Original Article

Effectiveness of Self-Instructional Module (SIM) on Knowledge Regarding Homecare Management among Patients with Chronic Renal Failure Undergoing Hemodialysis at SRM General Hospital, Tamilnadu, India

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Abstract - *Chronic Renal Failure is the gradual loss of kidney function and has become the 6th deadliest disease worldwide. Hemodialysis is the most effective proven treatment method for chronic renal failure patients (CRF). It leads the patients to maintain satisfactory life with a long survival rate. Home care management is the comprehensive care provided at home.*

To assess the pretest and post-test level of knowledge regarding home care management among patients with chronic renal failure undergoing hemodialysis. To determine the effectiveness of the Self-Instructional Module (SIM) and to associate post-test knowledge scores with their demographic variables.

Quasi-experimental research designs had chosen for the study. 60 samples were taken using a convenient sampling technique. Samples were split into 30 studies and 30 control groups, respectively. A structured interview questionnaire was used to collect the data. Self-Instructional Module was given to the study group except for the control group after the pretest. Post-test was conducted on the study group using the same questionnaire as well as for the control group.

70% had moderate knowledge in the pretest for the control group. 23.3 % had inadequate knowledge in the study group for pretest, and it was increased to 73.3% in post-test after the intervention. Association between the demographic variables and post-test level of knowledge with study group indicates that there is no significant association. Whereas, in the control group, there is an association between the numbers of hemodialysis per week and the duration of hemodialysis in months.

The study concluded that the Self-Instructional Module (SIM) regarding home care management was more effective in enhancing the knowledge among hemodialysis patients.

Keywords - *Chronic renal failure, Self-Instructional module, Hemodialysis, Knowledge.*

I. INTRODUCTION

Chronic renal failure is a progressive and irreversible loss of renal function over time, based on a gradual decline in the Glomerular Filtration Rate and creatinine clearance persisting for three months or more irrespective of the cause.[1]The main function of the kidney is removing the waste from the body via filtration through millions of nephrons.[2] Worldwide, 850 million people were approximate to have chronic kidney disease by various causes. 2.4 million deaths worldwide per year by chronic kidney disease. [3] Almost 2.5 lakh people pass away from kidney failure in India every year. It is the third-largest assassin after malignancy and heart disease. [4] Hemodialysis is a technique that is used to fix the imbalance of fluid and electrolytes from the blood. When the kidneys stop working properly, dialysis helps to separate waste products.[5] Dialyzer machine acts as an artificial kidney for purification of the blood. [6] Dialysis starts when kidney disease reaches to 5th stage or final stage whilst the patient won't survive without doing the dialysis.[7] The patients undergo hemodialysis three times per week. There are three major types of vascular access for Hemodialysis: Arteriovenous Fistula, Arteriovenous graft and Central venous catheter.[8] Home care is otherwise called domiciliary care. A large

number of patients have insufficient knowledge regarding post-dialysis home care, which might lead to some complications due to hemodialysis.[9] Only 4hrs patients spend in the dialysis Centre rest of the 20hrs they are spending in the home. That's why home care management is important for those patients undergoing hemodialysis.[10] There are approximately 220000 cases of end-stage renal disease (ESRD) in India each year, which results in additional 34 million dialysis sessions. Only a minority of Indians undergo long-term hemodialysis because of OOPES (out-of-pocket expenses). 90% of the patients requiring Renal Replacement Therapy (RRT) died because of the inability to afford the cost of treatment.[11] Unexpected complications have the potential to impose serious financial hardships.[12] In 2019, the fact that 30% of the patients in Tamil Nadu develop chronic kidney disease, this state has one of the highest rates of diabetes in India. Tamil Nadu state had 65,000 patients, whereas 15 000 required dialysis or kidney transplant.[13] In caring for patients who were admitted to a hospital for this condition, chronic kidney disease nurses play a very important role since they have close interaction with the patient, and nursing is entrusted with the most responsibility. The onus is more for the nurses who had a piece of very specialized knowledge and skills for the hemodialysis therapy, as well as the need for continuous education and guidance for patients and caretakers, which is of utmost importance to support therapeutic follow-up at home. [14] Nutrition plays a pivotal role in maintaining kidney function among patients with chronic kidney disease. The consumption of macronutrients, minerals, and fluids, as well as changes in energy intake, can significantly reduce the risks of mortality and morbidity. [15] The researcher is interested to know the detailed information regarding CRF, Hemodialysis and how the patients cope with their current situation, and how they are doing the activity of daily living (ADLs). The researcher is mainly focused on home care management as the patients were spending more time at home rather than at the dialysis Centre.

