Original Article

Bayero Journal of Nursing and Healthcare
bjnhc.nur@buk.edu.ng
Maiden Edition,
June 2019 . Pages 122-132

Assessment of Adherence to Treatment Regimen among Haemodialysis Patients in Selected Hospitals in Kano Metropolis Kano State, Nigeria.

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Abstract
Adherence to treatment regimen improves health related quality of life of haemodialysis patients. The study was aimed at determining the level of adherence to treatment regimen among haemodialysis patients receiving treatment in selected facilities of Kano metropolis. The study employed a descriptive cross sectional design and eighty three (83) haemodialysis patients formed the sample size. A standardised data collection form End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ) was adapted for the study. The data collected was analysed using SPSS version 24. The results shows that the mean age of the patients was 43.9±12.7 years, 53% were male and majority are married (78.3%). Mean years on dialysis was 1±1.1. Majority of the patients had two haemodialysis sessions (62.7%) per week, 90.4% spent 4 hours per session. The total adherence level was 55.4%. Financial constrains, clotted vascular access, poor knowledge of fluid and dietary restrictions were found to significantly affect adherence level. Pearson's correlation coefficient revealed a weak positive correction with statistical significance between marital status and adherence ($r = 0.224$, $p = 0.042$). The study concluded that there is a large number of non-adherences to haemodialysis treatment regimen among these patients. We therefore recommend that health care professionals need to improve on patients' education and the government should subsidize the cost of treatment for haemodialysis patients as this will improve their adherence.

Keywords: *Adherence, End-Stage Renal Disease (ESRD), Haemodialysis, Health Related Quality of Life (HRQoL)*

Background

The number of patients with End-Stage Renal Disease (ESRD) requiring renal replacement therapy (RRT) globally is estimated at over two million, yet this number may only represent 10% of people who actually need treatment to live (Couser, Remuzzi, Mendis & Tonelli, 2011: National Kidney Foundation, 2015). In Africa the number of patients with ESRD requiring dialysis is estimated at 949,000 (Liyanage, Ninomiya, Jha, Neal & Patrice, 2015). In Nigeria, the situation is such that CKD represents about 8–10% of hospital admission (Ulasi & Ijeoma, 2010). In Nigeria, as in most other developing countries, there is no social security system or health insurance scheme in place to assist the patient, and the burden is borne solely by the patient and relatives (Ulasi & Ijeoma, 2010: Makusidi, Liman, Yakubu, Isah, Abdullahi & Chijioke, 2014).

Adherence inpatient with ESRD undergoing haemodialysis usually defined as consisting attendance at haemodialysis sessions, adherence to the recommended medications,

fluid and diet restrictions (Sontakke, Budania, Bajait, Jawaisal & Pimpalkhute, 2015; Masina, Chimera, Kamponda & Dreyer, 2016). Lack of adherence to prescribed ESRD treatments is a public health issue, as it is a major contributor to poor outcome (Venkateswararao, Stephen, Indoria & Rama, 2015).

The available literature on haemodialysis patients' non-adherence identify a range of reasons for this behaviour one of which is inadequate education about their illness and illness management (Allen, Wainwright & Hutchinson, 2011). According to Chan, Zalilah and Hii (2012), and Venkateswararao et al., (2015), inadequate health knowledge, self-efficacy skills, forgetfulness, and financial constraints were the major perceived barriers towards better adherence to fluid, dietary regimen, medication and haemodialysis.

Dietary restriction especially protein is one of the key treatment modalities for a patient undergoing haemodialysis. Dietary protein may be decreased to around 60g per day or 0.6g/kg body weight and limited to protein high in essential amino acids (Hinkle & Cheever, 2013) and according to them sodium, patassium and phosphote rich diet are also restricted to prevent fluid retention and acidosis.

ESRD patients are expected to continue on haemodialysis for life except where they undergo a kidney transplant. Gracia-Llana, Remor, and Selgas, (2013) believe there is a positive correlation between the frequency of dialysis sessions and adherence. Adherence to dialysis shows a wide range of results. Various studies have reported about 52% adherences for dialysis sessions among haemodialysis patients in Makah and Palestine (Al-Khattabi, 2014: Naalweh, Barakat, Sweileh, Al-Jabi & Zyoud, 2017), Lam, Lee and Shiu (2014) reported that adherence to dialysis sessions is almost 100% at an acute renal unit hospital in Hong Kong because patients perceived that dialysis drained toxins out of their body and keep their condition under control. In a similar study, Chan et al. (2012) reported 91% adherence for dialysis sessions among Chinese patients.

