
Patient adherence to Continuous Ambulatory Peritoneal Dialysis treatment in a low-resource setting: An interventional study

Yapa M.S.S.¹, Chaminda J.L.P.¹, Amaraweera T.H.N.G.²

¹Ministry of Health, Sri Lanka

²Uva Wellassa University, Sri Lanka

Abstract

Background: Continuous Ambulatory Peritoneal Dialysis (CAPD) is an affordable home-based treatment method for low-resource settings. Currently, CAPD facilities in low-resource settings are expanding in Sri Lanka. Non-adherence of patients and caregivers to the treatment is a major problem.

Objective: To assess the current adherence and outcome of CAPD in low-resource settings, design an intervention to reduce the current shortcomings and evaluate the results of the intervention for improving patient adherence.

Methods: This was an interventional research project with patients undergoing CAPD. Interviewer-administered questionnaires and key informant interviews during the pre and post-intervention stages were used to assess adherence. Gaps identified after analysing the results of pre-intervention were used to design the intervention. Three “one-day” workshops were conducted to improve adherence. The new system was introduced and continued for five months, after which post-intervention was assessed. McNemar’s and paired t-tests were used to measure the statistical significance.

Results: Most of the participants were males, aged 50 to 59 years. Results showed that intervention proved to be effective in improving overall feelings about current health conditions ($p=0.004$). The number of days a patient stayed in a hospital

decreased after the intervention ($p=0.001$). It showed a positive effect on overall personal hygiene practices ($p=0.000$). Further, intervention positively impacted record keeping ($p=0.096$).

Conclusion: The intervention significantly contributed to improving patient adherence and caregivers’ knowledge. Continuous assessment, training programs, and home visits for problematic patients should be implemented to improve adherence and sustainability of the CAPD.

Keywords: Continuous Ambulatory Peritoneal Dialysis, Low resource setting, Chronic Kidney Disease

Introduction

Chronic Kidney Disease (CKD) is recognized as a major public health problem in Sri Lanka. Males aged between 40 and 69 years in North Central, Uva, North Western, and Central Provinces in Sri Lanka suffer from CKD and Chronic Kidney Disease of unknown etiology (CKDu). There is conflicting evidence of familial clustering ^[1,2]. Over 20,000 deaths due to CKD and CKDu were recorded in the last decade and the majority of CKD victims were middle-aged male farmers ^[3,4]. Mahaweli C region is identified as a high-risk geographic area for a high prevalence of CKD ^[5].

Treatment options for end-stage renal failure patients are Kidney Transplant (KT), Haemo Dialysis, and Peritoneal Dialysis (PD). Continuous Ambulatory

Peritoneal Dialysis (CAPD) has been identified as a more affordable, home-based treatment where patients or their caretakers attend to all PD procedures [6]. Global trends in rates of peritoneal dialysis show that approximately 11 % of the global dialysis population (197,000 patients) use CAPD as a long-term life-sustaining treatment [7]. However, studies have shown that poor bag exchange techniques result in an over 5-fold increase in the risk of peritonitis [8]. Hence, adequate training and knowledge of CAPD procedures are essential. According to the guidelines published by the International Society of Peritoneal Dialysis, a 1:1 trainer-to-patient ratio, experienced trainer, flexible and individual training methods, retraining, home training, and home visits are recommended for better outcomes of CAPD treatment [9-11]. Knowledge of patients on the value of the treatment, individualizing patient care, encouraging the use of community support, providing instructions and appropriate instructional materials, and decreasing the complexity of medication treatment are also important to minimize non-adherence to CAPD treatment [11,12]. Further, formal counselling or psychological treatment is needed in the case of depression and/or anxiety, substance abuse, coping problems, cognitive psychiatric disorders, and non-adherence to treatment [13].

Several pilot programs have been undertaken by the healthcare sector in Sri Lanka to explore the possibility of introducing CAPD [3,14,15]. Currently, CAPD facilities are expanding in Sri Lanka to facilitate dialysis for patients living in remote areas, especially in low-resource settings while providing greater freedom to work, reducing the time burden of dialysis,

and reducing the cost of renal replacement therapy [14].

According to Hospital statistics of Divisional Hospital (DH) Girandurukotte, 45 patients have undergone CAPD treatment from year 2015 to 2018. Among these patients, 29 patients are continuing CAPD treatment while four patients have removed the CAPD catheter and three patients have shifted their treatment to a KT by 2019. Nine CAPD patients have died due to peritonitis (n=5), suicide (n=2), and other reasons (n=2). Furthermore, psychological problems, catheter block and difficulty in fluid removal, abdominal hernia, pain, electrolyte and fluid imbalances, and loss of appetite were identified as complications. Such situations were most probably due to the non-adherence of patients and caregivers to the treatment regime.

