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Research article

Effectiveness of repeated structured teaching programme on knowledge regarding fluid and dietary compliance and its effect on biochemical parameters and interdialysis weight gain among patients undergoing hemodialysis

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Abstract

The study conducted was aimed to assess the knowledge, effectiveness of structured teaching programme regarding fluid and dietary compliance and find an association between the knowledge score with biochemical parameters and inter-dialysis weight gain.

Methods and materials: The research design selected for the study was Quasi Experimental time series design with control group. The samples comprised of 60 patients selected by Non-probability purposive sampling technique and 30 samples each were allotted to experimental and control groups receiving hemodialysis. The pre-test and 3 times posttest knowledge scores were assessed using self - structured knowledge questionnaires. The teaching program was administered to the experimental group only, for 3 times. The weight (interdialysis) for both the experimental and the control groups were recorded. The biochemical parameters were also extracted from patient medical records.

Results: The mean percentage and SD of pre-test score for experimental group were 66.38% and 2.132 respectively. The mean percentage and SD of pre-test score for control group were 65.13% and 2.059 respectively. Experimental group after receiving repeated structured teaching, the mean percentage and SD for post-test 1, post-test 2 and post-test 3 were (84.71%, 2.368), (94.46%, 1.398) and (97.50%, 2.027) respectively. This illustrated a significant improvement in the knowledge. There was no significant association between pre-test knowledge scores of the respondents with selected demographic variables. There was no significant association between knowledge scores, interdialysis weight and biochemical parameters for experimental group. The r-ANOVA done for tests of between-subjects effects predicted a significant difference between the two groups, calculated $F(3,174)=87.158$, $P<0.001$.

Conclusion: The study revealed that inspite of highly effective Repeated Teaching Programme in improving the knowledge, the compliance regarding fluid and diet were lacking.

Key Words: Repeated structured teaching programme, Effectiveness, Knowledge, Patient receiving hemodialysis, Fluid and dietary compliance.

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1. Introduction

The kidney is one of the vital organs. Proper function of urinary system is essential to life. [1] Chronic renal failure is the progressive reduction of functioning of renal tissue rendering patient to patient total dependence on hemodialysis for the maintenance of the body function and to avoid uremia. In early stage of renal impairment, symptoms may be minimized through hemodialysis and regulation of diet, control of fluids intake and use of medication. Management is accomplished primarily with medication and diet therapy, although hemodialysis may also be needed to decrease the level of uremic waste products in the blood and to control electrolyte balance. [2]

A population screening study showed the prevalence of CRF in India in the year 2005 was 0.8%. The screening in New Delhi had involved 48 hospitals and 4712 subjects

participated in a blood biochemistry test. Mean age of the patients was 42.38±12.54 years, 56.16% were male and 37 patients were found to have chronic renal failure with a prevalence rate of 0.78%. If this data are applied to India's billion population there are about 7.85 million Chronic Renal Failure (CRF) patients in India. [3]

A cross-sectional study conducted in Princess Margaret Hospital, Hong Kong assessed information about the knowledge of dietary and fluid restrictions related to dialysis, health beliefs, personal and medical characteristics, and self-reported compliance. In addition, serum levels of potassium (K) and phosphate (PO_4) and interdialytic daily weight gain were retrieved from the medical records. Dietary and fluid compliance was observed in only 35.5% and 40.3% of the patients, respectively. No direct relationship was observed between dietary knowledge and any compliance measures.[4]

In Malaysia a cross-sectional study was conducted to determine the compliance behaviors among 188 patients undergoing hemodialysis. Compliance rates of dietary, fluid, medication and dialysis were 27.7%, 24.5%, 66.5% and 91%, respectively. Younger male, working patients and those with longer duration on hemodialysis were found more likely to be non-compliant. Lacks of adequate knowledge, inadequate self-efficacy skills, forgetfulness and financial constraints were the major perceived barriers towards better compliance to fluid, dietary, medication and dialysis respectively [5].