According to Tovazzi and Mazzoni (2012), 42% of patients with ESRD are adherent to their fluid restrictions while 58% are not. Chan et al. (2012) reported 24.5% adherence to fluid restriction and 27.7% to dietary restrictions among dialysis patients in Malaysia while Naalweh et al. (2017) reported 31% adherence to fluid and 24% to dietary restriction among haemodialysis patients in Palestine. Al-Khattabi (2014) reported higher adherence to fluid 87.9% and 88.4% for dietary restrictions among haemodialysis patients in Makah.

According to Sontakke et al. (2015), 34% of patients were non-adherent to a prescribed medication schedule, whereas 37.33% of the patients showed low adherence and only 28.67% were adherents to their medications among chronic kidney disease patients in India. Other studies show higher percentages for medication adherence; Naalweh at al. (2017) 81%, Chan et al. (2012) 66.5% and 87.99% was reported by Al-Khattabi (2014).

Poor adherence was found to have a positive correlation with a number of concurrent illnesses and a number of medications prescribed and not buying all medicines and not taking medicines for the required duration were the most common types of Non-adherence (Sontakke, et al., 2015). Other reports observed that non-adherence is most common for fluid restrictions and somewhat less common for dietary restrictions and medication (Theofilou, 2012). Some factors associated with non-adherence include; forgetfulness and inability to abstain from the desire to eat or drink especially when the restrictions were newly imposed on the patients (Lam, et al., 2014). Naalweh et al. (2017) reported that overall adherence of patients to the dialysis treatment regimen is

such that 55.5% of patients have good adherence score while 40.5% have moderate adherence and 4.1% have poor adherence score on an adherence score scale of 100. Al-Khattabi (2014) observed that there are widely divergent results from different studies about the prevalence of adherence to dialysis treatment regimen due to the lack of clear cut and consistent definition of adherence.

Adherence is related to people's knowledge and beliefs about their illness, motivation to manage it, confidence in their ability to engage in illness management behaviours, and expectations regarding the outcome of treatment and the consequences of poor adherence. Some of the factors that may influence adherence include:

1. Demographic and Socio-economic factors-. Haemodialysis sessions frequency is often limited by financial constraint to below the standard practice of thrice-weekly (Nguyen, Bose, & Finkelstei, 2016). According to Makusidi et al. (2014), only about 12% of the patient could sustain at least two sessions per week of haemodialysis before defaulting because of financial constraint. Most haemodialysis treatment in sub-Saharan Africa is provided in fee-paying haemodialysis units (Nguyen et al., 2016). According to Lam et al., (2014) a major factor influencing adherence is support from family members. Age, gender and residence have been shown to have a positive association with adherence, specifically elderly male patients living in the city have better adherence (Naalweh et al., 2017). But Ibrahim, Hossam, and Belal, (2015) reported that there were no statistical differences between adherent and non-adherent patients with regards to age, gender, educational level and employment status.
2. Health care system factors; Lack of positive reinforcement from the health care provider, weak capacity of the system to educate patients and provide follow-up care can lead to poor or low adherence (Gracia-Llana et al., 2013).
3. Treatment-related dimensions; According to Wells (2015) complexity of treatment regimen (number of daily doses of drugs), dietary restrictions, time spent on haemodialysis per week, frequent changes in treatment regimen, social stigma attached to constructed arteriovenous fistulas and arteriovenous graft, unpleasant side effects of haemodialysis treatment interfere with lifestyle or require significant behavioural changes which could promote non-adherence. Unpalatable taste and not liking the allowable foods was the reason given for non-adherence with diet and fluid restrictions among ESRD patients undergoing haemodialysis (Wells, 2015).
4. Lack of knowledge and Misconception; Lack of knowledge about the usefulness of treatment regimen is another reason reported for non-adherence (Venkateswararao et al., 2015). Lack of awareness about type and quantity of food to be restricted, how to tackle thirst and wrong perception of the patient that haemodialysis will help in the removal of all fluid consumed (Gracia-Llana et al, 2013). Thus, it is evident that low health literacy along with complex treatment schedule contributes to Non-adherence (Chan et al., 2012; Sontakke et al., 2015).

