ORIGINAL RESEARCH PAPER
Volume-8 | Issue-10 | October - 2019 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EFFECTIVENESS OF AN ELECTRONIC SELF-INSTRUCTIONAL MODULE ABOUT SELF-MANAGEMENT ON MAINTENANCE HAEMODIALYSIS (MHD) IN TERMS OF KNOWLEDGE, PRACTICE AND SELF-EFFICACY OF PATIENTS UNDERGOING MHD

Nursing

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ABSTRACT

Introduction: Chronic kidney disease is increasingly recognized as a major public health burden and the leading cause of morbidity and mortality globally. The prevalence of CKD is as much as 10-15 percent worldwide but in India the exact figure is not known due to the lack of proper registry data and few population-based studies done. Kidney failure resulting from CKD is prevented via dialysis or transplantation.

Method: Quantitative Research Approach was used. Quasi- Experimental Time Series Design with two post-test observations over a gap of one week was employed. The Conceptual framework used was based on Orem's Self-Care Theory. The study was conducted at the Dialysis Unit of ILBS on a total of 60 patients undergoing MHD, who were then randomly allocated into Experiment and Comparison groups. Data was collected using standardized and structured questionnaires after establishing the validity and reliability. Statistical analysis was done on SPSS Version 22.0, using the descriptive and inferential statistics.

Results showed that almost half (E- 46.7%, C- 60%) of the patients were 50-65yrs of age and males (E- 73.3%, C- 66.7%). Majority of the patients in both the groups had average level of knowledge at baseline. Study groups were found homogenous in terms of baseline Knowledge, Practice and Self-Efficacy scores. The mean difference in the Knowledge scores only was found highly significant between the groups both over time ($F= 86.09$, $p= 0.001$) and across the group with time ($F= 73.41$, $p= 0.001$). Spearman's correlation between Change in Knowledge and Practice of patients in the Experiment group was also found highly significant ($\rho= 0.499$, $p= 0.005$).

Conclusion: The e-SIM was found highly effective in improving and retaining Knowledge of Self- Management in patients undergoing MHD.

KEYWORDS

Self-Management; Knowledge; Self-Efficacy; Maintenance Haemodialysis; electronic Self-instructional Module

INTRODUCTION

CKD is increasingly recognized as a major public health concern globally. Being the leading cause of morbidity and mortality, it poses a significant economic burden to the healthcare systems (Evans & Taal, 2015; Jager & Fraser, 2017). An estimated 8-16 percent of individuals are affected by CKD, it is partly due to an ageing population; and an increasing prevalence of diabetes and hypertension. Statistics indicated that one in every ten persons in the general population of India had some form of CKD. Every year, nearly 1, 75,000 new cases of kidney failure added up and required dialysis or kidney transplantation. CKD takes about 10 to 15 years to set in and therefore, it is vital to take the preventive measures at the earliest. Not doing so can lead to kidney failure, which is managed in two ways i.e. dialysis or/and transplant. Most patients in India fail to afford these treatments (Jha *et al,* 2013).

CKD is a complex disease requiring life-long management. Those undergoing Renal Replacement Therapy (RRT) should be offered adequate information, educated on CKD, and its treatment with more emphasis on the practice of self-management behaviors. One strategy to improve patient outcomes is to enhance the self-management using suitable educational or training programs (Walker, Marshall, & Polaschek, 2013).

A number of studies have highlighted the poor quality of patient's knowledge about their treatment regimen. Lack of knowledge appears to have two components: deficiency of counselling by professionals and poor recall of information by patients (Newman, Steed & Mulligan, 2004; Barlow, Wright, Sheasby & Turner, 2002). Several studies have shown that effective self-management behavior, such as adhering to healthcare recommendations on the RRT, can help improve the outcomes (Kazawa & Moriyama, 2013; Lin, Wu, Wu, Chen, & Chang, 2013b). Various studies also found that self-instructional form of educative material significantly improves the knowledge and self-management in chronic patients based on their own pace of learning (Sharma, Kumar & Venkateshan, 2016; Singh, Shandily & Mali, 2016)

Therefore, it is high time, that systematic written information in the form of an electronic Self-Instructional Modules (e-SIM) to be designed for Dialysis patients; which will act as a source of continual reinforcement to improve their self-management on Maintenance Haemodialysis (MHD).