A randomized controlled study was conducted in aim to evaluate educational strategies related to diet in hyperphosphatemic patients with CKD. Educational strategies reduced phosphorus levels with an MD of -0.72 mg/dL (95% CI: -1.11 to -0.33, P < .01). Sensitivity analysis of trials with follow-up of <4 months did not show any benefit of the intervention, but educational intervention for ≥ 4 months showed an MD of -1.07 (95% CI: -1.49 to -0.64, P < .01). Calcium-phosphorus product level was improved in 227 evaluated patients from 5 trials with an MD of -5.22 mg(2)/dL(2) (95% CI: -9.48 to -0.98, P = .02, and I(2) = 58%).[6]

Summary

In the light of the above facts, lack of information is the most important factor contributing to noncompliance with therapeutic regimens, especially diet and fluid restrictions, which in turn may lead to further deterioration. Therefore, the needs for conducting research studies on these problems are recommended.

Objectives of the study

1) To assess the knowledge scores regarding fluid and dietary compliance of experimental and control group by conducting a pre-test.
2) To assess the effectiveness of structured teaching programme on knowledge scores of experimental and control group regarding fluid and dietary compliance by conducting a post-test at different points of time.
3) To find an association between the knowledge score with biochemical parameters and inter-dialysis weight gain.
4) To compare mean pre-test and repeated post-test knowledge scores fluid with dietary compliance between experimental group and control group.
5) To find an association between the knowledge scores regarding dietary and fluid compliance and the selected demographic variables.

2. Materials and Methods

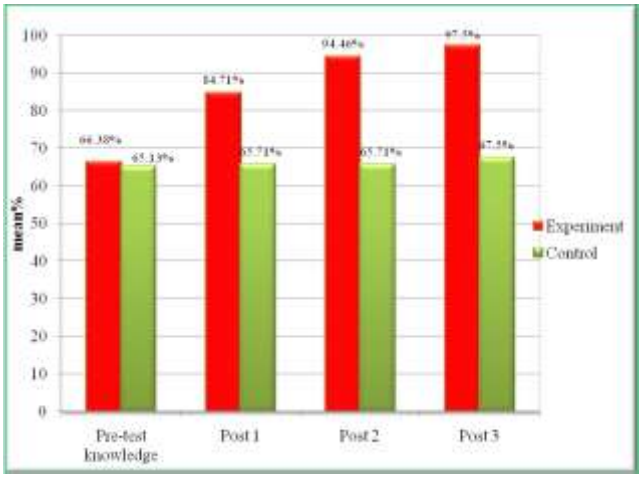
The research design selected for the present study was Quasi Experimental time series, with control group research design with Evaluative Approach. The samples comprised of 60 patients receiving hemodialysis in selected hospital, Bangalore. The samples were selected by Non probability purposive sampling technique and 30 samples were allotted to experimental and control group each. The pre-test was conducted using self-administered structured knowledge questionnaires, then repeated structured teaching program was conducted for three points only for the experimental group. Then a post-test was conducted using the same self-administered structured knowledge questionnaire for both the experimental and control group. The weight (interdialysis) for both the experimental and the control groups were recorded. The biochemical parameters were also extracted from patient medical records. Data were analyzed using descriptive (which includes mean, median, SD, frequency and percentage) and inferential (which includes (t-tests, r-ANOVA and Chi-square test) statistics and were represented in tables and graphs.

3. Results

Section I

Fig 1: Bar Diagram showing Findings related to assessment of knowledge among patients receiving hemodialysis of both experimental and control group regarding fluid and dietary compliance.

n=60



It can be inferred from the above table that respondents had inadequate knowledge regarding fluid and dietary

compliance during their pre-test and with repeated teaching, knowledge improved. Whereas in control group the respondent had inadequate knowledge regarding fluid and dietary compliance during pre-test and post-test.

