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Research Article

Effect of Computer-Assisted Instructions on Staff Nurses about Renal Dialysis for Chronic Renal Failure Patients

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I N F O

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A B S T R A C T

Background: The present study was conducted to assess the effect of computer-assisted instructions on the knowledge gain of the staff nurses on renal dialysis for chronic renal failure patients.

Methods: An experimental design was chosen with pre-test and post-test of the experimental and control group. The sample comprised 60 registered staff nurses divided into two groups - 30 in experimental group and 30 in control group. The tools used for conducting the study included demographic variables, and self-structured questionnaire to assess knowledge of experimental and control group. The experimental group was given computer-assisted instructions as an intervention and the control group was used only for comparison. The data was analysed with the help of descriptive and inferential statistics.

Result: The study clearly shows that there was a significant gain in the knowledge of staff nurses in experimental group with computer-assisted instructions regarding renal dialysis for chronic renal failure patients.

Conclusion: The staff nurses can be benefited by computer-assisted instructions to improve their knowledge and practice on renal dialysis for chronic renal failure patients and they can practice these interventions in clinical area in the future.

Keywords: Renal Dialysis, Chronic Renal Failure Patients, Computer-Assisted Instructions

Introduction

Chronic Renal Failure (CRF) is the most common medical problem among the old population. It is caused by a damaged kidney. CRF can be classified into five phases, depending on the glomerular filtration rate (GFR). Among these phases, phase 5 (GFR < 15 ml/min/1.73 m^2) is referred to as end-stage renal infection (ESRD).[1]

CRF is characterised by the accumulation of toxins and an abundance of water in the body. Dialysis is the preferred treatment for ESRD, which helps in the removal of accumulated toxins from the body. Patients undergoing dialysis have a higher probability of cardiovascular complications.[2] It also adversely affects the endothelial capacity and increases the risk of hypertension and heart issues. Due to these side effects of dialysis, it is of extreme importance that the doctors must inform the patients suffering from CRF about the risks involved with this process.[4]

Problem Statement

Assess the effect of computer-assisted instructions on the knowledge of staff nurses about renal dialysis for chronic renal failure patients in selected hospitals in Bhopal, (M.P.).

Objectives of the Study

The objectives of the study are as follows:

- To assess the knowledge of the staff nurses in the experimental and control group on renal dialysis for chronic renal failure patients
- To prepare a PowerPoint presentation as Computer-Assisted Instructions (CAI) programme on renal dialysis for chronic renal failure patients
- To assess the effects of Computer-Assisted Instructions (CAI) on knowledge of the experimental group regarding renal dialysis for chronic renal failure patients
- To compare the knowledge of experimental and control groups regarding renal dialysis for chronic renal failure patients

Null Hypothesis

H_1: There will be no significant difference in the knowledge score of staff nurses of the experimental group before and after computer-assisted instructions on renal dialysis for chronic renal failure patients.

H_2: There will be no significant difference in the knowledge score between the control and experimental groups after providing computer-assisted instructions to the experimental group regarding renal dialysis for chronic renal failure patients.

H_3: There will be no significant association of the knowledge scores of the experimental and control groups regarding renal dialysis for chronic renal failure patients with their selected demographic variables.

Methods

The study used an evaluative testing approach to determine the efficacy of computer-assisted instructions in enhancing the knowledge of staff nurses regarding dialysis for helping chronic renal failure patients.

Study Design

True experimental research design with pre-test and post-test of experimental and control groups.

Duration of the Study

The duration of the study was six weeks.

Setting

The study was conducted in selected hospitals in Bhopal, Madhya Pradesh.

Criteria for Sample Selection

Inclusion Criteria

- Staff nurses who were willing to participate in the study

Exclusion Criteria

- Staff Nurses who were absent at the time of the study

Statistical Analysis

Data were organised and evaluated to observe the knowledge of staff nurses regarding renal dialysis. Frequency, percentage, mean, and standard deviation were used to analyse the results. An unpaired t-test was used to find if there was any substantial difference in the knowledge scores of the experimental and control groups.

Ethical Clearance

After obtaining approval from the authority, an interview was scheduled to obtain the demographic and baseline data.

Independent Variable

PowerPoint display is the independent variable in this study, which provides computer-assisted teaching on renal dialysis.

Dependent Variable

In this study, knowledge is a dependent variable that depends on the provided computer-assisted instructions.