Objective

To assess the current adherence and outcome of CAPD treatment procedures in low-resource settings, design an intervention to reduce the current shortcomings of CAPD treatment procedures and evaluate the results of the intervention for the possibility of improving patient adherence to CAPD treatment.

Methodology

This interventional research project was conducted in three stages, i.e. pre-interventional, interventional, and post-interventional among all 29 patients already undergoing CAPD treatment procedures in the Mahaweli C region (low resource setting) at Base Hospital Giradurukotte. A pre-tested Interviewer Administered Questionnaire (IAQ) and Assessment Form (AF), developed based on Hays et al., 1994 and Baxter Healthcare Corporation, 2012

were used to identify the adherence to CAPD treatment at the pre-interventional stage by two trained interviewers^[16,17]. The results obtained from the pre-intervention were analysed and gaps were identified under key areas. Strategies were identified to improve patient safety practices, and a workshop plan was prepared to operationalize the strategies.

Key Informant Interviews (KII) were conducted with the District Medical Officer (DMO), the Visiting Nephrologist, the Senior Medical Officer (SMO) in the clinic, the Chief Nursing Officer (CNO) of the clinic, pharmacists, the Medical Laboratory Technologist to assess problems with the presently used system, its gaps, and suggestions for improving patient adherence to CAPD treatment in the low-resource setting. Three “One-day workshops” for CAPD patients and their caregivers were conducted by the SMO and CNO-renal unit, public health nursing officer, and counsellor to improve patient adherence to CAPD treatment. This workshop was conducted to improve knowledge and practices on the personal hygiene of the patient, the status of record maintenance, the status of the exchange room environment, and compliance with the prescription.

The new system was used for five months from the time of implementation. At the end of this period, the post-interventional assessment was done to determine adherence to CAPD treatment by using the same IAQ and AF. The results of pre-intervention and post-intervention were used to evaluate the effect of the intervention. Quantitative data analysis was done using the statistical software application SPSS version 22. McNemar’s test was performed to assess the statistical

significance of pre and post-interventional results.

Ethical clearance was obtained from the ethical review committee of the Postgraduate Institute of Medicine, University of Colombo. Administrative clearance was obtained from the Regional Director of Health Services, Badulla, and DMO DH Girandurukotte.

Results

All participants in KII stressed the “importance of improving patient adherence to CAPD treatment in low resource setting”. Most of the participants explained that it is not available for CAPD patients at present. Further frequent risk analysis methods, continuous training, and awareness programs were recommended. Some of the participants of KII emphasized the “importance of helpline/24-hour hotline, for guidance, advice, and additional information exchange”. Most of the participants expressed that they perceived some improvement in patient adherence to CAPD treatment after the intervention and they had seen some improvements in the physical, mental, social, and spiritual well-being of the CAPD patients.

Among 29 patients undergoing CAPD treatment, the majority were males (89.7%) in the age group of 50 to 59 years (37.9%), engaged in cultivation (41.4%), and had a low education level below GCE (O/L).

Table 1 shows the overall feeling about the current health condition before and after the intervention. According to McNemar’s test statistics, patients felt good about their health condition after the intervention, and the intervention positively affected the patient’s current health condition ($p=0.004$).

Table 1: Overall feeling about the current health condition

	Observed frequencies under 4-Likert-scale				McNemar's test		
	Very Good (%)	Good (%)	Fair (%)	Poor (%)	Good	Poor	P-value
Before (n=29)	1(3.45)	4(13.79)	20(68.97)	4(13.79)	5	24	0.004
After (n=29)	3(10.34)	11(37.39)	15(51.72)	0	14	15	

Among all four categories, Very Good and Good categories were amalgamated as Good while Fair and Poor categories as Poor. Then, frequencies of those two categories were calculated before and after the program and compare those frequencies using McNemar’s test.

Table 2 summarizes the results of the patient assessment of their body pain during the previous four weeks. The body pain of most patients declined significantly after the intervention, as they were aware of the treatment and followed the treatment steps more correctly than before (p=0.002).

room environment of the patient were assessed by assessment form. Table 4 summarizes the percentage of correspondence to the assessment form. The majority of patients advanced their knowledge of the processes of each criterion after the intervention. Although

Table 2: Body pain during the previous four weeks

Measures	Observed frequencies under 5-Likert-scale					McNemar's test		
	None (%)	Very mild (%)	Mild (%)	Moderate (%)	Severe (%)	No	Yes	P-value
Before (n=29)	5(17.24)	6(20.69)	5(17.24)	9(31.03)	4(13.79)	16	13	0.002
After (n=29)	9(31.03)	17(58.62)	3(10.34)	0	0	29	0	

“None, Very mild and Mild” were amalgamated as “No”, while “Moderate and Severe” categories as “Yes”. McNemar’s test was then performed

The number of days a patient stayed in a hospital due to complications related to CAPD treatment, before and after the intervention was assessed (Table 3). After the intervention, the number of days a patient stayed in a hospital decreased. The p-value (p=0.001) indicates that there is a positive effect of the intervention.