Material and Methods

Design: A descriptive cross-sectional research design was used for the study. The study was conducted at Aminu Kano Teaching Hospital and Muhammad Abdullahi Wase Specialist Hospital Kano. Eighty-three patients from both hospitals were recruited for the study

using census sample size. The end-stage renal disease adherence questionnaire (ESRD-AQ) by Kim, Evangelista, Phillips, Pavlish, and Kopple (2010) was modified and used for the study.

Final grading score of less than 50 indicates low adherence, a score of 50 to 74 indicates moderate adherence, while a score of 75 to 100 is indicative of good adherence. The questionnaires were administered to the respondents by the researchers. Ethical clearance and permission for conduct of the study were obtained from the Health Research Ethics Committees of both hospitals (AKTH/MAC/SUB/12A/P-3/VI/2079 and MOH/HO/797/T.I/351). Patients' confidentiality was maintained and participation was voluntary. Statistical Package for Social Sciences (SPSS) version 24 statistical software was used for data analysis.

Results

Results of the study are shown in frequency and percentages tables. Mean and standard deviations were also shown where applicable.

The result shows the mean age of the respondents was 43±12.67. About half of the respondents were male 44(53%), the majority were married 65(78.3%) and practice Islam as religion 60(72.3%) while 77.1% were literate. Table 2 showed that majority of the respondents were on dialysis for less than a year 52(62.7%) and about a quarter 21 (25.3%) for one to two years. The mean duration of dialysis was 1±1.1 years. The major source of fund for dialysis was from family and relatives of the patients 57(68.7%). Most of the respondents attend dialysis twice a week 52(62.7%) and 75(90.4%) spent 4 hours on dialysis per session. About half of the patients 47 (56.6%) live within 10 Km radius of the dialysis centres. While about a quarter (24.1%) lived at a distance greater than 50 km from the dialysis centres.

Adherence to dietary restriction is the highest with 70(84.3%) having good adherence score, followed by adherence to medication 62(74.7%) and adherence to haemodialysis is the lowest 34(41.0%). The table also shows that the overall adherence level (i.e. when the four components of adherence are summed up together) of the patients are good 46(55.4%), moderate 25(30.1) and low 12(14.4%) for treatment regimen.

Table 4 showed that the major factors affecting adherence to treatment regimen are; lack of fund 21(25.3%) and side effects of dialysis 20(24.1%), for shortening dialysis session. Major factors affecting another component of the treatment regimen as shown in the table are the inability to control thirst for fluid restriction 60(72.3%) cost of medicine 17(20.5%), and not willing to control diet for dietary restriction 13(15.7%).

Table 1 Socio-Demographic Characteristics of Respondents (n =83)

Variable	F	%
Age in years		
18–24	5	6
25-31	11	13.3
32-38	14	16.9
39-45	19	22.9
46-52	6	7.2
53-59	19	22.9
60 and above	9	10.8
Mean age = 43.94±12.65		
Gender		
Male	44	53
Female	39	47
Marital status		
Single	12	14.5
Married	65	78.3
Divorced	2	2.4
Widowed/widower	4	4.8
Educational qualification		
Tertiary	32	38.6
Secondary	22	26.5
Primary	10	12.0
Informal/Qurʾānic	19	22.9
Occupation		
Student	19	22.9
Business	20	24.1
Artisan	2	2.4
Civil servant	18	21.7
Unemployed	11	13.3
Housewife	13	15.7
Religion		
Islam	60	72.3
Christianity	23	27.7

Table 2: HaemodialysisTreatment History of Respondents (n = 83)

Variable	F	%
First started dialysis		
Less than 1 year	52	62.7
1 – 2 years	21	25.3
3 – 4 years	5	6.0
5 – 6 years	3	3.6
Above 6 years	2	2.4
Mean year = 1.0±1.1		
Sessions of dialysis per week		
2	52	62.7
3	31	37.3
Numbers of hours per session		
Less than 3	1	1.2
3	6	7.2
4	75	90.4
More than 4	1	1.2
Distance of dialysis centre from home (KM)		
Less than 10	47	56.6
11 – 20	6	7.2
21 – 30	6	7.2
31 – 40	2	2.4
41 – 50	2	2.4
Above 50	20	24.1
Source of fund for dialysis		
Self-sponsored	19	22.9
Family / Relatives	57	68.7
Employer	6	7.2
A philanthropist	1	1.2