Demographic Variables

The demographic variables for the study include age, religion, academic qualification, and source of knowledge about renal dialysis.

Sample

The sample consisted of 60 staff nurses who fulfilled the inclusion criteria. Out of this, 30 were included in the experimental group, and 30 in the control group.

Scoring Procedure

Every question had four possible answers from which the sample had to select only one. The correct answer received a score of 01, while the incorrect answer was scored as zero. The scoring was interpreted as mentioned below:

- **Inadequate Knowledge:** Score less than or equal to 50%
- **Moderate Knowledge:** Score between 51-74%
- **Adequate Knowledge:** Score more than or equal to 75%

Intervention

The staff nurses of the experimental group were shown a 45-minute presentation (computer-assisted instructions-PPT), while the control group did not receive the intervention (computer-assisted instructions) and continued with their normal hospital routine.

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Method of Data Collection

The sample gave their informed written consent, and the authorities gave their permission to perform the analysis. The following phases were used to collect data:

Phase 1: A structured questionnaire consisting of 30 items was given to the staff nurses of both the groups-experimental and control, to determine their pre-test awareness score on renal dialysis for chronic renal failure patients.

Phase 2: The staff nurses of the experimental group participated in a 45-minute computer-assisted instruction session, while the control group's subjects continued with their daily hospital routine.

Phase 3: On the seventh day, both the experimental and control groups were given the same questionnaire to assess their post-test knowledge.

Result

Table 1, shows that in the experimental group, 13 (43.33%) staff nurses were between 21 and 25 years of age, 12 (40%) were between 26 and 30 years of age, and 5 (16.66%) were between 31 and 35 years of age. In the control group, majority of the staff nurses (18, 60%) were between 21 and 25 years of age, 10 (33.33%) were between 26 and 30 years of age, and 2 (6.66%) were between 31 and 35 years of age.

In the experimental group, majority of the participants (15, 50%) were Hindu, 02 (6.66%) were Muslim, and 13 (43.33%) were Christian. In the control group, majority of the staff nurses (15, 50%) were Hindu, 05 (16.66 %) were Muslim, and 10 (33.33 %) were Christian.

In the experimental group, majority (19, 63.33 %) of staff nurses had an experience of 1-3 years, 08 (26.66 %) had an experience of 4-6 years, and 03 (10%) had an experience of 7-9 years. The majority of participants (21, 70%) in the control group had 1-3 years of professional experience, 05 (16.66 %) had 4-6 years of experience, and 04 (13.33 %) had 7-9 years of experience.

Table 1.Frequency and percentage distribution of subjects as per age, religion, professional experience, educational qualification, socio-economic status, and source of knowledge

N = 60 (Experimental - 30 & Control - 30)

Characteristics	Category	Subjects' Groups			
		Experimental		Control	
		f	%	f	%
Age (in years)	21-25	13	43.33	18	60
	26-30	12	40	10	33.33
	31-35	05	16.66	02	6.66
Religion	Hindu	15	50	15	50
	Muslim	02	6.66	05	16.66
	Christian	13	43.33	10	33.33
Professional Experience (in years)	1-3	19	63.33	21	70
	4-6	08	26.66	05	16.66
	7-9	03	10	04	13.33
Educational Qualification	Diploma in Nursing	10	33.33	13	43.33
	BSc Nursing	15	50	14	46.66
	Post Basic BSc Nursing	05	16.66	03	10
	Any other	00	00	00	00
Institution where Experience was Gained	Govt hospital	07	23.33	06	20
	Private hospital	23	76.66	24	80
	Community primary health centres	00	00	00	00
Source of Knowledge	Newspapers and magazines	25	83.33	24	80
	Relatives	03	10	05	16.66
	CNE on renal dialysis	02	6.66	01	3.33

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Regarding educational qualifications, 10 (33%) participants in the experimental group had a Diploma in Nursing, 15 (50%) had a BSc Nursing degree, and 05 (16.66%) had done Post Basic BSc Nursing. In the control group, 13 (43.33%) volunteers had received a Diploma in Nursing, 14 (46.66 %) had a BSc Nursing degree, and 03 (10%) had done Post Basic BSc Nursing.

In terms of the institution where expertise was obtained, majority of the participants in the experimental group (23, 76.66%) were trained from private hospitals whereas only 23.3% of the participants were trained in government hospitals. In the control group, a total of 06 (20%) staff nurses were trained in government hospitals, while 24 (80%) were trained in private hospitals.

