Effect of programmed nursing care in prevention of hemodialysis complications

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Abstract

Aims. This study was performed with the aim of assessing the effect of programmed nursing care on prevention of hemodialysis complications in under treatment patients in Shahid Beheshti University affiliated hospitals.

Methods. This research is a quasi-experimental one-group before and after study. 30 under hemodialysis patients were selected by non-random method. These 30 patients once were considered as control group and once as case group. Data collecting instrument consisted of two checklist and demographic data questionnaire. The nursing care protocol was supplied based on valid references and professional acceptance. Nursing care protocol contained preparing of hemodialysis machine, preparing of patient and machine connecting to patient, caring during hemodialysis (blood pressure control every hour and checking complications and their removal) and caring immediately after hemodialysis such as controlling and charting patient’s weight, blood pressure and hemorrhage after disconnecting patient from machine. Data was analyzed by Fisher exact test.

Results. There were significant differences at frequency of hypotension, hypertension, nausea and vomiting and muscles cramp after and before care performing stages.

Conclusion. The nurses decrease hemodialysis complications in patients by performing programmed nursing care.

Keywords: Hemodialysis, Programmed Nursing Care, Nursing Assessment

Introduction

Severe decrease of renal function, either acute or chronic, is a threat for life and for its treatment wastes and excess water should be eliminated and volume and combination of the body liquids should return to its normal state. For this aim, dialysis or in some cases of acute renal failure, artificial kidney can be used. If the function decrease is irrevocable, it is necessary to do chronic dialysis for life preservation [1].

Until mid years of 20th century, people suffering from renal insufficiency were helpless people who expected death. Abel invented the hemodialysis machine in 1913 for the first time [2]. First effective hemodialysis was performed by Berk keltef in 1944. Dr Belding Skribner invented a method that made frequent dialysis possible for renal patients in 1960 [3].

Chronic renal failure or ESRD (End Stage Renal Disease) is an irrevocable progressive renal disorder that removes the body power for balancing liquids and electrolytes and causes uremia and azotemia. The ESRD incidence has been increased 8% from 2004 to 2009. More than 280000 patients are dialyzed in United States (5%); more than 120000 people have transplanted kidney (28%) and more than 24000 patients use Peritoneal Dialysis (7%) [4].

Hemodialysis is the most common method for kidney replacement treatment in Iran. Number of permanent under dialysis patients is increasing every year [6]. More than 15000 under dialysis patients are dialyzed 3 times a week and according to the statistics in December 2008, 16600 homodialysis patients are dialyzed in 355 chronic homodialysis units. In spite of this, many people are not informed of their acute renal disease. Scientific statistics of the Health Ministry show the 20% annual growth of these patients in the country and 100 patients are added monthly. So, with serious worry about this growth, a remedy for prevention and decrease of patients should be sought from now [7].

Dialysis used for the treatment of patients suffering from severe edema (resistant to the drugs), hepatic coma, hyperkalemia and hypercalcemia, hypertension and uremia [4]. Survival is estimated about 10 years for 80% of the patients who have dialyzed from 15-19 years old [3]. Although hemodialysis can increase the life expectancy of patients, it can't change normal trend of the renal disease and cannot be replaced for renal function and the patient will be exposed to some problems and complications [4]. In Wingard’s study, 16720 patients were followed for 5 years and as
compared, the early mortality rate in under
dialysis patients in United States of America was
33% more than Europe (p<0.0001) and was three
times more than Japan (p<0.0001). This difference
was not explainable according to demographic
situations [8].