Table 3 Level of Adherence to the Treatment Regimen of Haemodialysis Patients (n =83)

Variable	Poor		Low		Moderate		Good		Mean±SD
	F	%	F	%	F	%	F	%	
Haemodialysis	5	6.9	17	20.5	27	32.6	34	41.0	58.14±21.06
Medication	-	-	1	1.2	20	24.1	62	74.7	81.63±24.41
Fluid	1	1.2	4	4.8	31	37.3	47	56.6	68.98±23.29
Dietary	-	-	6	7.2	7	8.4	70	84.3	81.93±21.50
Overall adherence	-	-	12	14.5	25	30.1	46	55.4	67.86±15.68

*Poor < 25, Low; 25-49, Moderate; 50-74, Good; 75- 100

Table 4 Factors affecting Adherence to Haemodialysis Treatment Regimen among Haemodialysis Patients (n = 83)

Questions / Responses	F	%
Reason for missing dialysis?		
Did not miss dialysis	40	48.2
Transportation problem	11	13.3
Lack of fund	21	25.3
Clotted vascular access	8	9.6
Hospitalised	3	3.6
Reason for shortening dialysis time?		
Did not shorten dialysis time	40	48.2
Side effects	20	24.1
Clotted vascular access	17	20.5
Work schedule	2	2.4
Transportation problem	1	1.2
Staff convenience	3	1.6
Reason for missing medication?		
Did not miss any medication	54	65.1
Medicine cost	17	20.5
Side effects to medications	4	4.8
Forgetfulness	5	6.0
Drug not available	3	3.6
Kind of difficulties you had with fluid restrictions?		
Not interested	8	9.6
Unable to control thirst	60	72.3
Don't understand the restrictions	8	9.6
Others	7	8.4
Type of difficulties you had with dietary restrictions?		
No difficulty	56	67.5
Not willing to control diet	13	15.7
Unable to control certain diet	11	13.3
Lack of knowledge	1	1.2
Others	2	2.4

Table 5 Pearson's Correlation Coefficient on Socio-Demographic Data of Patients and Adherence to Haemodialysis Treatment Regimen

Variable	Pearson's (r)	P value
Age	-0.073	0.511
Gender	0.073	0.509
Marital status	0.224	0.042*
Religion	0.072	0.518
Occupation	-0.054	0.625
Education	-0.090	0.418
Year first started dialysis	-0.128	0.247

*Significant

Table 5 shows that there is a weak positive correlation and statistical significance between marital status and adherence to haemodialysis treatment regimen of the patients, r = 0.224 P = 0.042. This means that married patients have better adherence to treatment regimen compared to unmarried patients if all other conditions are similar.

Discussion

The overall level of adherence of the patients from the study revealed that about half of the patients 55.4% have a good level of adherence to the treatment regimen. This is similar to the findings of Naalweh et al., (2017) that also reported 55.5% for adherence among Palestine dialysis patients.

In relation to adherence to the components of the treatment regimen, finding from this study revealed that good level of adherence behaviour was highest for diet (84.3%) and lowest for haemodialysis (41.0%). These findings are contrary to those reported by Chan et al. (2012) that reported 27.7% and 91.0% for dietary and haemodialysis adherence respectively in a study conducted at Malaysia and Ibrahim et al. (2015) who also reported 64% good level of adherence to haemodialysis sessions in another study conducted among haemodialysis patients at Al Agouza Hospital in Egypt. The possible explanation for the low adherence to dialysis sessions in the present study could be linked to; the difficulties associated with transportation and the long distances of the dialysis centre as against the developed countries where hospital ambulances possibly picked patients right from their homes. Another reason may be due to patients paying for their haemodialysis session out of pocket, which means patients only go to the dialysis centre when they have money to pay for their dialysis sessions.