Out of the 30 participants in the experimental group, 25 (83.3%) had received information regarding renal dialysis from newspapers and magazines, 03 (10%) had received it from their families, and 02 (6.66%) had received it from CNE on dialysis. In the control group, 24 (80%) staff nurses learned about renal dialysis from newspapers and magazines, 05 (16.66%) from families, and 01 (3.33%) from CNE on dialysis.

Assessment of Knowledge Score

In the experimental group, majority of the staff nurses (24, 80%) had insufficient knowledge and 06 (20%) had moderate knowledge in the pre-test, whereas 04 (13.33%) participants had moderate knowledge and 26 (86.66%) had adequate knowledge in the post-test (Table 2 and Figure 1).

In the control group, majority of participants (23, 76.66%) had insufficient knowledge, and 07 (23.33%) had moderate knowledge in the pre-test, whereas 21 (70%) participants had insufficient knowledge, and 09 (30%) had moderate knowledge in the post-test (Table 2 and Figure 2).

Table 2.Frequency and percentage distribution of overall knowledge Score of experimental and control group

N = 60 (Experimental - 30 & Control - 30)

S. No.	Level of Knowledge	Experimental Group				Control Group			
		Pre-test		Post-test		Pre-test		Post-test	
		f	%	f	%	f	%	f	%
1.	Inadequate (< 50%)	24	80	-	-	23	76.606	21	70
2.	Moderate (51-75%)	06	20	04	13.33	07	23.303	09	30
3.	Adequate (> 75%)	-	-	26	86.606	-	-	-	-

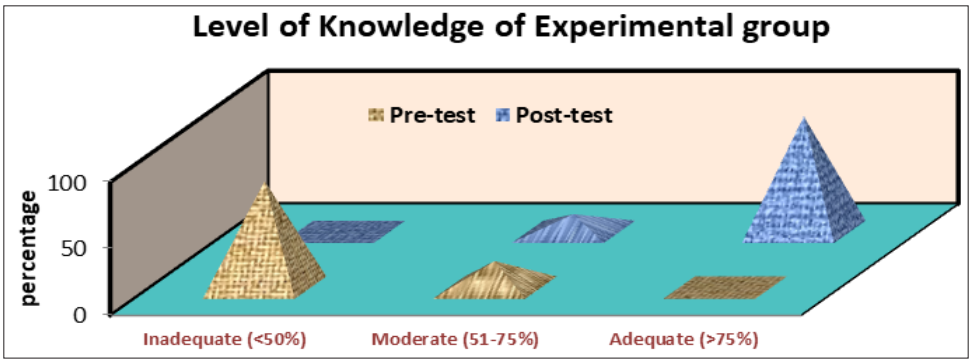

Figure 1.Level of knowledge of experimental group

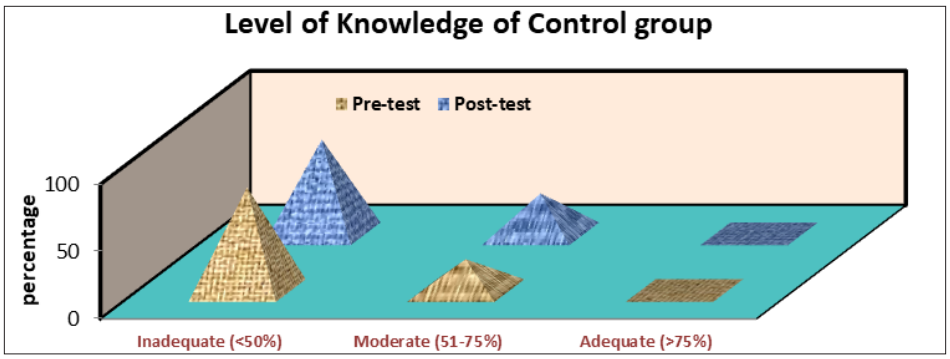

Figure 2.Level of knowledge of control group

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Table 3.Comparison of overall pre-test and post-test mean, standard deviation, mean difference, and paired – 't' value between experimental and control group

N = 60 (Experimental - 30 & Control - 30)

S. No.	Group	Mean		Standard Deviation		Mean Difference	Paired t -Test
		Pre-test	Post-test	Pre-test	Post-test		
1.	Experimental	11.712	22.122	1.2332	1.6	10.41	1.2 df-29
2.	Control	11.714	12.721	1.4	1.3	1.007	0.46818 df-29