II. MATERIALS AND METHODS

A. Research Approach

Quantitative approach

B. Research Design

Quasi-experimental (pre-test and post-test design) with control group design was used to determine whether a Self-Instructional Module (SIM) on home care management would improve the knowledge of chronic renal failure patients undergoing hemodialysis.

Table 1. Illustration of Research Design

GROUPS	PRE-TEST	INTERVENTION	POST-TEST
STUDY GROUP	O1	X1	O2
CONTROL GROUP	O1	-	02

a) Key

O1: Pretest knowledge about home care management

X1: (SIM) Self- Instructional Module

O2: Post-test knowledge about home care management

b) The setting of the study

SRM General Hospital 3rd and 5th floor.

c) Population

All chronic renal failure patients underwent hemodialysis in morning and afternoon sessions. Individuals who have extended periods of kidney damage to require permanent renal replacement therapy and who had undergone hemodialysis more than 3 months.

d) Sample

Chronic renal failure patients who underwent dialysis in the outpatient department of SRM General Hospital, Kattankulathur. Sixty patients were included in the study.

e) Sampling Technique

The selection of participants was done by means of a convenient sampling technique

f) Calculation of sample size

$$\text{Sample size} = \frac{Z_{1-\mu/2}{}^2 \, SD^2}{d^2}$$

Sample size= 60.

C. Selection Criteria

a) Inclusion criteria

- Hemodialysis patients on hemodialysis for more than 3 months at SRM General Hospital.
- Hemodialysis patients who agreed to participate in the study.
- Hemodialysis patients who were capable of understanding, reading, and writing Tamil /English.
- Staff nurse student nurse who was agreed to help during the collection of data as an interpreter

b) Exclusion Criteria

- Patients who are not present during the study, i.e. night shift patients
- Patients who did not give consent for the study
- Patients who were sick during the time of data collection (difficulty in breathing, hearing problem, vision problem)

c) Source of Data

Data was collected from the third floor for the control group and 5th floor for the study group who came for hemodialysis on the Out-Patient Department at SRM General Hospital, Kattankulathur.

d) Tools for data collection

1) Demographic data sheet

It consists of age, gender, educational status, occupation, monthly income, socio-economic status, marital status, *Clinical Variables:* Type of hemodialysis access, restriction of fluid, amount of fluid, number of hemodialysis per week. *Extraneous Variables:* Mass media, books, health care professionals

2) Structured questionnaire

Structured questionnaire to assess the knowledge regarding home care management, which consists of 30 questions.

3) Methods of data collection

The present study included those patients who fulfilled the inclusion and exclusion criteria. Oral and written consent was received from the participants. Individuals were assured that the study's confidentiality was maintained, and they were free to pull out from the study at all times. The researcher went to the morning and afternoon shifts.

It includes 3 Phase

- The Knowledge Assessment Tool as a pretest was administered to patients that took 20-30min to complete.
- A self-Instructional Module was given to the patients of the study group.
- A post-test was conducted by the investigator on the 12th day

e) Self-Instructional Module consists of [16,17]

- Kidney anatomy and physiology
- Chronic renal failure
- Hemodialysis & Dialysis
- Explanation of the vascular access and daily basis care
- Nutrition (foods to be taken & avoid)
- Exercise (Dos and Don'ts)

Fig. 1 Distribution of SIM to the patients

f) Statistical Methods

Descriptive statistics and inferential statistics were done for data analysis. A paired "t" test was conducted to compare the change in the knowledge scores and to find the association, and the Chi-square was used.