Section II: Table No 1: Findings related to effectiveness of repeated structured teaching regarding fluid and dietary compliance for the experimental group.

n=30

Knowledge	Mean	S.D.	Source	Mauchly's Sphericity Assumed	Mean Sum of Square	df	f-Ratio	P-Value
Pre-Test	15.93	2.132	Type III Sum of Squares	567.34	189.115	3	87.518	P<0.001
Post 1	20.33	2.368						
Post 2	22.67	1.398						
Post 3	23.40	2.027						

A repeated measure of Analysis of Variance (r ANOVA) applied to measure the improvement in the knowledge regarding fluid and dietary compliance from pre-test through post-test have revealed that the Mauchly'ssphericity (testing equality of variances) at different time point were statistically significant (567.34). However, the ANOVA carried out by correcting the degree of freedom for appropriateness, the testing for equality of means from pre-test and different readings of three time point post-test suggests that the knowledge were statistically highly significant, calculated F (3,174) =87.158, P<0.001. There was significant difference between pre-test and three points post-test: post-test 1, post-test 2, post-test 3, indicating that there was a progressive improvement of knowledge among hemodialysis patient, due to administration of repeated structured teaching program regarding fluid and dietary compliance.

Section III: Table No 2: showing Comparison of Interdialysis Weight for Experimental and Control Group (student't'-Test)

n=60

Group		Pre test Pre dialysis Mean	Pre test Pre dialysis SD	Post test Post dialysis Mean	Post test Post dialysis SD	Post test Post dialysis Mean	Post test Post dialysis SD	't' value	Df	P value Inference
Experimental	VISIT 1	65.85	9.41	- -	- -	63.00	9.49	23.40	29	P<0.05*
	VISIT 2	- -	- -	65.45	9.06	62.57	9.10	45.84	29	P<0.05*
	VISIT 3	- -	- -	65.14	8.92	62.19	8.98	28.20	29	P<0.05*
	VISIT4	- -	- -	64.71	8.97	61.68	9.23	26.33	29	P<0.05*
Control	VISIT 1	65.63	6.53	- -	- -	62.60	6.48	14.11	29	P<0.05*
	VISIT 2	- -	- -	66.00	6.48	62.99	6.60	31.49	29	P<0.05*
	VISIT 3	- -	- -	66.29	6.58	63.00	6.64	43.71	29	P<0.05*
	VISIT4	- -	- -	66.25	6.59	62.82	6.56	31.69	29	P<0.05*

***is significant**

The data revealed that there was a relation or difference between pre-test and post –test weight of experimental group and control group. Therefore, the p-value inference reveals that the comparison of weight between pre-test and post –test weight of experimental and control groups is significant at (p<0.005).

Section IV: Table No 3: Correlation between Knowledge Scores, Biochemical Parameters and Interdialysis Weight of Experimental and Control Group

n=60

Correlations between knowledge and parameters		Karl Pearson 'r' Experimental	Karl Pearson 'r' Control	Inference
Biochemical Parameter	Serum creatinine	-0.069	0.115	NS
	Sodium	0.089	0.043	
	Urea	-0.172	0.250	
	Potassium	0.233	-0.037	
	Phosphorous	-0.159	-0.096	
Weight	VISIT I (Predialysis)	-0.283	-0.286	
	VISIT II (Predialysis)	-0.286	-0.300	
	VISIT III (Predialysis)	-0.285	-0.306	
	VISIT I V(Predialysis)	-0.288	-0.296	
	VISIT I (Postdialysis)	-0.272	-0.260	
	VISIT II (Postdialysis)	-0.284	-0.298	
	VISIT III(Postdialysis)	-0.303	-0.310	
	VISIT IV (Postdialysis)	-0.288	-0.298	

NS- not significant

The above data shows perfectly negative correlation between the knowledge scores, biochemical parameters and interdialysis weight. Therefore, this indicates that all the correlation is not significant.