MATERIAL AND METHODS

In this study, the researcher aimed at determining the effectiveness of an e-SIM about Self- Management on MHD in terms of Knowledge, Practice and Self-Efficacy of patients undergoing MHD at the Dialysis Unit. A Quantitative Research approach was opted and a Quasi-Experiment Time Series design was employed in the study. Based on previously done studies the sample size was calculated as sixty (Singh, Shandily & Mali, 2016; Roy, Gurjar & Bhattarcharjee, 2017). A sample of 60 Patients undergoing MHD was enrolled in this study after meeting the inclusion and exclusion criteria for the selection of patients (Figure 1). These patients were then randomly allocated in two groups- Control and Experiment. Both the groups had undergone a pre-test followed by introduction of e-SIM in the Experiment group and then two post-observations were made with a minimum gap of a week in between each post-observation. Patients were included in the study based on a criteria i.e. those undergoing MHD at least once a week in the Dialysis Unit during time of Data Collection, had CKD stage V and were from 18-65 year age group. Critically ill CKD patients undergoing MHD at I.C.U or Emergency units and with visual or cognitive impairments were excluded in the study.

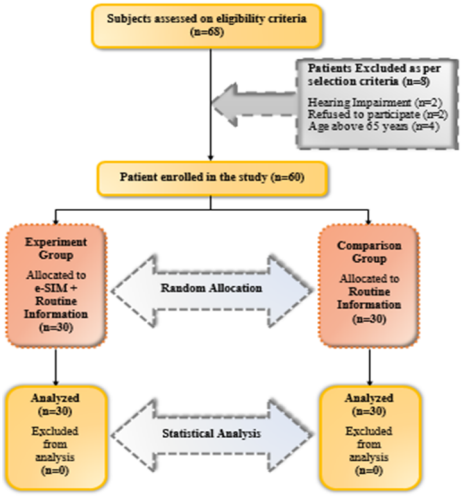

Figure 1. The chart showing sampling of the study

The study tools had five parts i.e. Demographic Profile, Clinical Profile, Knowledge Questionnaires, Chronic Kidney Disease Self-Management Instrument (CKD-SM) and Self-Efficacy for Managing Chronic Disease (SEMCD). Tools used in the study were validated by seven experts and had the index of validity of more than 0.78 Revised Kuppuswamy's Socio Economic Status (SES) Scale was used to identify the socio-economic class of the patients. A Structured Questionnaire was designed on four aspects of Self-Management on Haemodialysis i.e. vascular access of HD, care of VAD, diet and post-dialysis activities. KiKs, CKD-SM and SEMCD were the standardized tools used and were available for open access. The reliability established for the tools ranged from 0.71 to 0.82

Development of e-SIM was done in line with the Guidelines for preparing an electronic-Module. It was divided in six sections i.e. Kidneys and its functioning, CKD, Vascular Access Devices, Treatment- MHD, Instructions for Self-Management on MHD and Minor Problems faced. A bilingual e-SIM was designed on Google forms to enable individualized learning. It was developed for use on tabs to the patients of Experiment group just after the completion of pre-test, on the same day.

Ethical Consideration**:** Written permission and clearance was obtained from the Scientific Review Committee and Ethical Committee, ILBS. *Patient Information Sheet* was given and an *informed written consent* was obtained from the patients.

After the try-out of tools and e-SIM, a Pilot study was conducted on six patients from the Dialysis Unit and it was ensured to exclude these patients from the main study. The main study was conducted in November, 2018. Data collection process took nearly 30-40 minutes per patient. Measurement of Weight and other bio-physiological parameters was done using calibrated instruments, checked constantly on daily basis.

Data obtained was analysed with SPSS Version 22.0 using descriptive and inferential statistics.

RESULTS

Demographics of Patient**:** Nearly half of the total sixty patients in the study were aged 50-65 years, most of them were men from rural areas, formed major proportion of Upper Middle Class and were presently unemployed in both the groups. Maximum patients in Experiment group were from '8th pass to illiterate' category whereas in Comparison group were Graduates.

Chi square computed for the demographics depicted that the two groups didn't show any statistical difference in terms of their demographic characteristics. Data analysed was presented as Frequency and Percentage (refer Table 1).

