

IMPACT OF A DESIGNED SELF-CARE PROGRAM ON SELECTED OUTCOMES AMONG PATIENTS UNDERGOING HEMODIALYSIS

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ABSTRACT

Self care program empowers patients to move toward their self-care abilities. The aim was to evaluate the effect of a designed self-care program on selected outcomes among patients undergoing hemodialysis. Quasi-experimental design was chosen to conduct study. Results, there were high statistical significant differences in the total mean scores of knowledge, Nottingham scale and total practice of the patients in the study group compared to the control group and compared to their own baseline in the post and follow up periods. Conclusion, the designed self care program was effective for improving patients' knowledge, practice and level of dependence of hemodialysis patients.

KEYWORDS: Hemodialysis, Knowledge, Nottingham DLA Scale, Practice, Self Care Program

INTRODUCTION

Hemodialysis is often started after symptoms or complications of chronic kidney disease (CKD5) develop. Hemodialysis patients are subjected to multiple physiological and psychosocial troubles and may be endangered with many potential losses and lifestyle alterations (Hinkle & Cheever, 2013). Hemodialysis alters the lifestyle of the patient & family; role change, difficulty for holding a job, economical burden of hemodialysis treatment and transportation difficulty to buy the medications and the amount of time required for dialysis and physician visits. Being chronically ill can create sense of less controlling of the disease (Ignatavicius, 2015; Ignatavicius, & Workman, 2013). Hemodialysis may improve quality of life and increase life expectancy but hemodialysis provides only about 10% of normal kidney function. The most common complications during hemodialysis are hypotension, cramps, nausea & vomiting, headache, chest pain and itching (Khodir, Alghateb, Okasha, & Shalaby, 2012).

Compliance with the diet, fluid limitations and taking medications should be appraised on regular basis (Serwan, 2012). Dietary, fluid and sodium restriction, medications, care of arteriovenous fistula, how to deal with complications and warning signs, worry about marriage, having children, the burden that patients bring to their families and the inability of patients to do the activities of daily living are all problems of the hemodialysis patients facing and need to learn about how to overcome these problems through adherence to a designed self care program. Patients having information about their disease, treatment and their needs, this information affect their self care practices and decrease exposure to hemodialysis complications (Hinkle, & Cheever, 2013; Sayyed, Ali, & Mohamed, 2012).

Stressors in the life of hemodialysis patient can comprise dietary and time restrictions, functional restrictions, loss of jobs, alterations in self-perception, changes in sexual desire, general and apparent effects of illness, drugs used for

treatment of the illness, and terror of death. The needs of CKD5 patients treated with hemodialysis include possible changes in a patient's marital status, familial, occupational, and societal perspectives; the everyday expenditure and worries related to the treatment and the disease, as well as hesitation, anxiety, and costs required while waiting for a transplant (Finnegan-John & Thomas, 2013).

Renal rehabilitation (RR) is coordinated, comprehensive interventions designed to maximize a renal patient's physical, psychological, and social functioning, adding together to stabilizing, decreasing, or even reversing the development of renal deterioration, thus decreasing morbidity and mortality. Renal rehabilitation includes five major ingredients: such as exercise training, diet and fluid management, medication and medical supervision, education, psychological and vocational counseling (Kallenbach, 2016; Kohzuki, 2013). Self-care involves performing some parts of physical care, monitoring symptoms and side effects, and following positive wellness behaviors. Self-care behaviors comprise maintaining appropriate diet, limit fluid intake, take medicine on regular basis, and adapt to stress. Inadequate self-care behaviors lead to severe complications (Rossi et al., 2014).

To be trained about methods of self-care efficiently, the patient must be motivated and attitude is positively encouraged. Patients have to make every effort for a high degree of independence through learning and presuming responsibility for self care as far as probable. The nurse is accountable for ongoing assessment of the patient and generally starts multidisciplinary care when required by the patient's physical, emotional, or social conditions. Patient and family education and ongoing support for self care are additional services presented by the nurse (Kallenbach, 2016).

In this regards and according to Orem's self care deficit theory; Orem emphasized the role of the patient to care for self. Self care refers to actions and attitudes which contribute to the maintenance of well-being and personal health and promote human development, in terms of health maintenance, self care is any activity of an individual, family or community, with the intention of improving or restoring health, or treating or preventing disease (Ziguras & Christopher, 2013). Patients who are better informed and more educated have better self care abilities (Mertig & Rita, 2012). The main issues involved with self care and the onset of illness are medically related such managing drug side effects, emotions and psychological issues, changes to lifestyle and knowledge acquisition to assist in self care (Taylor, Susan, Renpenning & Renpenning, 2011).

SIGNIFICANCE OF THE STUDY

Worldwide more than 30 in every 10,000 develop CKD5. In Egypt, according to statistics and medical records department at Cairo university hospital in the period from 2007 to 2011, the hemodialysis patients were increasing (11986, 14421, 14904, 17612 and 17800 respectively) (Khodir et al., 2012; Mahmoud et al, 2010).