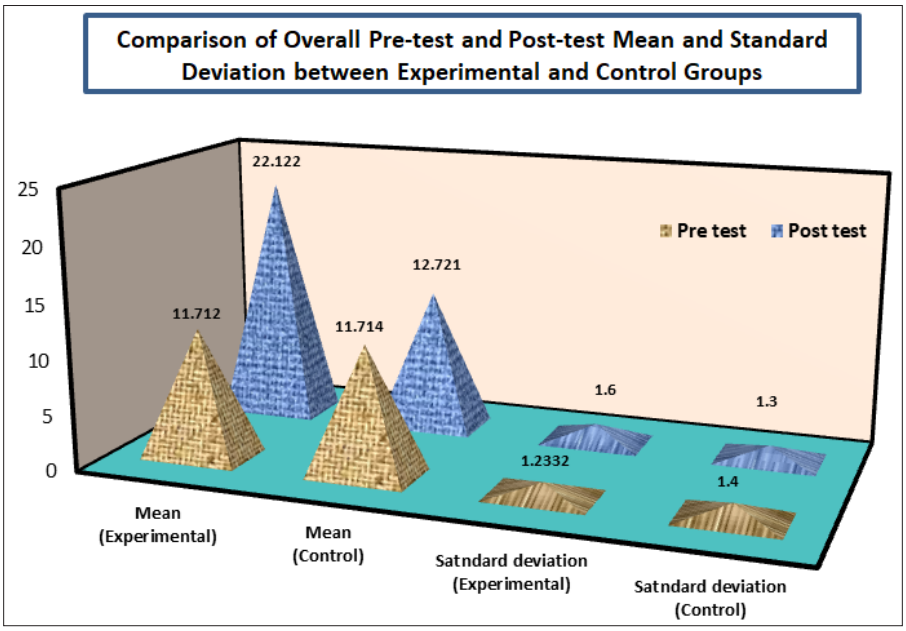

Figure 3.Comparison of overall pre-test and post-test mean and standard Deviation between experimental and control groups

Association of Post-test Knowledge of Experimental and Control Group with selected Demographic Variables

The association of post-test knowledge of the experimental and control groups with their selected demographic variables was done by chi-square test. Out of the many variables for the study, age, experience and the training institutes were found to be associated with knowledge.

Discussion

As shown in Table 2, the overall assessment of knowledge in the experimental group revealed that in the pre-test 80% of the staff nurses were found to have inadequate knowledge whereas 20% of the participants had moderate knowledge. However, after computer-assisted teaching, the overall score improved, with 13.33% of the participants having moderate knowledge and 86.66% having adequate knowledge. In the pre-test of the control group, it was found that 76.66% of staff nurses had inadequate knowledge, 23.33% had moderate knowledge, while none had adequate knowledge. Similarly, in the post-test of the control group, 70% of staff nurses had inadequate knowledge, 30% had moderate knowledge, and none had adequate knowledge.

As shown in Table 3 and Figure 3, the experimental group's post-test mean is 22.122, with a standard deviation of 1.6, while the control group's post-test mean is 12.721, with a standard deviation of 1.3. The t-value is 1.2. The substantial difference between the pre-test and post-test knowledge scores implies that the null hypothesis is dismissed as the Calculated Value (CV) is greater than the Table Value (TV) at 0.005 levels and 29 degrees.

This is supported by the study that was conducted to assess the effect of computer-assisted teaching on the knowledge gain of students on GCS with Coma patients. The study was conducted on 60 BSc Nursing 3rd year students divided into two groups of 30 (experimental and control). Computer-assisted teaching was provided as an intervention to the experimental group and the control group was used for comparison only. No intervention was provided to the control group. The study clearly revealed that there was a significant increase in the knowledge of students in experimental group with the intervention.[6] Thus computer-assisted teaching is very helpful in imparting knowledge to the subjects.

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Limitations

- The researcher had no control over the extraneous variables like source of information
- Sometimes selected staff nurses were not present due to night shift, so teaching had to be adjusted as per their timing

Conclusion

The study revealed that after computer-assisted teaching on the subject, awareness regarding renal dialysis among the staff nurses had improved. This can be used as a basis for including computer-assisted instructions in the curriculum to help staff nurses gain a better understanding of the subject.

Confidentiality of Data

The feedback forms secured by the staff nurses were kept confidential. Only the principal investigator had access to these documents.

Sources of Funding: Self

Conflict of Interest: None

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