Section V: Table 4: Association between knowledge scores with selected demographic variables experimental group

n=30

Demographic data		Knowledge Scale				
		Median and below		Above median		χ^2
		N	%	N	%	
Age	30-40	1	14.3	6	85.7	7.648 NS
	41-50	4	100.0	0	0.0	DF=3
	51-60	3	50.0	3	50.0	
	61 & above	7	53.8	6	46.2	
Sex	Male	8	47.1	9	52.9	0.136 NS
	Female	7	53.8	6	46.2	DF=1
	Secondary	5	62.5	3	37.5	DF=2
	Graduation	8	47.1	9	52.9	
	PG	2	40.0	3	60.0	
Religion	Hindu	9	52.9	8	47.1	2.150 NS
	Christian	5	45.5	6	54.5	DF=3
	Muslim	0	0.0	1	100.0	
	Others	1	100.0	0	0.0	
Occupation	Government servant	1	33.3	2	66.7	1.344 NS
	Private	4	40.0	6	60.0	DF=3
	Homemaker	5	62.5	3	37.5	
	Retired	5	55.6	4	44.4	
Dietary pattern	Vegetarian	6	42.9	8	57.1	0.536 NS
	Mixed	9	56.3	7	43.8	DF=1
Age at the diagnosis of renal disease	30-40	4	44.4	5	55.6	1.254 NS
	41-50	3	75.0	1	25.0	DF=3
	51-60	3	42.9	4	57.1	
	61 & above	5	50.0	5	50.0	
Age at the commencement of hemodialysis	30-40	2	33.3	4	66.7	2.578 NS
	41-50	4	80.0	1	20.0	DF=3
	51-60	5	50.0	5	50.0	
	61 & above	4	44.4	5	55.6	

S- is significant; NS-is not significant

In the study there was no significant association between knowledge scales of the patient receiving hemodialysis with selected demographic variables of the experimental group.

Section VI: Table 6: Association Between knowledge Scores with Selected Demographic Variables—Control Group

n =30

Demographic Data		Knowledge Scale				
		Median and below		Above median		χ^2
		N	%	N	%	
Age	30-40	1	16.7	5	83.3	6.018 NS
	41-50	5	83.3	1	16.7	DF=3
	51-60	6	66.7	3	33.3	
	61 & above	5	55.6	4	44.4	
Sex	Male	10	52.6	9	47.4	0.344 NS
	Female	7	63.6	4	36.4	DF=1
	Secondary	5	71.4	2	28.6	DF=2
	Graduation	10	55.6	8	44.4	
	Post graduation	2	40.0	3	60.0	
Religion	Hindu	9	64.3	5	35.7	5.032 NS
	Christian	7	58.3	5	41.7	DF=3
	Others	1	100.0	0	0.0	

Demographic Data		Knowledge Scale				
		Median and below		Above median		χ^2
		N	%	N	%	
Occupation	Government servant	5	62.5	3	37.5	1.886 NS
	Private	4	40.0	6	60.0	DF=3
	Homemaker	3	60.0	2	40.0	
	Retired	5	71.4	2	28.6	
Dietary pattern	vegetarian	6	66.7	3	33.3	0.524 NS
	Mixed	11	52.4	10	47.6	DF=1
Age at the diagnosis of renal disease	30-40	3	33.3	6	66.7	4.438 NS
	41-50	3	100.0	0	0.0	DF=3
	51-60	8	61.5	5	38.5	
	61 & above	3	60.0	2	40.0	
Age at the commencement of hemodialysis	30-40	3	33.3	6	66.7	4.508 NS
	41-50	3	100.0	0	0.0	DF=3
	51-60	7	63.6	4	36.4	
	61 & above	4	57.1	3	42.9	

S- is significant; NS-is not significant

In the study there was no significant association between knowledge scales of the patient receiving hemodialysis with selected demographic variables of the control group

4. Discussion

The discussions are framed under the following headings.

Assessment of knowledge of patients receiving hemodialysis of both experimental and control group regarding fluid and dietary compliance.

In the study pre-test scores, were 27(90%) for good knowledge and only 3(10%) for very good knowledge regarding fluid and dietary compliance. This indicated that majority of the patients had good knowledge regarding fluid and dietary compliance in experimental group. During pre-test of control group25 (83.3%) of the respondent had good knowledge, 3(10%) had very good knowledge and 2 (6.7%) had average knowledge regarding fluid and dietary compliance, indicating that majority of patients had only good knowledge regarding fluid and dietary compliance.