Table 1 ***Frequency and percentage distribution of patients in Experiment and Comparison group on the selected Demographic Variables.***

$n_1+n_2=30+30$

Demographic variables	Experiment group (%)	Comparison group (%)	χ2	df	p value
Age (in years)					
18-34	06(20.0)	04(13.3)	1.12	2	0.64
35-49	10(33.3)	08(26.7)			
50-65	14(46.7)	18(60.0)			
Gender					
Male	22(73.3)	20(66.7)	0.31	1	0.77
Female	08(26.7)	10(33.3)			
Area of Residence					
Rural	20(66.7)	21(70.0)	0.07	1	1.00
Urban	10(33.3)	09(30.0)			
Marital status					
Married	28(93.3)	27(90.0)	0.21	1	1.00
Unmarried	02(06.7)	03(10.0)			
Socio-economic Status					
Upper	04(13.3)	03(10.0)	0.85	3	0.90
Upper Middle	12(40.0)	13(43.3)			
Lower Middle	06(20.0)	08(26.7)			
Upper Lower-Lower	08(26.7)	06(20.0)			
Education					
Post-graduation	05(16.7)	02(06.7)	4.80	4	0.31
Graduate Degree	07(23.3)	13(43.3)			
12th pass	06(20.0)	05(16.7)			
10th pass	04(13.3)	06(20.0)			
8th pass-Illiterate	08(26.7)	04(13.3)			
Employment Status					
Full Time	08(26.7)	08(26.7)	0.32	2	1.00
Part Time	02(06.7)	03(10.0)			
Unemployed	20(66.7)	19(63.3)			

p>0.05; Not Significant

Clinical Characteristics of Patients: Duration of illness was less than 5 years in more than half of the patients, nearly half of them were undergoing MHD for less than 1 year and had at least three dialysis sessions per week in both the groups. Majority had comorbidities and AV fistula for the vascular access on MHD in both the groups.

Chi square computed for the clinical characteristics depicted that the two groups were homogeneous in terms of their clinical characteristics. Data analysed was presented as Frequency and Percentage (refer Table 2).

Table 2 ***Frequency and percentage distribution of patients in Experiment and Comparison group on the selected Clinical Variables.***

$n_1+n_2=30+30$

Clinical Variables	Experiment group *f* (%)	Comparison group *f* (%)	χ2	df	p value
Illness Duration (in year)					
Less than 5	23(73.3)	16(53.3)	8.33	2	0.14
5-10	08(26.7)	07(23.3)			
More than 10	00(00.0)	07(23.3)			
Duration of undergoing MH (in year)					
Less than 1	18(60.0)	14(46.7)	1.12	2	0.61
1-5	07(23.3)	10(33.3)			
More than 5	05(16.7)	06(20.0)			
No. of dialysis sessions per week					
Once a week	01(03.3)	01(03.3)	0.33	2	1.00
Twice a week	13(43.3)	14(46.7)			
Thrice a week	16(53.3)	15(50.0)			
Presence of Comorbidity					
Yes	28(93.3)	27(90.0)	0.21	1	1.00
No	02(06.7)	03(10.0)			
Vascular Access Present					
AV Fistula	23(76.7)	21(70.0)	1.06	2	0.74
Permacath	06(20.0)	06(20.0)			
Venous Catheter	01(03.3)	03(10.0)			

p>0.05; Not Significant

Baseline Bio-Physiological Parameters: No significant statistical difference was found in the baseline Bio-Physiological parameters between the Experiment and Comparison groups.

The mean Knowledge, Practice and Self-Efficacy scores did not differ significantly in between the Experiment and Comparison groups at baseline.

Comparison of Knowledge, Practice and Self-Efficacy scores between the Experiment and Comparison group to determine the effectiveness of e-SIM: The e-SIM was found highly effective in improving the Knowledge scores of the MHD patients in the Experiment group both over time and across the groups with time compared to the Comparison group (refer Table 3).