Unlike in other countries where there is social health insurance for people with kidney diseases undergoing haemodialysis as submitted by Kugler, Meading, & Russel (2011). Lastly, poor vascular access (as most patients are on catheter access), due to repeated clotting as well as the repeated puncturing of the vascular site leading to fibrosis of the blood vessels present difficulties in having the dialysis. This is unlikely in developed countries where almost all the patients are having arteriovenous fistula created before the commencement of dialysis in all ESRD patients (Daugirdas, Blake, & Ing, 2014).

For adherence to medication and fluid restrictions, the study revealed a good level of adherence in 74.7% and 56.6% for medication and fluid respectively. Naalweh et al. (2017) reported 81% and 31% good level of adherence to medication and fluid respectively and Chan et al. (2012), reported 66.5% and 24.5% for a good level of medication and fluid adherence respectively. This shows that adherence to medication is often higher than that of fluid adherence from the various studies available which is similar to the result of this study in respect of medication and fluid adherence.

The explanation is that the general perception is that medication is seen as a necessity for every illness while the fluid restriction is not. The studied sample though have better adherence to fluid (56.6%) as against what was reported in other studies. The high level of adherence to fluid in this study could be due to smaller sample size or due to lack of uniformity in the cut-off point used to determine adherence and non-adherence among the various studies as observed by Al-Khattabi (2014). It could also be due to patients overrating their adherence level to fluid since the assessment tool relied only on patient's subjective assessment of his or her adherence level as Kugler et al. (2011) reported wide variations in self-reported adherence against laboratory values.

This study found that the factors affecting adherence were lack of funds, clotted vascular access site, transportation problem and side effects to dialysis and medications. Other factors affecting fluid restriction and dietary adherences are the inability to control the fluid intake and certain foods, lack of knowledge and understanding of fluid and dietary restriction. According to Makusidi et al. (2014), only about 12% of patients could sustain at least two sessions per week of haemodialysis before defaulting due to

financial constraint. Gracia-Llana et al. (2013) and Wells, (2015) identified lack of positive reinforcement and weak capacity to educate patients by health care providers as some factors that often lead to low adherence level among haemodialysis patients. The findings of Gracia-Llana et al., (2013) and Wells (2015) can be likened to lack of knowledge and understanding of dietary and fluid restrictions identified in this study. Similar to the findings in this study, Kugler et al., (2011) and Wells (2015) identified unpleasant side effects of haemodialysis and medications for promoting non-adherence. Whenever a patient experiences the severe side effect of dialysis such as hypotension, fever, disequilibrium syndrome, etc, he or she is likely to miss the next session because of fear of experiencing the same.

When Socio-demographic variables were correlated with adherence, the result revealed that there were a weak positive correlation and a statistically significant relationship between marital status and adherence to the treatment regimen ($r = 0.224$ $p = 0.042$). This means that married patients may have a better adherence level compared to unmarried patients or those without spouse if all other condition remains the same. This is similar to the findings of Lam et al., (2014) who reported better adherence among patients that have spouses and family support.

There was however no statistically significant relationship between other socio-demographic variables such as gender ($P = 0.461$), religion ($P= 0.099$), occupation ($P = 0.077$) and adherence to treatment regimen. This is similar to what was reported by Ibrahim et al. (2016) that there were no statistical differences between adherent and non-adherent haemodialysis patients with regards to age, gender, education and employment status. This was however different from the study of Naalweh, et al. (2017) who reported the positive association of age, gender and residence with adherence scores in study conduct at An-Najah University Hospital in Palestine. These divergent reports may be due to some other extraneous factors such as environment, sample size and the mean ages of the studied populations.

Conclusion

It was concluded that a significant percentage of haemodialysis patients are non-adherent to the treatment regimen. Lack of fund, clotted vascular access, transportation problem, side effects of the drugs and haemodialysis are the major factors affecting adherence to the treatment regimen. It was recommended that dialysis centres should put in place routine educational programmes for patients and that all haemodialysis patients in both centres should have permanent vascular access created. The federal and state government should subsidize the cost of dialysis treatment or if possible make it free.

Conflict of interest

No conflict of interest in this study.

Acknowledgement

We gratefully acknowledge the unrestricted support of the nursing staff of the haemodialysis centres of the hospitals this study was carried out.

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