Effectiveness of repeated structured teaching program on knowledge of patients receiving hemodialysis regarding fluid and dietary compliance for experimental group.

This study confirmed that in the experimental group the mean percentage and SD were (66.38%, 2.13), (84.71%,2.36), (94.46%,1.39) and (97.50%,2.02) for pre-test, post-test1, post-test2and post-test3 respectively.

The result of r-ANOVA revealed the equality of means for knowledge from pre-test and different readings of three time point post-test was statistically highly significant, calculated F (3,174) =87.158, P<0.001. There were significant difference between pre-test and three points post-test: post-test 1, post-test 2, post-test 3, indicating a progressive improvement of knowledge among hemodialysis patient, due to administration of repeated structured teaching program regarding fluid and dietary compliance.

Similarly study was conducted in Taiwan to examine the effectiveness of self efficacy training on fluid intake compliance with 62 End Stage Renal Disease patients. Among them 12patients received sessions of self-efficacy training with an educational component measured was mean body weight. Results using ANOVA showed a statistically significant value (F=8.10, P=0.006) supporting the hypothesis that patients who received the self-efficacy training had better fluid intake compliance than those who did not. [7]

Therefore, with proper education awareness can be brought among patients regarding importance of fluid and dietary compliance among patients receiving hemodialysis.

Association of pre-test knowledge scores of patients receiving hemodialysis of both experimental and control group with selected demographic variables.

Chi-square test was applied to find out the association between selected demographic variables and pre-test level of knowledge in the experimental group and control group. In the study, it was observed that there was no association between selected demographic variables and pre-test knowledge scoresof patients receiving hemodialysis in both experimental and control groups.

Similarly, an evaluative study was conducted in Tokyo on 256 outpatient hemodialysis patients to examine the Body Mass Index of patients under chronic hemodialysis, focusing on problems encountered during outpatient hemodialysis therapy. Patients were selected randomly and results depicted that in patients under 60 years of age, those with excessive interdialytic weight gain had a statistically larger BMI (23.0, n=21) compared to patients with good hemodialysis control (20.2,n=86). [8]

Therefore, it can be noted that with increasing age, adherence to fluid and dietary compliance becomes challenging to patients receiving hemodialysis.

Correlation of knowledge scores of patients receiving hemodialysis of both experimental and control group with interdialysis weight and biochemical parameters.

Karl Pearson coefficient correlation was used to find the correlation between knowledge scores, biochemical parameters and interdialysis weight for experimental and control group, the result showed perfectly negative correlation between the parameters, indicating that the correlation was not significant.

An evaluative study was conducted in Poland on adult hemodialysis patients to assess changes in plasma leptin (marker of nutritional status) concentration during the first year of hemodialysis. Evaluation of nutritional status and biochemical parameters were performed in 21 adult patients randomly selected after initiation of hemodialysis and after subsequent 12 months follow up. Results showed a significant correlation between Total Fat Mass and plasma leptin (r=0.521, P=0.02) at the beginning of hemodialysis and during one year of follow up(r=0.466,P=0.04) was noticed. Study revealed that a significant reduction of over hydration and bone mineralization occurred after initiation of hemodialysis. [9]

Therefore, it can be inferred that with proper guidance and follow up there can be significant change in knowledge and biochemical parameters among patients receiving hemodialysis.

Recommendations

On the basis of the findings of the study the following recommendations have been made:

- A similar study can be replicated on a large scale to generalize the findings.
- A follow up study can be taken up to determine the effectiveness of structured teaching programme in terms of practice of self care and adherence to fluid and dietary compliance.

Conclusion

There are evidences showing the successful treatment of patients with end stage renal disease is directly related to compliance, including dietary restriction, medication regimen and fluid restriction. Therefore, the need to educate and encourage patients regarding fluid and dietary compliance receiving hemodialysis is a prime importance today.

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Conflict of interest - None

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