Patients undergoing hemodialysis also experience problems depending on the blood flow rate and the rate of solutes removal such as hypotension, nausea, vomiting, muscle cramps, headache, and chest pain. Hemodialysis imposes an altered life style on the family and patient, as well, the time required for hemodialysis decrease time available for social activities (Taha, Abd Elaziz, & Farahat, 2013).

Self care program enables patients to improve their self-care abilities by making more knowledgeable decisions, and assuming greater personal responsibility for their health. To promote healthy behaviors, health concepts and self-care strategies must be delivered to the patients in an understandable, accessible, and cost-effective manner. The more

understanding the better making decisions about treatment and lifestyle changes that may help feeling better; both physically and emotionally (Sitzman & Eichelberger, 2011).

So it is important to develop self care program to assist those patients to reach improved selected clinical and laboratory outcomes, doing the activities of daily living independently and adhere to self care program instructions. In order to provide optimal care for patients undergoing hemodialysis, the present study therefore will be conducted to help them maintain effective self- care practice.

AIM OF THE STUDY

The aim of the current study was to evaluate the impact of a designed self-care program on selected outcomes among patients undergoing hemodialysis.

Research Hypotheses

To achieve the aim of the study, the following research hypotheses were postulated:

H₁: - Patients who will receive the designed self care program will have significant difference in the total knowledge mean score than patients who do not.

H₂: - Patients who will receive the designed self care program will have significant difference in the total practice mean score than patients who do not.

H₃: - Patients who will receive the designed self care program will have significant difference in the mean score of Nottingham Extended ADL Scale than patients who do not.

H₄: - Patients who will receive the designed self care program will experience complications related to disease and hemodialysis treatment less than patients who do not.

SUBJECTS AND METHODS

Design

Quasi-experimental design will be utilized in the current study. A quasi-experiment is an empirical study used to estimate the causal impact of an intervention on its target population.

Sample

A convenience sample of 60 patients with end stage renal disease undergoing maintenance hemodialysis who present in the hemodialysis unit were assigned randomly into two groups: study and control group (30 patients for each group).

The inclusion criteria were as following: (1) both sexes (2) adult patient \geq 18 year (3) patients with chronic kidney disease stage five on maintenance hemodialysis not less than six months (4) patients who are willing to participate in the study.

Setting

This study was conducted in hemodialysis unit at New Teaching University Hospital.

TOOLS FOR DATA COLLECTION

Four tools were used in this study for data collection:

Tool I: Semi-structured scheduled interviews which include the following parts:

Part 1

Sociodemographic data sheet (Age, gender, occupation, educational level, economical status, marital status, family size, etc.....)

Part 2: Patients' medical history it was developed by the researcher which includes:

Duration of illness, causes of renal failure, having other diseases, hospitalization during the past 6 months, family medical history, kidney transplantation history, duration of dialysis, type of vascular access, number of vascular access creation, occurrence of complication due to vascular access, the disease and dialysis treatment and problems pre, during and after dialysis session.

Part 3: Physiologic Data Measures

- It was measured by the researcher with standardized apparatus; it includes 5 items covering the following:
 1. Vital signs (temperature, pulse and blood pressure)
 2. Selected nutritional assessment parameters (body weight, height and body mass index).
 3. Peripheral edema.
 4. Local signs and symptoms of infection at vascular access site
- Laboratory indicators will be obtained from patient's file, it will include: BUN, creatinine and albumin, WBCs, hematocrit and hemoglobin, Serum electrolytes (Calcium, Potassium and Phosphorus).

Tool II: A Structured Self Care Interview - Questionnaire Tool

Self care interview - questionnaire to test the knowledge regarding self care in patients undergoing hemodialysis was constructed by the researcher after reviewing the relevant literature and supervision advice. It covers areas about adherence to diet, fluid restriction and medications, fistula care, having bleeding, edema, muscle cramps, hypertension, hypotension, itching, how to maintain healthy habits, dealing with some disease complications, and exercise.

Tool III: Nottingham Extended Adl Scale

The Nottingham Extended Activities of Daily Living (EADL) Scale is frequently used in clinical practice to assess patients' independence level in activities of daily living. The EADL assesses the level of activity actually performed by a patient. Twenty-two activities are considered, which fall into 4 subscales: mobility, kitchen, domestic, and leisure activities. Responses are recorded using 1 of 4 options (not at all = 0, with help = 1, on my own with difficulty = 2, on my own = 3).