One of the chief causes of chronic under hemodialysis
patients’ death is atherosclerosis. This rate increases 2-4
times in Diabetic patients [9]. Triglyceride increase,
congestive heart failure, anemia and weakness are
some other complications. Hypotension, muscle
cramp, nausea and vomiting, dysrhythmias, air emboli
and etc. are some other complications which happen
through the treatment [8]. Studies have shown that 5-
20% of under dialysis patients encounter painful
involuntary muscle cramps, more than 10% of
patients encounter nausea and vomiting and 10-15% of
them encounter hypotension. Nurses are directly
responsible for care of under dialysis patients. They
are responsible for training the patients and their
families and support them for their self care [9].
Kering’s study evaluated the factors affecting under
hemodialysis patients’ life quality, biological function,
disease symptoms, general health level and personal
and environmental characteristics, and defined that
anxiety, depression and general health level have
certain effects on the life quality level [10]. Suitable
vascular access is the most basic method for decrease
of the disease, the hospitalization time, infection and
finally the mortality [11]. The patient and the dialysis
apparatus should be under supervision consistently, so
that different potential complications such as air
emboli, insufficient ultra filtration or more than
necessity filtration (hypotension, muscle cramps and
vomiting), blood leakage, pollution and circulating
liquid clotting can be detected.

The nurse plays an important role in control,
protection and training of the patient [4]. Events and
complications due to dialysis (especially sudden
events through dialysis that can cause dangers such as
death) can be prevented and patients’ lives can
increase with suitable cares through the treatment
period (with hemodialysis). This study was performed
to study the effect of programmed nursing cares on
prevention of complications through hemodialysis in
patients at hospitals affiliated to Shahid-Beheshti
University.

Methods

In this quasi-experimental before and after one-group
study, 30 patients referred to the hemodialysis wards
of two medical centers affiliated to Shahid-Beheshti
University were selected by available non random
method. At first, the control protocol was extracted
with use of nursing and medical reliable references
and was studied by specialists. It was judged again and
then was confirmed after using an experts group’s
reformatory comments. Then a checklist was designed
for measuring and documenting the complications.
Content validity method was used for confirmation of
the scientific validity. A draft was prepared after
studying valid publications with use of conducting and
consulting masters’ comments and was presented to
10 of the scientific board members of Tehran
universities and two nephrologists, and their points of
view and reforms was used. The checklist’s reliability
was confirmed by a Pilot study on 10 hemodialysis
patients. The hemodialysis apparatus was the same
(Gambro; Germany) for all patients. For the
performance stage start, after explaining the study
method for all patients, their informed satisfaction was
acquired. In the pre-test stage, the patients were
controlled according to usual care methods used in
hemodialysis wards. At first, patients were weighed
with a fixed scale calibrated according to the
manufacturer company’s manual and were connected
to the prepared apparatus. The apparatus heat was set
37°C and the apparatus liquid concentration rate was
set by engineers. The whole apparatus and the filter
were washed with the physiologic serum and then, the
excess air was taken. After the apparatus’ complete
connection and starting to work, patient’s blood
pressure was controlled (through the pulse). The
patient had no prohibition for eating within the time of
hemodialysis. The negative pressure was 0 at first and
then it was set according to the patient’s situation (for
the set time and its amount). When the patient
expressed discomfort or a complication occurred
within the time of dialysis, only physiologic serum
was infused and when the complication was removed,
the serum infusion finished. Complications and vital
signs registration was according to usual process of
the ward. In this stage, complications within the
dialysis time were controlled and documented.

In the next reference times, the programmed control
protocol was performed for patients by the following
method. The researcher weighed the patient and
patients suffering from hypertension were evaluated
for vital signs and the last dose of the anti-
hypertensive drug was documented (the blood
pressure was controlled in standing and sitting
position). The apparatus readiness was checked
according to the manufacturer company and reliable
sources’ manuals for the disinfection, the proper heat
and concentration of dialysate and was connected
according to proper scientific conditions. The positive and negative pressures resultant was set according to Total Membrane Pressure formula (TMP). The blood pressure was checked every hour during dialysis and the probable complications were documented. Food limitation was considered through dialysis. Weight, blood pressure and bleeding were controlled after disconnecting from the apparatus. It was performed according to the protocol for removal of any complication (in time of incidence).