Personal hygiene, the status of record maintenance, and the status of the exchange

more than 50% of patients followed many of the standards correctly before the intervention, it was statistically proven, that “a” parameter and “b” parameters in personal hygiene assessment improved significantly. It showed a positive impact on the patient’s adherence to “Six-step hand washing” and “Agent used for cleaning hands” due to the intervention (Table 4). The exchange room environment and record-keeping revealed quantity-wise

Table 3: Total number of days patients stayed in a hospital in the last 5 months

Measures	Number of days stayed in a hospital				McNemar's test		
	0	1-5	6-10	>10days	No	Yes	P-value
Before(n=29)	15(51.72)	6(20.69)	1(3.45)	7(24.14)	15	14	0.001
After(n=29)	26(89.66)	2(6.90)	1(3.45)	0	26	3	

“1-5, 6-10, and >10 days” categories were merged as “Yes”.

Table 4: Percentage of responses to the assessment form

Assessment Form	Assessment Form	Before	After	McNemar's
		(%)	(%)	test p-Value
Personal Hygiene	a. Six-step hand washing	6.9	65.5	0.000
Assessment Form	b. Agent used for cleaning hands	17.2	55.2	0.013
	c. Does the patient dry his/ her hand after six step hand wash	58.6	72.4	0.453
	d. Daily bath	69.0	86.2	0.227
Exchange Room	a. Closed windows	79.3	89.7	0.508
Environment	b. Closed doors	82.8	93.1	0.453
Assessment Form	c. Fan switched off	96.6	100.0	1.000
	d. Work surface (tabletop) cleaned with disinfectant	48.3	69.0	0.210
Record Keeping	a. Record maintained	44.8	72.4	0.096
Assessment Form				

improvement after the intervention. However, the improvement is statistically insignificant (Table 4).

Discussion

The majority of the participants in the study were males (89.7%) in the age group of 50

to 59 years (37.9%), engaged in cultivation (41.4%), and had a low education level below GCE (O/L). This age category and occupation are comparable with most victims of CKD identified in Sri Lanka [3,4]. Russo et al., 2006 highlighted the need for the re-training of CAPD patients of

that age category, especially patients with lower education levels ^[18]. The test results on feelings about the current health condition ($p=0.004$), and body pain ($p=0.002$) are significant. This indicates the intervention positively affected the patients' general health condition.

A randomised controlled trial for CAPD from a nurse-led telephone support model in China showed statistically significant positive effects on observed pain reduction ($p\text{-value}=0.00$) and general health perception ($p=0.00$) ^[19]. This study shows similarities with the present study and implies that the reinforcement of knowledge and ability to correctly perform CAPD treatment is vital for improving the general health condition of CAPD patients.

Sayed et al., 2013 reported that only 38% of CAPD patients and caregivers demonstrated proper hand-washing techniques, and 8% of the patients used soap ^[18]. The present study also showed that only 6.9 % of patients followed the six-step hand washing and 17.2 % used disinfecting agents for hand washing before the intervention. The intervention in this study positively affected the patient's adherence to six-step hand washing ($p=0.000$) and the agent used for cleaning hands ($p=0.013$). Moreover, the overall indicator for personal hygiene assessment also improved after the intervention in this study ($p=0.000$).

According to Sayed et al., 2013, only 28 % of patients maintained records in the logbook [20]. The current study showed that 44.8 % of patients maintained records before the intervention. The level of record maintenance was enhanced to 72.4 % after the intervention.

Conclusion

This project aimed to improve patient adherence to CAPD treatment in the low-resource setting. The outcome indicators were used to evaluate the effectiveness of the interventions using interviewer-administered questionnaires and assessment forms.

The intervention proved to be effective in improving the overall feeling about the existing health condition, reduced body pain, and positive effect on the patient's adherence to treatment. The number of days a patient stayed in a hospital due to problems associated with the CAPD treatment decreased after the intervention. Hence the project clearly showed an improvement in patient adherence to CAPD treatment in the low-resource setting due to the intervention.

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