Tool IV: Structured Observation (Checklists)

This tool was constructed by the researcher after reviewing the relevant literature and supervision advice to evaluate the practical domain pre and post implementation of the program it covers: A. weight measurement. B. Care of arteriovenous fistula. C. lower limb edema measurement. D. hand wash. E. breathing exercise and F. physical exercise. With scoring system (done = 1, not done = 0)

Scoring

Knowledge: For the knowledge items, a correct response was scored 1 and the incorrect zero. For each area of knowledge, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score, and means and standard deviations were computed. Knowledge was considered satisfactory if the percent score was 50% or more and unsatisfactory if less than 50%.

Practice: the items observed to be “done” were scored “1” and the items “not done” were scored “0”. For each area, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score, and means and standard deviations were computed. The practice was considered adequate if the percent score was 60% or more and inadequate if less than 60%.

Nottingham scale for daily life activities (DLA): Items were scored 0, 1 and 2 for fully independent, partially independent, and fully dependent, respectively, so that a higher score means more dependence. The scores of the items were summed-up and converted into a percent score. The subject was considered dependent if the percent score was 60% or more and independent if less than 60%.

VALIDITY AND RELIABILITY

Structured interview questionnaire tool and structured observations were given to a panel of 5 experts in the field of medical surgical nursing and renal dialysis physicians to obtain the agreement with the scope of items and to examine the extent to which the items reflect the concepts under study. A permission was taken to use the Nottingham extended activities of daily living and it was translated to Arabic language to be used and then retranslated to check its accuracy then reliability was done (Cronbach's Alpha. 0.62) and the reliability test used for structured observations (checklists) inter rater reliability test was 100% agreement.

ETHICAL CONSIDERATION

Ethical approval was obtained from the relevant ethics committee in the Faculty of Nursing, Cairo-University, to approve the research. An official permission from the directors of hemodialysis unit at New Teaching University Hospitals was also obtained. The aim and nature of the study was explained to all patients who participated in the study. The researcher was assured anonymity of subjects and confidentiality of data, and freedom to withdraw at any time during the study without affecting the care provided in hemodialysis. An informed written consent was obtained by the researcher from legible participants.

STATISTICAL ANALYSIS

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and medians for quantitative variables. Cronbach's alpha coefficient was calculated to assess the reliability of the Nottingham scale through its internal consistency. Quantitative continuous data were compared using the non-parametric Mann-Whitney test. Qualitative categorical variables were compared using chi-square test. Whenever the expected values in one or more of the cells in a 2x2 tables was less than 5, Fisher exact test was used instead. In larger than 2x2 cross-tables, no valid test could be applied whenever the expected value in 10% or more of the cells was less than 5.

Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones. In order to identify the independent predictors of the knowledge, practice, and Nottingham scores, multiple linear regression analysis was used after testing for normality, and homoscedasticity, and analysis of variance for the full regression models were done. Statistical significance was considered at p -value <0.05 .

RESULTS

Results of the present study will be presented in three parts; Sociodemographic part, Intervention part and Correlational part.

Sociodemographic Part. Figure (1) indicated that the majority of patients in the study group (86.7%) were less than 60 year with their mean age 51.0 ± 9.5 years and that (85.7%) in the control group were under 60 year with mean age 47.4 ± 9.9 years. Regarding gender, Figure (2) revealed that equal percentages 50% in the study group were males and females. While in the control group three quarters of patients (75%) were males. In relation to education Figure (3) illustrated that highest percentages of study group (70%) had university education while more than half of control group (57.1%) had basic to intermediate education, with statistically significant difference between study and control group $p = 0.01$. Concerning job status Figure (4) showed that the majority of the patients in study and control groups were employee (hold their jobs) (90%, 89.3%) respectively.

Intervention Part. Regarding blood tests table (1) revealed that the study group had an improvement in relation to hematocrit level. One third (33.3%) of patients in the pre intervention period had normal hematocrit level and two thirds (66.7%) in the post intervention period had normal hematocrit level while the majority of patients (93.3%) had normal hematocrit level in the follow up period. There was highly statistically significant difference among pre and post intervention and follow up periods regarding hematocrit level ($p < 0.001$). Also there were statistically significant difference ($p = 0.001$) among pre, post and follow up periods regarding hemoglobin level. The same table showed that there were no statistically significant difference in control group regarding WBCs, hematocrit and hemoglobin levels.

As regard total knowledge in the study and control group throughout intervention figure (5) illustrated that the minority of patients (13.3%) had satisfactory total knowledge in pre-intervention period while 100% of patients in the study group had satisfactory level in post and follow up periods, with highly statistically significant difference among pre, post and follow up periods. ($p < 0.001$)

In relation to total practice, figure (6) showed that no one in the study group had adequate practice in pre intervention period while 100% of patients were had adequate practice in post and follow up periods with highly statistically significant difference among pre, post and follow up periods regarding total practice ($p < 0.001$) and that patients in control group had no statistically significant differences in pre intervention, post intervention and follow up periods regarding total practice.

