

## Adherence to Haemodialysis Among Chronic Renal Failure Patients of a Tertiary Health Facility, Benin City, Edo State

Ehwarieme Timothy A<sup>1</sup> and Awhim Blessing<sup>2</sup>

### ABSTRACT

**Background:** The prevalence of chronic renal failure (CRF) is becoming alarming among patients which necessitates management with dialysis. **Objective:** This study assessed the level of adherence to haemodialysis among chronic renal failure patients. **Method:** A descriptive cross-sectional survey design was adopted in a sample size of 200 patients attending a nephrology unit in a tertiary hospital in Benin using a standardized instrument (ESRD-AQ) and a convenience sampling technique. Data obtained was analysed using descriptive statistics while hypotheses were tested using Chi-square and multiple logistics regression at 5% significant level. **Result:** Majority 167(83.5%) have a poor level of knowledge, 147(73.5%) have a poor level of adherence. Financial constraints, lack of transportation, forgetfulness, and long waiting times were factors affecting adherence. Multiple logistics regression shows that respondents 18 – 30years are nine times (O.R. = 9.23; C.I. = 0.94-90.92) more likely to adhere than those who are greater than 60years, Males are 12% (O.R. = 0.88; C.I. = 0.40-1.90) less likely to adhere than females. Married patients are twice (O.R. = 2.40; C.I. = 0.65-6.39) more likely to adhere than those who are not, while respondents who are not educated are less (O.R. = 0.80; C.I. = 0.19-3.49) likely to adhere than those with college/university certificate. **Conclusion:** participants in this study had low level of knowledge as well as low adherence. There is a need for a structured teaching/awareness programme on the importance of adherence to dialysis to motivate individuals who have CRF and improve adherence thereby reducing suffering and improving quality of life.

**Keywords:** Adherence, Knowledge, Haemodialysis, Perceived factors, Chronic renal failure.

<sup>1</sup>Department of Nursing Science, School of Basic Medical Sciences, University of Benin, Benin City, Edo State. <sup>2</sup>School of Midwifery, University of Benin Teaching Hospital, Benin City, Edo State

#### Corresponding Author:

Timothy A, Ehwarieme  
Department of Nursing Science, School of Basic Medical Sciences, University of Benin, Benin City  
email: timy4real12@gmail.com, 0806069687

#### Introduction

The prevalence of Chronic renal failure (CRF) is becoming alarming among patients which necessitates management with dialysis indispensable for better outcomes, and adherence to prescribed treatment essential.<sup>1</sup> According to American kidney foundation<sup>2</sup>, treatment of end-stage renal disease (ESRD, chronic kidney failure) is demanding, multifaceted and complex, requiring strict patient adherence to treatment protocols to achieve favorable health outcomes and satisfactory quality of life. Providing treatment for ESRD patients is becoming more of a concern, especially since most treatment options are costly and would need to be balanced with the provision of other health services.<sup>3</sup> Hemodialysis (HD) is one of the renal replacement therapy most commonly used worldwide including in Nigeria. Though kidney transplantation is one of the best options that end-stage renal disease patients can choose from financial incapacity and lack of kidney donors have become another problem

#### Access this article online

Quick Response Code	
	website: <a href="http://www.bornomedicaljournal.com">www.bornomedicaljournal.com</a>
	DOI: 10.31173/bomj.bomj_2126_18



affecting these options. Therefore, haemodialysis has become the commonest treatment option for patients with end-stage renal diseases in both developed and developing countries like Nigeria. Nevertheless, non-adherence to treatment regimens may be a widespread problem of great clinical relevance among these haemodialysis patients.<sup>4</sup> Studies have shown that knowledge of and factors, which influence HD patient adherence, vary and may be treatment-related, condition-related, health system-related or socioeconomic.<sup>5</sup>