Table 3 ***Repeated Measure ANOVA of Knowledge, Practice and Self-Efficacy scores between Experiment and Comparison group.***

$n_1+n_2=30+30$

Scores	Test	Groups		Time F (p)	Group* Time F (p)
		Experiment (Mean ± SD)	Comparison (Mean ± SD)		
Knowledge	Pre-test (Day 1)	27.47 ± 04.95	26.20 ± 05.44	86.092 (0.001**)	73.416 (0.001**)
	Post-test 1 (Day 7)	35.00 ± 01.53	26.60 ± 04.36		
	Post-test 2 (Day 14)	37.03 ± 00.76	26.53 ± 04.869		
Practice	Pre-test (Day 1)	86.30 ± 09.77	85.00 ± 09.61	1.617 (0.205)	0.588 (0.543)
	Post-test 1 (Day 7)	88.03 ± 07.53	85.57 ± 07.65		
	Post-test 2 (Day 14)	89.67 ± 07.32	85.83 ± 08.74		
Self-Efficacy	Pre-test (Day 1)	34.27 ± 10.23	35.47 ± 13.95	2.365 (0.100)	1.984 (0.144)
	Post-test 1 (Day 7)	37.90 ± 09.52	35.63 ± 11.86		
	Post-test 2 (Day 14)	39.63 ± 08.19	35.70 ± 10.49		

p<0.01, Highly Significant**

The level of Knowledge in patients was categorized as Good (>32), Average (21-32) and Poor (<21).

Figure 2 presents the frequency distribution by level of knowledge of the Experiment and Comparison groups at different time intervals.

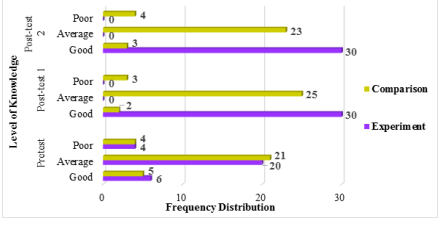

Figure 2.Clustered Bar Chart **showing the Frequency distribution by level of knowledge in patients**

Relationship between Change in Knowledge, Practice and Self-Efficacy scores: To correlate between Change in Knowledge, Practice and Self-Efficacy scores of dialysis patients in the Experiment group, the Spearman's Coefficient of Correlation was computed (refer Table 4).

Table 4 ***Correlation between change in Knowledge, Practice and Self-Efficacy scores of dialysis patients in the Experiment group.***

$n_1=30$

Scores	Mean	SD	ρ	p value
Change in Knowledge	09.57	04.66	0.499	0.005**
Change in Practice	03.37	04.61		
Change in Knowledge	09.57	04.66	0.015	0.939
Change in Self-efficacy	05.37	04.37		
Change in Practice	03.37	04.61	0.330	0.075
Change in Self-efficacy	05.37	04.37		

p<0.01, Highly Significant**

A significant relationship was found between Change in Knowledge and Change in Practice scores of patients who received e-SIM; which showed that with the increase in Knowledge of self-management, the practice of MHD patients also improved (Figure 3).

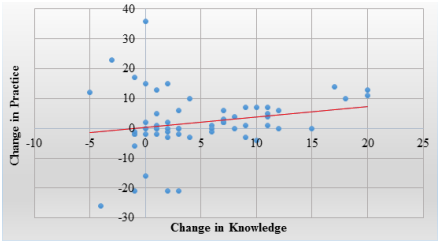

Figure 3.Scatter plot of the correlation between change in knowledge and practice scores in Experiment group

Relationship of Change in Knowledge with Selected Demographic: There were statistically significant relationships of change in knowledge with Marital status (Z=3.000, p=0.028) and Education of patients (H=11.597, p=0.021).

Relationship of Change in Practice with Selected demographic: There was a statistically significant relationship of Change in Practice with Education of patients (H=16.408, p=0.003).

Relationship of Change in Self-Efficacy with Selected demographic: There was a statistically significant relationship of Change in Self-Efficacy with Marital status of patients (Z=4.500, p=0.041).

DISCUSSION

In the present study, mostly the patient's age in both the groups ranged from 50-65 years and were men. These findings were in agreement with the study done by Singh, Shandily and Mali, (2016) which revealed that majority (82%) of the patients undergoing haemodialysis had age above 46 years and were mostly (68%) men. Majority of the patients in both the groups of present study were from rural area and married. Similarly in a study done by Roy, Gurjar and Bhattacharjee (2017) majority (90%) of the dialysis patients were from rural area. Atashpeikar, Jalilazar and Heidarzadeh (2012) found in a study that most (77.4%) of the dialysis patients were married.