Concerning Nottingham scale of daily life activities, figure (7) revealed that there was an obvious improvement in the performance of patients in the study group; in pre intervention period only 30% of patients were independent and in post intervention period 50% were independent while two thirds 66.7% of patients in the follow up period were independent. There was statistically significant difference among pre, post and follow up periods regarding dependency level ($p = 0.02$). It was noted that there was decline in dependency level of patients in the control group in pre, post and

follow up phases (25%, 7.1% and 10.7%) respectively.

Correlational Part. Table (2) clarified that the intervention was the only factor that affect positively the knowledge score in the study group regardless age, gender, education, income, duration of hemodialysis and previous graft variables with percentage of 32%. (r- Square=0.32)

Table (3) revealed that knowledge score in the study group affect positively on the Nottingham DLAs, and that age affect negatively the Nottingham DLAs, also that female gender affect negatively the Nottingham DLAs and that intervention affect positively the Nottingham DLAs, regardless education, income, duration of hemodialysis and previous graft variables with 20% (r- Square=0.20).

Table (4) showed that in the study group, knowledge score and the intervention affect positively the practice score and that duration of dialysis affects practice score negatively with 85% regardless age, gender, education, income and previous graft variables (r- Square = 0.85).

Regarding hemoglobin level table (5) indicated that the intervention was the only variable that affects positively hemoglobin level throughout intervention in the study group with 6% (r- Square = 0.06) regardless age, gender, education, duration of hemodialysis and previous graft variables.

DISCUSSIONS

Patients under hemodialysis to be engaged in self-care activities necessitate continuous education on self-care and adaptation to the disease in order to dependency troubles gets condensed. Some researches in this field showed that training in self care to hemodialysis patients can lessen the patients' physical problems and enhance the quality of their life and reduce dependency (Hinkle & Cheever, 2013). Hemodialysis patients are subjected to multiple physiological and psychosocial problems and may be threatened with many potential losses; lifestyle changes, facing many challenges and constantly urge to learn about how to overcome these problems through adherence to a designed self care program.

Concerning the characteristics of patients in the present study, it was noted that the majority of patients in study and control groups were under age of 60 years with mean age 51.0 ± 9.5 and 47.4 ± 9.9 respectively, These findings were supported by (Rahimi, Gharib, Beyramijam, & Naseri, 2014) who found that the mean age for intervention group and control group were 47.46 ± 9.77 and 49.55 ± 9.88 respectively. Another study by (Dewar, Soyibo, & Barton, 2012) found that the mean age for the studied sample, male and female were 51.9 years and 47.6 years respectively.

According to the present study findings found that male were three quarters of control group and equal percentage in study group these results agree with most of studies and review of literature which found that chronic renal failure is more prevalent in males than females (Hecking et al, 2014; Kimmel, Fwu & Eggers, 2013; Sarhan, Iman, Kamel & Cherry, 2015). Also (Dewar, et al., 2012) found that of the total participants, 54.5% were male and 45.5% female.

In relation to patients' education in the present study it was found that more than two thirds of patients in study group had university education and that more than half of patients in control group had Basic/intermediate education. This result comes in line with (Li, Jiang, & Lin, 2014) who found that 44.4% of studied sample were graduated from high school. The results contradicted with (Seyyedrasooli, Parvan, Rahmani, & Rahimi, 2013) who reported that 10.5% only of intervention group had higher education.

(Chilcot, Wellsted, & Farrington, 2011) found that patients with chronic renal failure, are reported encompassing high levels of fatigue and are often unable to hold in normal daily activities. Aspects that may add to fatigue in dialysis patients include anemia, malnutrition, inflammation, depression and/or sleep disorders. All these aspects can negatively affect a person's aptitude to work. Lack of keeping job is possible for working age in hemodialysis individuals. In center hemodialysis also affect working condition of hemodialysis patients because it usually requires three sessions per week, typically during the work day, with each session lasting 3 to 4 hours. In the present study findings it was noted that the majority of patients in both study and control groups were working. These findings were contradicted with (Li et al., 2014; Muehrer et al., 2011) who told that the majority of patients in their studies were not working.

In relation to blood tests results throughout intervention, the present study findings revealed that there were significant differences between pre, post and follow up periods in hemoglobin and hematocrit in the study group and also between study and control groups. These results were in agreement with (Moattari, Ebrahimi, Sharifi, & Rouzbeh, 2012) who showed that no significant difference between the intervention and control groups, with the exception of hemoglobin and hematocrit which were significantly higher in the experimental group. This means that the self care program had a positive effect on increasing hemoglobin and hematocrit levels due to following the dietary instructions provided in the self care program.

