treatment.

Patient education is crucial to improve patient knowledge and fluid compliance, and a need to develop a patient information booklet was identified. The suggested education program will promote a consistent approach in teaching patients. As a result, patients are better educated, more compliant and assume more responsibility for their care. Having said that, further research is necessary to delineate clearly the psychosocial factors and correlates of fluid compliance among haemodialysis patients. This study also provides a

basis for conducting future studies. Replication and expanded studies are needed to show evidence that education is sorely responsible for improving fluid compliance.