According to a study in Rwanda, 21(51%) ESRD participants adhered highly (scores < 80%) to HD. Seventeen (42%) adhered moderately (70-79%) while 3 (7%) had a low level of adherence to HD (below 70%). The factors associated with adherence to haemodialysis were age (mean = 27; 95% CI 26.76-29, 17;  $p = 038$ ) and religion (95% CI 26.29-60.12,  $p = 003$ ).<sup>6</sup> It was reported that more than half (58%) of patients reported non-adherence to dietary recommendations.<sup>2</sup> Also, a Turkish study revealed that the non-adherence rate was 39.1% for dietary and fluid restrictions, 33.6% for HD, and 20.1% for medication and the risk of non-adherence to dietary and fluid restriction was found to be four times higher in high school graduates.<sup>7</sup> In Aceh, Indonesia, it was reported that the percentage of patients who adhered to haemodialysis was 60% and there were significant relationships between haemodialysis adherence and satisfaction, self-efficacy, acceptance and social support.<sup>8</sup> Other studies also reported a poor level of adherence to haemodialysis among their respondents.<sup>5,9</sup>

Non-adherence to haemodialysis is an area of concern internationally among chronic kidney disease patients,<sup>6</sup> and the burden of kidney disease has increased in poorly-resourced regions due to increased exposure to infections, poverty, poor access to healthcare, and genetic predisposition to kidney disease, contributing further to the problems when managing CKD and acute kidney injury.<sup>10</sup> The Challenges of renal replacement therapy are overwhelming in Nigeria, also, the prevalence of chronic kidney disease is on the increase coupled with a high mortality rate despite the increase in the number of dialysis centres in Nigeria. This has impacted negatively on the patients, family members and society as a whole. What could have led to this? Could it be that the patient lacks knowledge of the importance of dialysis? Or other pertinent questions

are begging for answers among the patients and healthcare providers. Though studies abound on non-adherence to haemodialysis in Nigeria, there is a dearth of empirical literature in Edo state on the level of adherence with haemodialysis among patients with chronic renal failure, hence the need for this study. Specifically, the study objectives are to; ascertain the level of knowledge of the importance of haemodialysis among ESRD patients, determine the level of adherence to haemodialysis by ESRD patients and identify factors influencing adherence to haemodialysis by ESRD patients.

### Method

This was a descriptive cross-sectional study carried out in the University of Benin teaching hospital: a first generational tertiary health facility located in Egor local government area of Edo State, Nigeria. The institution serves as a referral, diagnostic, teaching and research centre with a well-equipped renal unit for haemodialysis and management of ESRD.

Two hundred patients with renal disease between the ages of 18 - 60 years who are on haemodialysis in the nephrology unit of the hospital were recruited between March and August 2020 using convenient sampling technique.

### Inclusion criteria

Patients with chronic renal failure receiving care/undergoing haemodialysis sessions in the study institution.

### Instruments for data collection

The End stage renal disease adherence questionnaire (ESRD-AQ)<sup>11</sup> which was a standardized instrument was adopted for the study. It is a 46-item questionnaire with five sections. The questionnaire was divided into (4) sections A, B, C, D. In section A, the respondents provided personal /demographic data. Section B, was on knowledge of the importance of adherence to haemodialysis which comprises 10 questions, a score of (1-3) was considered poor knowledge, a score of (4-6) was considered fair knowledge and a score of (7-10) was considered a good level of knowledge of the importance of adherence to haemodialysis. Section C was on Level of adherence to haemodialysis towards haemodialysis treatment, fluid, diet and medication



and results from correspondents were classified as either low level, moderate or high level of adherence to haemodialysis, while section D, was on factors affecting adherence to haemodialysis among ESRD patients, mean score greater than or equal to 2.5 is considered a factor.

**Validity/reliability of the instrument:** The instrument was subjected to face and content validity by two experts; a consultant nephrologist and a professor of measurement and evaluation. The reliability of the instrument was determined by conducting a pilot study. The questionnaires were administered to 10% of the target population, patients who came for haemodialysis at the renal unit in a similar tertiary institution in Benin City. Data was collected and analysed using split-half reliability using Cronbach Alpha and a value of 0.81, 0.89, and 0.75 respectively which shows the instrument was reliable.