Increasing the knowledge and consciousness of hemodialysis patients must comprise a cornerstone of therapy and an integral part of nursing responsibilities_(Poorgholami, Javadpour, Saadatmand, & Jahromi, 2016). The present study results confirm the first hypothesis which stated that patients who received the designed self care program had significant difference in the total knowledge mean score than patients in control group who did not receive the designed self care program. The current study findings revealed that patients in both study and control groups had limited knowledge related to dietary and fluid regimen, fatigue management, skin care, fistula care and medication and infection control before the intervention. This is in congruence with (Mohsen, Mohammed, Riad, & Atia, 2013) who reported that the majority of patients on hemodialysis had a limited level of knowledge about their condition in pre intervention period but after implementation of intervention program in the present study, the knowledge of the patients in the study group showed improvements, compared to the control group and compared to their own baseline.

What is more, the mean knowledge scores among patients in the study group increased immediately after the program, and decreased slightly in the follow-up phase. Pre, post intervention and follow up total knowledge mean scores were 28.1 ± 19.9 , 92.9 ± 9.0 and 89.3 ± 13.7 respectively. The decreased mean score in the follow up phase might emphasize that the patients started to forget, this means that the patients needed to be reminded all the time. No improvements could be noticed among patients in the control group throughout the study phases. These finding came in agreement with the result finding of (Ali et al., 2011) who revealed that significantly improved hemodialysis patients' knowledge of the diseases, dietary behaviors, after the implementation of teaching guidelines which has a positive effect on the studied patients' total knowledge regarding chronic renal failure with its management and self care behaviors, in comparison to only few subjects of the control groups who showed a little improvement in their knowledge. This means that the theoretical sessions that were given to the study group, were successful in improving their knowledge.

Decreasing of dependence on others in activities daily living and performing autonomous function becomes very important. In up to date caring science, enabling patients for reaching independence as much as possible has been proposed

as an integral ingredient of the caring duties of healthcare staff (Moghadam & Nasiri, 2014). The second research hypothesis also was accepted which declared that patients who received the designed self care program had significant difference in the mean score of Nottingham extended ADL scale than the patient in the control group who did not receive the designed self care program. The current study findings showed that patients in both study and control groups had nearly adequate ability for doing daily living activity in the pre intervention phase with Nottingham mean score 54.5 ± 20.3 and 53.4 ± 16.9 respectively figure (7). These results are congruent with (Moghadam & Nasiri, 2014) who stated that physical dependence was 48.97 ± 15.13 before intervention that reached 41 ± 14.44 after intervention. In the present study after implementation of intervention program, the Nottingham extended ADL score of the patients in the study group showed improvements, compared to the control group and compared to their own baseline.

Furthermore, the mean Nottingham extended ADL scores among patients in the study group increased immediately after the program, and continued to be high at the follow-up phase, pre, post intervention and follow up Nottingham extended ADL mean scores 54.5 ± 20.3 , 63.1 ± 16.9 and 71.0 ± 17.0 respectively. There was highly statistically significant variation between study and control groups. No progress could be noticed among patients in the control group. These finding came in line with the result finding of (Rahimi et al., 2014) who reported that self-care education is effective in improving the level of patient's activity and may be useful in reducing stress and anxiety in patients undergoing dialysis.

Also (Moghadam & Nasiri, 2014) results were congruent with the present study findings that showed positive effects self-care program on reducing the dependence level of hemodialysis patient. Similarly (Ghadam et al., 2016) reported that implementation of the self-care training program improves functionality of patients. Contradicting the current study findings (Ali et al., 2011) revealed that teaching guidelines had no effect on patients' activities performance status.

The third research hypothesis also recognized its purpose where as patients who received the designed self care program had significant difference in the total practice mean score than patients in control group who did not receive the designed self care program. The current study findings revealed that minimal percentages of patients in both study and control groups had less adequate performance of practice related to hand wash and measuring weight because these practices routinely done in the dialysis unit before and after the hemodialysis session especially measuring weight. Although patients did these two procedures (hand wash and measuring weight), they didn't reach the required level of adequate performance. The percentage of patients in the study group increased immediately after the program, and continued to be high at the follow-up phases. No improvements could be observed among patients in the control group. These findings came in agreement with the result finding of (Mohsen et al., 2013) who revealed that, the mean practice scores among patients in the study group verified an increasing trend throughout program stages, whereas the control group patients had a minimal increasing tendency of a very low scale. Another study by (Mansour, Youssef, Salameh, & Yaseen, 2014) reported that there was progress in patients' nutritional knowledge, practice and their compliance with dietary guidelines for the dialysis patient.