Most of the patients in the present study were ill for less than 5 years and were undergoing MHD for past 1 year for thrice a week in both the groups. Similar results were found by Varghese and Jayalakshmi (2016); Roy, Gurjar and Bhattacharjee (2011) that showed, majority of the patients had illness for past 5 years and were undergoing MHD from 6 months to 1 year. A study conducted by Moattari, Ebrahimi, Sharifi and Rouzbeh (2012) found that majority (72.9%) of the patients underwent dialysis for 3 times a week followed by 2 times a week.

There was a marked increase in Knowledge scores of Experiment group in the present study both overtime and across the two groups with time. These findings were in line to the studies done with a SIM as the intervention which revealed that the mean Knowledge score was significantly higher in Experiment group than the Comparison group at 0.05 level (Sharma, Kumar, & Venkateshan, 2016); one group studies with higher scores in post-test (Singh, Shandily & Mali, 2016; John, 2016; Varghese & Jayalakshmi, 2016).

In the present study, the Practice and Self-Efficacy scores did not show any marked improvement in Experiment group both overtime and across the two groups with time. Contrary to these findings, studies done with different modalities of intervention disclosed that post-intervention, the Practice of Self-Management improved significantly in the experiment group than the comparison group (p< 0.001); use of face-to-face educational program as study intervention (Choi & Lee 2012); group discussion as an intervention (Mahjubian, Bahraminejad, & Kamali, 2018). Studies also found that post-intervention the Self-Efficacy in Self-Management improved significantly in the experiment group than the comparison group (p< 0.001); used study intervention as empowerment program (Moattari, Ebrahimi, Sharifi & Rouzbeh, 2012; Royani, Rayyani, Behnampour, Arab & Goleij, 2013; Saiednejad, Mirbagher Ajorpaz & Aghajani, 2018).

A moderate positive correlation (ρ =0.499) for change in Knowledge and Practice was found highly significant (p= 0.005) in the present study. These results were in agreement with a similar study led by Wu, Hsieh, Lin and Tsai (2016) which stated a weak positive correlation of Knowledge with self-care practice (r= 0.18, p<0.01).

Study findings depicted that the knowledge of married patients and those from '8th pass to Illiterate' category improved more than the other patients. No statistically significant relationship was seen of change in Knowledge with the clinical variables. In contrast to this, studies led by Shukla and Kaur (2012); Sharma, Kumar and Venkateshan (2016) found a significant relationship of knowledge with the patient's illness duration.

Present study found that the practice of patients belonging to '8th pass to Illiterate category' improved more than those from higher education

status. Unlike these findings, a study done by Roy, Gurjar and Bhattacharjee (2017) found that self-care ability of patients was significantly associated with their age, gender, and marital status.

Also, in the present study the married patients gained higher Self-Efficacy than the unmarried ones. In contrast, a similar study led by Curtin, Walters, Schatell, Pennell, Wise and Klicko (2008) found Self-Efficacy had no consistent relationship with the demographic or health characteristics of patients.

CONCLUSION

Study indicated that the e-SIM was a highly effective method of providing health education to the dialysis patients as it improved their knowledge on self-management. Moreover, it emphasized on the need for information updates and education on self-management of the dialysis patients via continuous reinforcement using a systematically planned educative material to enhance their knowledge, practice and self-efficacy of self-management on MHD. Thus, the e-SIM serves as an accessible, interactive and flexible way of educating the dialysis patients.

APPLICATIONS TO NURSING PRACTICE

- Use of the e-SIM by nurses as an educative material to foster self-responsibility in the patients for the self-care
- e-SIM is a safe, user-friendly and non-invasive form of nursing intervention for promoting Self-Management behaviors among patients
- Serves as a diversion therapy for long medical procedure like Dialysis
- Relatives of dialysis patients may also use to aptly attend to patient's needs

ACKNOWLEDGEMENT

The author would like to thank Dr. Mini George and Dr. Dibyajyoti Kalita for the expert guidance, valuable advices, dynamic supervision, providing an access to various resources and helpful information for this study. A special thanks to Mr. Dinesh Taneja for his exemplary help in making of the e-SIM in this study. Moreover, would like to thank all the subjects who enthusiastically participated in this study.

CONFLICT OF INTEREST STATEMENT

The results presented in this article have not been published previously in whole or part. The other authors have no financial interest to declare relevant to this work.

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