The entrance criterions were age between 20-60 years old, continuous reference to the studied hemodialysis centers (3 times a week and each time 3.5-4 hours), 1-5 years history of hemodialysis, no history of diabetes, not using anti-hypertensive drugs within possible limits. All studied patients were negative for HBV antigen. Antigen tests were performed for all patients every three months and if the test was positive, the patient would be excluded. Exact Fischer test and Chi square test were used for data analysis.

Percentage of patients who suffered from vomiting was 16.7% while receiving usual nursing cares and was 0% in the programmed nursing cares. Fischer test showed that there is a significant difference between the two stages (before and after intervention) for vomiting (p<0.02). 50% of patients suffered from muscle cramps with usual nursing cares and 6.7% suffered from this complication while receiving programmed nursing cares. Chi square statistical test showed that there is a significant difference between the two stages (before and after intervention) for muscle cramps (p<0.001).

### Discussion

The patients’ life quality can be promoted and the complications of renal failure can decrease with sufficient and effective hemodialysis. With regard to importance of the dialysis efficiency, more studies are required for finding out the causes of the low dialysis efficiency. Studies are also required in order to access high efficiency hemodialysis [5].

Regarding hypotension during hemodialysis, the results showed that the programmed control method had a significant effect. Makhlough studied the relation between hypocaemia and hypotension during hemodialysis on 100 patients and showed that 28% of the patients suffered from hypotension during hemodialysis. 25% of the patients had low blood calcium levels. This decrease was 39.3% in patients with low blood pressure and the difference between the two groups was significant. Revision of the dialysate concentration was suggested in this research. The dialysate concentration setting was one of the controlled items in programmed nursing cares [12]. One of the other causes for hospitalization of the hemodialysis patients was the blood pressure and volume overloading. Results showed that there is a significant difference between the two stages before

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Table 1- The partial and absolute frequency of the complications before and after intervention in under dialysis patients

56.7% of the patients were male. 50% of the patients were in 21-40 age group and the other half were in 41-60 age group. 70% of the patients had 40-60 months dialysis history and in 90% each dialysis session lasted for 4 hours. 66.7% of the patients suffered from hypotension during hemodialysis with usual nursing cares (table 1); whereas, only 10% of the patients suffered from this complication while receiving programmed nursing cares. Chi square statistical test showed that there is a significant difference between the two groups (before and after intervention) for hypotension (p<0.001). 33.3% of study units suffered from nausea during hemodialysis with usual nursing cares and 3.3% suffered from this complication while receiving programmed nursing cares. Chi square statistical test showed that there is a significant difference between the two stages (before and after interventions) for nausea outbreaks (p<0.02).
and after intervention. Rahimi showed that the mean systolic and diastolic blood pressure before and after hemodialysis would decrease after performing the model. In other words, the insistent care model performance causes a significant difference in patients’ blood pressure [13].

Nausea and vomiting due to dialysis imbalance may happen because of CSF shift or hypotension due to the rapid liquid shift during dialysis [4]. Ahmadi showed that performance of this model leads to patients’ life quality increase and decreases the complications and the problem outbreaks [14]. The most important method for the nausea and vomiting control is preventing hypotension and the rapid liquid shift. Hemodialysis sends out the liquids through ultra filtration. Complications will happen because of high liquid loss or rapid liquid shift. These complications are hypotension, fatigue, chest pain, foot cramps, nausea and headache. These complications can be prevented by regulation and control of the liquid shift speed and amount [15].

Painful muscle cramp is usually a late dialysis complication and is because of the rapid liquid and electrolytes going out from the extracellular spaces [4]. The results showed that patients who receive the programmed care have a significant decrease of this complication. Yaaghoobi studied 35 under hemodialysis patients and showed that isometric and isotonic exercise program in these patients causes prevention and decrease of muscle cramps [16].

According to Oren’s view, whereas people have the ability of self care, nurses can bring about the possibility of under hemodialysis patients’ self care by encouraging and training them and cause a positive effect on under hemodialysis patients’ life quality and this shows the great importance of nursing cares in these patients [17].

Conclusion
Performance of programmed nursing cares decreases the hemodialysis complications.

Acknowledgment
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References