The present study findings revealed that the program intervention only had the effect on patients' knowledge score and that variables that could interfere with the effect of program intervention on knowledge (age, gender, education, income, duration of hemodialysis and previous graft failure) were excluded table (2). These results explain the powerful effect of the designed self care program on the patients' knowledge score. Also it was noticed that increased age of patients related to decreased scores of Nottingham DLAs scale. In this aspect (Rahimi et al., 2014) found that with increasing age,

their self care ability would be reduced. (Atashpeikar, Jalilazar, & Heidarzadeh, 2012) told that known physical troubles were lower in younger individuals and they had higher power and strength, they probably would have advanced self-care ability. Naturally, younger individuals have better physical status and can better care for themselves. The current findings also revealed female gender correlated with decreased Nottingham DLAs score. This result was congruent with (Hecking et al., 2014) who reported that Women's survival advantage was obviously weakened in hemodialysis patients. (Guerra-Guerrero, Sanhueza-Alvarado, & Caceres-Espina, 2012) revealed that men scored better than women on the symptoms, effects and mental functioning subscales.

But these findings were in contrast with (Moghadam & Nasiri, 2014) who reported that there was reduction in the mean total dependence in hemodialysis women was more than hemodialysis men and increase in independence of women is more than men. This result indicated the more influence probability of self-care programs in dependency and autonomy dimensions among hemodialysis women.

There were negative correlation between duration of dialysis treatment and practice score. These findings are in line with (Alkhan, 2015) who reported that patients who had dialysis less than 5 years had hepatitis C and the patients who had the dialysis more than 5 years had less ability of performance. (Wang & Chen, 2012) also reported that a significant relationship between the duration of hemodialysis treatment and the level of fatigue. In addition, fatigue is positively correlated with depression and negatively with quality of life.

The current study findings revealed that the program intervention (theoretical and practical parts) had a significant positive effect on improved hemoglobin level. The improved and corrected anemia leads to decreased fatigue level and consequently increases their ability for doing daily living activities and improving self care ability. These findings were in line with (Horigan, Schneider, Docherty, & Barroso, 2013; Mohsen, et al., 2013) who reported that there were improvements in the levels of hemoglobin, BUN, and creatinine levels among hemodialysis patients in the study group, leading to positively affecting their general health. This involves that the theoretical and practical sessions that were provided to the study group, were successful in improving their knowledge. Thus last research hypothesis was also confirmed by these present study findings throughout program phases and therefore, confirming all research hypotheses throughout program phases.

CONCLUSIONS

The current study concluded that the designed self care program was effective on improving patients' knowledge, practice and dependency level. All research hypotheses were accepted where as patients who received the designed self care program had significant differences in the total knowledge, practice and Nottingham mean scores as well as diminished complications related to disease and hemodialysis treatment than patients in the control group who did not receive the designed program. Duration of hemodialysis treatment correlated negatively with total practice score. The program intervention had positive significant effect on improving hemoglobin level.

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APPENDICES:

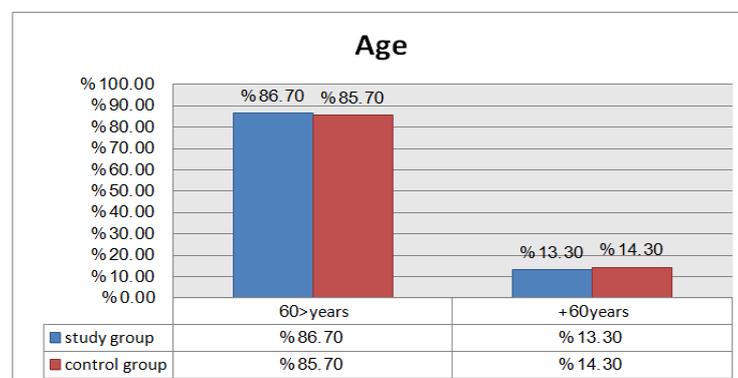


Figure 1: Patients' Age

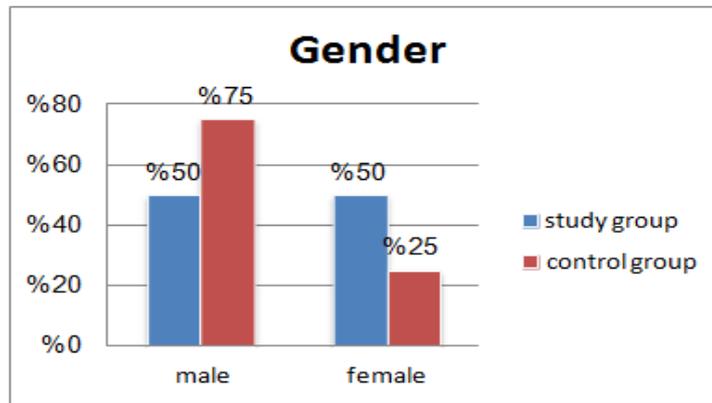


Figure 2: Patients' Gender

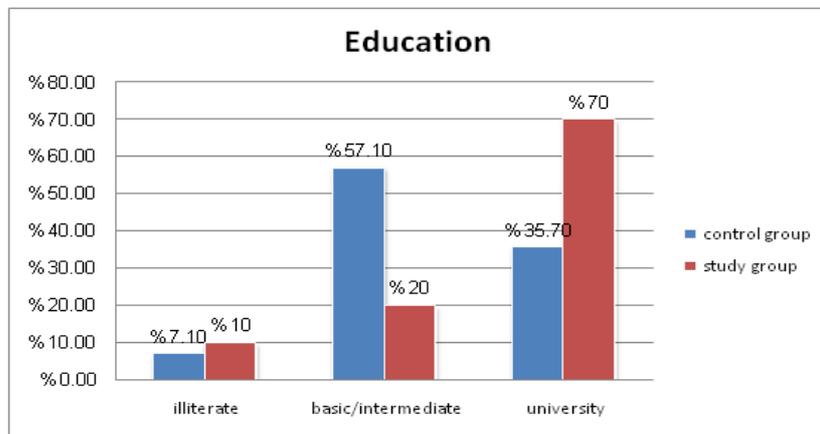


Figure 3: Patients' Education

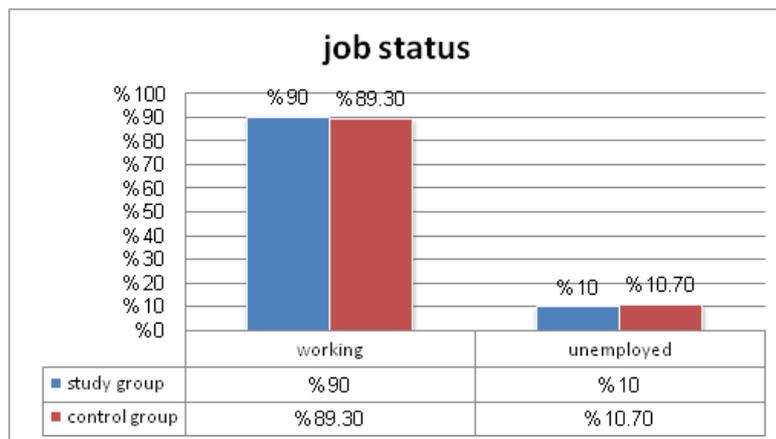
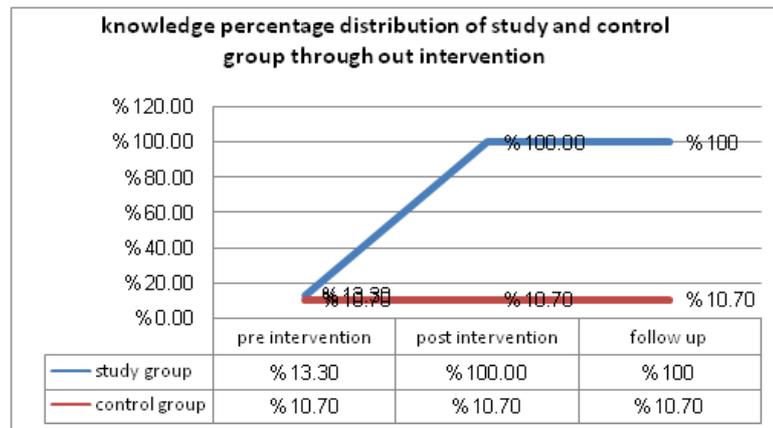


Figure 4: Patients' Employment

Table 1: Blood Tests of Patients in the Study and Control Groups throughout Intervention (N= 58)

Study Group	Time						X ² Test	P-Value
	Pre		Post		FU			
	No.	%	No.	%	No.	%		
WBCs:								
Normal	29	96.7	30	100.0	30	100.0		
Abnormal	1	3.3	0	0.0	0	0.0	--	--
Hematocrit:								
Normal	10	33.3	20	66.7	28	93.3		
Abnormal	20	66.7	10	33.3	2	6.7	23.66	<0.001*
Hemoglobin:								
Normal	3	10.0	3	10.0	13	43.3		
Abnormal	27	90.0	27	90.0	17	56.7	13.34	0.001*
CONTROL GROUP								
WBCs:								
Normal	27	96.4	24	85.7	24	85.7		
Abnormal	1	3.6	4	14.3	4	14.3	--	--
Hematocrit:								
Normal	12	42.9	16	57.1	11	39.3		
Abnormal	16	57.1	12	42.9	17	60.7	2.01	0.37
Hemoglobin:								
Normal	8	28.6	8	28.6	4	14.3		
Abnormal	20	71.4	20	71.4	24	85.7	2.10	0.35