III. RESULTS

Table 2. Description of demographic variables and clinical variables of the patients   n=60

Variables	Class	No. of respondents			
		Control group	%	Study group	%
Age	20-30	4	13.3	3	10.0
	31-40	3	10.0	2	6.7
	41-50	7	23.3	9	30.0
	51-60	6	20.0	5	16.7
	> 61	10	33.3	11	36.7
Gender	Male	21	70.0	20	66.7
	Female	9	30.0	10	33.3
Education	No formal education	5	16.7	7	23.3
	Primary education	4	13.3	7	23.3
	Secondary education	8	26.7	5	16.7
	Higher secondary education	6	20.0	4	13.3
	Collegiate	7	23.3	7	23.3
Occupation	Government employee	7	23.3	2	6.7
	Private employee	3	10.0	6	20.0
	Self-employee	3	10.0	5	16.7
	Daily wager	10	33.3	4	13.3
	Unemployed	7	23.3	13	43.3
Income	> 50000	4	13.3	0	0.0
	40000-49000	2	6.7	1	3.3
	30000-39000	2	6.7	2	6.7
	20000-29000	4	13.3	3	10.0
	10000-19000	2	6.7	4	13.3
	< 10000	16	53.3	20	66.7
Socio-economic class	Upper	1	3.3	2	6.7
	Upper middle	10	33.3	8	26.7
	Lower middle	13	43.3	14	46.7
	Upper lower	6	20.0	6	20.0
Marital status	Married	22	73.3	20	66.7
	Unmarried	6	20.0	6	20.0
	Divorced	0	0.0	0	0.0
	Widow(er)	2	6.7	4	13.3

Types of Hemo dialysis access	AV Fistula	27	90.0	26	86.7
	AV Graft	0	0.0	0	0.0
	Central Venous Catheter	3	10.0	4	13.3
Duration of hemo dialysis in months	< 6 Months	4	13.3	2	6.7
	7- 12 Months	4	13.3	6	20.0
	13 - 24 Months	9	30.0	8	26.7
	> 24 Months	13	43.3	14	46.7
Number of hemo dialysis per week	Daily	0	0.0	0	0.0
	1 time	0	0.0	4	13.3
	2 times	29	96.7	25	83.3
	3 times	1	3.3	1	3.3
Restriction of food and fluid	Yes	30	100.0	30	100.0
	No	0	0.0	0	0.0
Amount of fluid intake per day	300-500ml	19	63.3	16	53.3
	600-700ml	4	13.3	5	16.7
	800-900ml	7	23.3	9	30.0
Sources of information	Books	6	20.0	6	20.0
	Relatives Friends and Neighborhood	11	36.7	5	16.7
	Mass media	4	13.3	6	20.0
	Health care Professional	9	30.0	13	43.3

Table 2. Represents the data of control and study group

Considering the age of patients in the control group 10 (33.3%) and in study group 11(36.7%) belonged to more than 61 years. In the control group, males were 21(70%), while in the study group, 20(66.7%) were male.

In regard to the educational status in the control group, 8(26.7%) of patients had secondary education level whereas, the educational status of the patients in the study group, 7(23.3%) of them had no formal education, 7(23.3%) of them had primary education, and 7(23.3%) of them had completed college level. Occupations in the control group 10 (33.3%) were daily wage earners. On the other hand, in the study group, 13 (43.3%) were unemployed. Concerning the family's monthly income, 16 (53.3%) and 20(66.7%) of them earn Rs. <10000 per month in the control group and study group, respectively. With respect to the socio-economic class, 13(43.3%) and 14(46.7%) of them were lower-middle in the control group and study group, respectively. In relation to marital status, 22(73.3%) were married in the control group; on the other hand, 20(66.7%) were married in the

study group. Regarding the type of hemodialysis access, 27(90%) and 26(86.7%) had AV Fistula in the control group and study group, respectively. With respect to the duration of hemodialysis in months, 13(43.3%) and 14(46.7%) had more than 24 months in the control group and study group, respectively. Considering the number of hemodialysis per week, 29(96.7%) and 25(83.3%) of them were done 2 times in the control group and study group, respectively. Regarding the restriction of food and fluid, 30 (100%) and 30 (100%) of them were on food and fluid restriction in the control group and study group, respectively. With respect to the amount of fluid intake per day, 19(63.3%) and 16(53.3%) were on 300-500ml in the control group and study group, respectively. Regarding the information source, 11(36.7%) of them received details from relatives, friends, and neighbourhoods in the control group, whereas, regarding the information source, 13(43.3%) of them received details from health care professionals in the study group.