(*) Statistically significant at $p < 0.05$ (--) test result not valid

**Figure 5: Knowledge Percentage throughout Intervention**

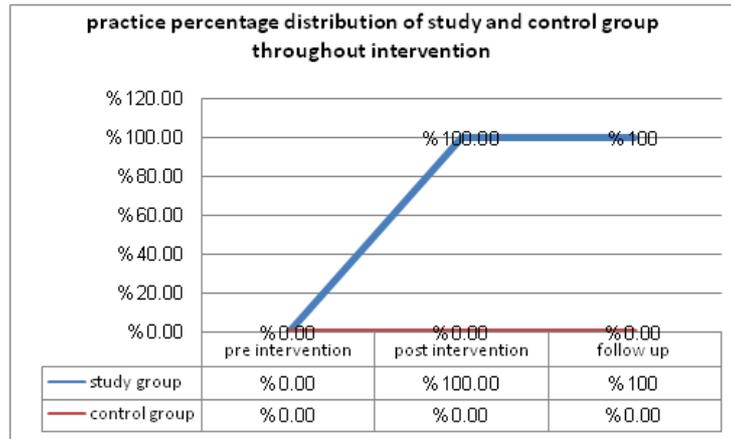


Figure 6: Practice Percentage throughout Intervention

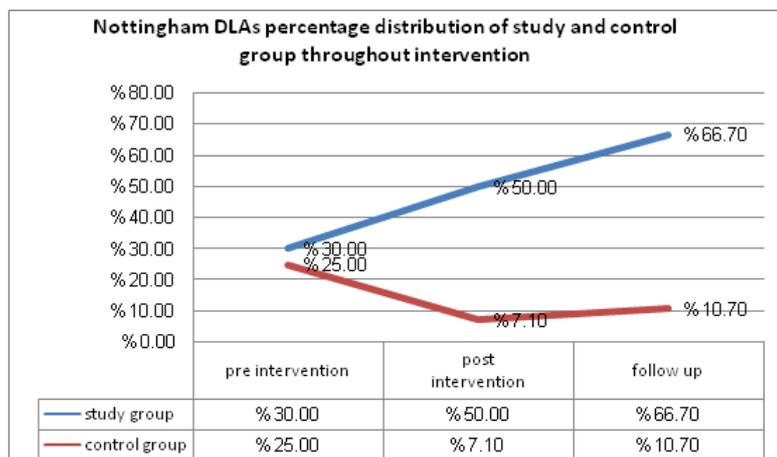


Figure 7: Nottingham DLAs Percentage throughout Intervention

Table 2: Best Fitting Multiple Linear Regression Model for the Knowledge Score (N= 58)

	Unstandardized Coefficients		Standardized Coefficients	T-Test	P-Value	95% Confidence Interval For B	
	B	Std. Error				Lower	Upper
Constant	104.85	6.03		17.391	<0.001	92.95	116.75
Intervention	34.76	3.85	0.57	9.021	<0.001	27.15	42.36

R-square=0.32

Model ANOVA: F=81.37, p<0.001

Variables entered and excluded: age, gender, education, income, duration of HD, previous graft

Table 3: Best Fitting Multiple Linear Regression Model for the Nottingham Score (N= 58)

	Unstandardized Coefficients		Standardized Coefficients	T-Test	P-Value	95% Confidence Interval For B	
	B	Std. Error				Lower	Upper
Constant	92.43	11.35		8.147	<0.001	70.03	114.83
Knowledge score	0.16	0.05	0.26	3.140	0.002	0.06	0.25
Age	-0.41	0.13	-0.22	-3.077	0.002	-0.68	-0.15
Female gender	-7.35	2.72	-0.20	-2.698	0.008	-12.72	-1.97
Intervention	8.52	3.18	0.23	2.682	0.008	2.25	14.79

R-square=0.20

Model ANOVA: F=10.43, p<0.001

Variables entered and excluded: education, income, duration of HD, previous graft

Table 4: Best Fitting Multiple Linear Regression Model for the Practice Score (N= 58)

	Unstandardized Coefficients		Standardized Coefficients	T-Test	P-Value	95% Confidence Interval For B	
	B	Std. Error				Lower	Upper
Constant	25.55	5.94		4.303	<0.001	13.83	37.27
Knowledge score	0.95	0.05	0.75	21.102	<0.001	0.86	1.04
Intervention	20.05	2.81	0.26	7.127	<0.001	14.49	25.60
Duration of dialysis	-0.72	0.28	-0.08	-2.559	0.011	-1.28	-0.16

R-square=0.85

Model ANOVA: F=339.05, p<0.001

Variables entered and excluded: age, gender, education, income, duration of HD, previous graft

Table 5: Best Fitting Multiple Linear Regression Model for the Hemoglobin Level (N= 58)

	Unstandardized Coefficients		Standardized Coefficients	t-Test	P-Value	95% Confidence Interval For B	
	B	Std. Error				Lower	Upper
Constant	10.52	0.27		38.969	<0.001	9.98	11.05
Intervention	0.43	0.12	0.25	3.450	0.001	0.18	0.68

R-square=0.06

Model ANOVA: F=11.90, p<0.001

Variables entered and excluded: age, gender, education, duration of HD, previous graft