Table 3. The pretest and post-test level of knowledge regarding home care management among chronic renal failure undergoing hemodialysis control group and study group   n=60

Knowledge level	Control group				Study group			
	Pre test	%	Post test	%	Pre test	%	Post test	%
Inadequate	4	13.3	6	20	7	23.3	3	10
Moderate	21	70.0	24	80	21	70.0	5	16.7
Adequate	5	16.7	0	0	2	6.7	22	73.3

Table 3 outcomes reveal that in the *control group* pretest, 21 (70%) had moderate knowledge, 5 (16.7%) had adequate knowledge and 4 (13.3%) had inadequate knowledge whereas, in post-test, 24 (80%) had moderate knowledge, 6 (20%) had inadequate knowledge, and 0 (0%) had adequate knowledge. Whereas in *the study group* pretest, 21(70%) had moderate knowledge,7 (23.3%) had inadequate knowledge, and 2 (6.7%) had adequate knowledge whereas, post-test 22 (73.3%) had adequate knowledge, 5 (16.7%) had moderate knowledge, and 3 (10%) had inadequate knowledge.

Table 4. Comparison between pretest and post-test knowledge mean score of study group after the implementation of Self-Instructional Module   n=60

Test	N	Mean	SD	t value	df	P-value
Pretest	30	14.57	3.954	-6.555	29	0.000**
Post-test	30	23.50	5.488			

(Paired "t"-test)

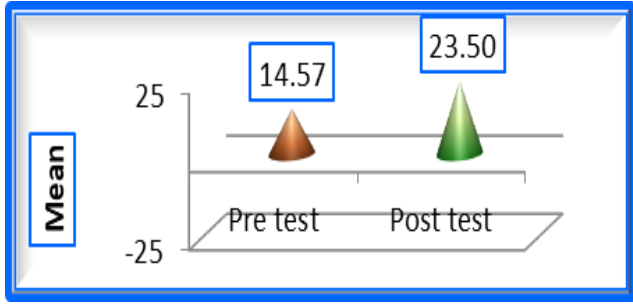*-Significant at 5% level   **-Significant at 1% level

Fig. 2 Pyramid shows the comparison between the knowledge mean score of the study group

Table 4 shows that the p-value calculated is less than 0.01, and it is highly significant at the 1% level. The value is different from pretest to post-test for the study group. Hence, there is a highly significant difference between the average knowledge scores before and after the test conducted, which means that the Self-Instructional Module (SIM) on knowledge regarding home care management among patients with chronic renal failure undergoing hemodialysis is effective.

Table 5. Comparison between the pretest and post-test mean knowledge score of control group n=60
(Paired "t"-test)

Test	N	Mean	SD	t value	Df	P-value
Pretest	30	16.23	4.725	2.491	29	0.019*
Post-test	30	13.47	3.360			

*-Significant at 5% level   **-Significant at 1% level

Table 5 suggest that the p-value calculated is less than 0.05, which is significant at the level of 5%. Hence, there is a

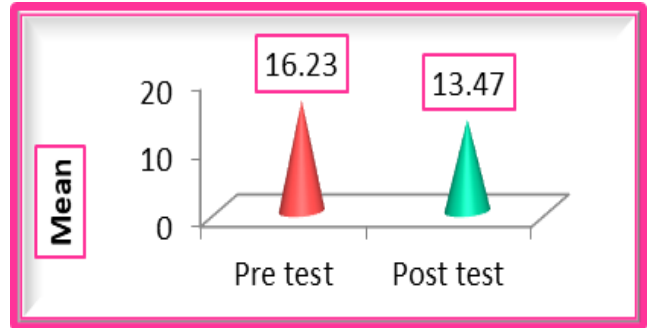significant difference between the average knowledge scores before and after the test.

Fig. 3 Pyramid shows the comparison between the mean knowledge score of the control group

Table 6. Comparison between control and study groups concerning the knowledge regarding home care management among patients with chronic renal failure undergoing hemodialysis at post-test level *n=60* (Independent t-test)

SN	Group	N	Mean	SD	t value	df	P-value
1	Control	30	13.47	3.360	-8.540	58	0.000**
2	Study	30	23.50	5.488			

*-Significant at 5% level   **-Significant at 1% level

Table 6 shows that The mean ± SD for the control group and study group is 13.47 ± 3.360 and 23.50 ± 5.488, respectively. Also, the mean value of the study group and control group is higher than the mean value of the control group. Therefore, we can conclude that the post-test level of knowledge regarding home care management among patients with chronic renal failure undergoing hemodialysis in the study group is better than the control group.

Table 7. Association between the demographic variables and knowledge level of the study group at the post-test level n=60

Variables	Class	Knowledge Level			Chi-Square value	DF	P-value
		Inadequate	Moderate	Adequate			
Age	20-30	0	0	3	8.284	8	0.406
	31-40	0	0	2			
	41-50	2	3	4			
	51-60	1	1	3			
	> 61	0	1	10			
Gender	Male	2	2	16	1.964	2	0.375
	Female	1	3	6			
Education	No formal education	0	1	6	8.568	8	0.380
	Primary education	1	3	3			
	Secondary education	1	0	4			

	Higher secondary education	1	0	3			
	Collegiate	0	1	6			
Occupation	Government employee	0	0	2	6.695	8	0.570
	Private employee	1	0	5			
	Self employee	0	1	4			
	Daily wager	0	0	4			
	Unemployed	2	4	7			
Income	40000- 49000	0	0	1	3.709	8	0.882
	30000- 39000	0	0	2			
	20000- 29000	0	0	3			
	10000-19000	1	1	2			
	< 10000	2	4	14			
Socio economic class	Upper	1	0	1	6.710	6	0.348
	Upper middle	0	1	7			
	Lower middle	1	2	11			
	Upper lower	1	2	3			
Marital status	Married	2	4	14	2.080	4	0.721
	Unmarried	1	0	5			
	Widow(er)	0	1	3			
Types of Hemo dialysis access	AV Fistula	3	4	19	0.656	2	0.721
	Central Venous Catheter	0	1	3			
Duration of hemo dialysis in months	< 6 Months	1	1	0	11.245	6	0.081
	6 - 12 Months	0	0	6			
	13 - 24 Months	1	0	7			
	> 24 Months	1	4	9			
Number of hemo dialysis per week	1 time	0	1	3	1.045	4	0.903
	2 times	3	4	18			
	3 times	0	0	1			
Restriction of food and fluid	Yes	3	5	22	Cannot perform a chi-square test		
	No	0	0	0			
Amount of fluid intake per day	300-500ml	1	3	12	3.990	4	0.407
	500-700ml	0	0	5			
	700-900ml	2	2	5			
Sources of information	Books	0	0	6	8.426	6	0.209

*-Significant at 5% level   **-Significant at 1% level

Table 7 reveals that the p values corresponding to the demographic variables "Age in years, Gender, Education, Occupation, Income, Socio-economic class, Marital status, Types of Hemodialysis access, Duration of hemodialysis in months, Amount of hemodialysis per week, Restriction of food and fluid, Amount of fluid intake per day and Sources of information" are not less than 0.05 at 5% level. Hence, there is no significant association between the demographic variables and the knowledge level.

Table 8. Association between the demographic variables and knowledge level of control group at the posttest level n=60

Variables	Class	Knowledge Level		Chi-Square value	DF	P-value
		Inadequate	Moderate			
Age	20-30	0	4	3.780	4	0.437
	31-40	1	2			
	41-50	2	5			
	51-60	0	6			
	> 61	3	7			
Gender	Male	4	17	0.040	1	0.842
	Female	2	7			
Education	No formal education	2	3	4.122	4	0.390
	Primary education	1	3			
	Secondary education	0	8			
	Higher secondary education	2	4			
	Collegiate	1	6			
Occupation	Government employee	0	7	7.351	4	0.118
	Private employee	2	1			
	Self employee	0	3			
	Daily wager	3	7			
	Unemployed	1	6			
Income	> 50000	0	4	3.438	5	0.633
	40000- 49000	0	2			
	30000- 39000	0	2			
	20000- 29000	1	3			
	10000-19000	1	1			
	< 10000	4	12			

Socio economic class	Upper	0	1	2.772	3	0.428
	Upper middle	3	7			
	Lower middle	1	12			
	Upper lower	2	4			
Marital status	Married	6	16	2.727	2	0.256
	Unmarried	0	6			
	Widow(er)	0	2			
Types of Hemo dialysis access	AV Fistula	5	22	0.370	1	0.543
	Central Venous Catheter	1	2			
Duration of hemo dialysis in months	< 6 Months	0	4	2.449	3	0.000**
	6 - 12 Months	1	3			
	13 - 24 Months	1	8			
	> 24 Months	4	9			
Number of hemo dialysis per week	2 times	5	24	4.138	1	0.042*
	3 times	1	0			
Restriction of food and fluid	Yes	6	24	Cannot perform a chi-square test		
	No	0	0			
Amount of fluid intake per day	300-500ml	5	14	1.617	2	0.446
	500-700ml	0	4			
	700-900ml	1	6			
Sources of information	Books	1	5	1.433	3	0.698
	Relatives Friends and Neighbour hood	3	8			
	Mass media communication	0	4			
	Health care Professional	2	7			

*-Significant at 5% level   **-Significant at 1% level

Table 8 shows that, the p-value corresponding to "Duration of hemodialysis in months" is less than 0.05 and is significant at 5% and number of hemodialysis per week is significant at 0.01 and is highly significant at 1% level. Hence, there is a significant association between the demographic variable Duration of hemodialysis in months and number of hemodialysis per week and knowledge level and no significant association with other variables.

IV. DISCUSSION

In this study 60 patients were taken for the study. On the first day of contact, data was collected from the participants both interview technique and self-filling. As an intervention Self-instructional module (SIM) booklet was given according to their understanding of English and Tamil language. Time duration to collect the data was up to 4 weeks. In control group pretest and posttest knowledge score was moderate 70% and 80% respectively. In study group group pretest knowledge score was moderate 70% and knowledge score was increased upto 73.3% which is adequate after posttest.

The present study findings is supported by the similar study an exploratory cross sectional study conducted by Sakhardande. V, Shaikh. A, Bano. S. et.al (2018) [18] which results shows that the assessment of knowledge was carried out and was found that 75% of the samples receiving Hemodialysis had good knowledge on home management of Hemodialysis and 25% of them had average knowledge.Saini.P, Smirti.A (2017) where 58% of the participants had average knowledge in dietary management. [19]. Shrestha. BK. Rajbanshi. L.et. al(2016) similar descriptive study was conducted on the National kidney center in Nepal among 100 patients. Patients possessed poor knowledge on self-care management .[20]

The study also aimed to determine the effectiveness of Self- Instructional Module (SIM) among hemodialysis patient. The posttest mean score of knowledge (23.50) was higher than the pretest mean (14.57) score for the study group. The present study findings is supported by the similar study, *Ramya.J(2017)* [21] The educative programme was effective in impacting knowledge. Quasi experimental research design was adopted for this study also where 60 caregivers were chosen for the data collection in P.G Hospital, Coimbatore.

Salman.AH, Sanar.A. et.al (2019) shows the positive effect of Instructional Module on the daily basis care of Arteriovenous fistula [22]. Pradeep.K (2020) this study shows that VAT(video assisted teaching) enchances the knowledge of the caregivers of hemodialysis patients. [23] Thus the the formulated research hypothesis RH1: There will be a significant difference between pretest and posttest level of knowledge, which is *accepted* in this study.

whereas to find the association for the Posttest knowledge scores with selected demographic variables were evaluated by using chi square test. Association between the demographic variables and posttest level of knowledge with study group indicates that there is no significant association. Whereas, in control group there is association between the numbers of hemodialysis per week and duration of hemodialysis in months

Similarly the Hypothesis RH2: stated that there will be a significant association on the level of knowledge and selected demographic variables of chronic renal failure patients regarding home care management. Which is *rejected* in present study. The similar results shown by Naveent.K (2015) The relation of caregiver with patient, caregivers' age, gender, education, occupation, type of family and income showed no significant impact on the knowledge of caregiver regarding post dialysis home care. [24]. Singh .R, Shandily D, Mali. R. et.al (2016) reveals that there was no significant association found between post test knowledge score of patients when compared with age, gender, marital status, qualification, family monthly income,

dietary habits, occupation, area of residence, source of information regarding management of chronic renal failure patients. Thus the research hypothesis is rejected. [25]

V. LIMITATIONS OF THE STUDY

- This study was limited to 4 weeks and can be conducted in large sample size
- Patients who are cooperative and willing to participate in the study are only included.

VI. RECOMMENDATIONS

- A descriptive study can be conducted to evaluate the attitude and practice of home care management

- A similar study can be undertaken on the different areas.

- A study with involvement of caretaker and nurses can be conducted

VII. CONCLUSION

The present study is supported by other studies, which ensures that the Self-Instructional Module (SIM) is an effective information giving tool which was used to increase the level of knowledge regarding home care management among chronic renal failure patients undergoing hemodialysis at SRM General Hospital, Chennai, Kattankulathur, Tamilnadu.

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