**Method of data collection:** Two research assistants who were registered nurses working in the nephrology unit were recruited and trained on the modalities and ethics of administering the questionnaires. The questionnaires were administered to the patients prior to their dialysis session after informed consent have been obtained. It took them an average of 10 minutes to fill and was collected immediately.

**Method of data analysis.** Data collected were analysed using descriptive statistics (frequency and percentage). The hypotheses were tested using inferential statistics; chi-square, independent t-test, and multiple logistic regression at a 5% level of significance. Statistical package for the social sciences (SPSS) version 21.0 was used for all analyses.

**Ethical consideration:** Ethical approval for the study with protocol number ADM/E/VOL VIII/ 14831026 was obtained from the research and ethical committee of the University of Benin Teaching Hospital. Informed consent was duly sought. Assurance and adherence to confidentiality of information were maintained throughout the study.

Participation in the study was voluntary and also, anonymity was maintained throughout the study.

### Results

Socio-demographic characteristics of respondents Findings from the study showed that twenty-two (11%) were within 18-30 years, 56(28%) were 31-40 years, 35(17.5%) were 41-50 years, 24(12%) were above 60 years. Majority were males [125(62.5%)] 75(37.5%) were married, 41(20.5%) were single, 46(23%) were separated and 38(19%) were widowed. Forty (20%) were not educated, while 45(22.5%) had primary education, 87(43.5%) had secondary education, and 28(14%) had college/university education. Most 95(47.5%) were self-employed, 51(25.5%) were public servants and 54(27%) were unemployed. Monthly earnings in Naira were as follows: 148(74%) earned less than 50,000, 36(18%) earned between 50000-100000, 6(3%) earned 100,000 to 200,000, while 10(5%) earned more than 200,000. Majority 162(81%) were Christian adherents.

### Description of the duration of ESRD among respondents

Findings showed that the majority 113(56.5%) were diagnosed with ESRD 3 months to 1 year, 61(30.5%) reported theirs was more than a year to 2 years, 17(8.5%) reported theirs was more than 2 years to 3 years, 5(2.5%) reported that theirs was more than 3 years to 5 years, 4(2%) reported theirs was more than 5 years. It was reported by the majority 159(79.5%) that their haemodialysis payment was self-sponsored, 25(12.5%) reported their payment was government-assisted, 9(4.5%) reported their payment was through private medical insurances, 7(3.5%) reported their payment was through community-based health insurance.

Majority 164(82%) reported that they received haemodialysis 2 days or less in a week, 13(6.5%) reported they received treatment 3 days a week, 6(3%) said that their treatment was 4 days a week, while 5(2.5%) indicated that their treatment was more than 4 days and very few 12(6%) received treatment for more than 5 days a week. 154(77%) reported that each session of the haemodialysis lasted less than 3 hours, 12(6%) reported they were reported for 3 hours, 8(4%) reported that their haemodialysis lasted for 3 hours and 15 minutes, 11(5.5%) reported their session lasted



for 3 hours and 30 minutes, 6(3%) while 3(1.5%) reported that their session lasted more than 4 hours. Table 2 shows the level of adherence by the respondents. On the overall level of compliance 147(73.5%) have poor level of adherence, 40(20.0%) have moderate level, while 13(6.5%) have high level of adherence.

**Respondents perceived factors affecting adherence to haemodialysis**

Findings showed that financial constraints had a mean and SD of 3.61±0.72, lack of transportation had a mean and SD of 3.62±0.71, forgetfulness had a mean and SD of 3.62±0.71, lack of improvement had a mean and SD of 3.62±0.72, long waiting time had a mean and SD of 3.62±0.71, advancing age had a mean and SD of 3.62±0.71, lack of counselling from health care professional had a mean and SD of 3.62±0.71, busy schedule had a mean and SD of 3.62±0.71, attitude of medical personnel had a mean and SD of 3.62±0.71. In general, the grand mean of 3.61± 0.71 indicate that all

the factors listed were a huge constraint to haemodialysis adherence. Table 4 shows the association between socio-demographic characteristics and level of adherence. It showed that there is no significant association between level of adherence and respondents' age (p0.086), sex (p0.967), marital status (0.065), level of education (p0.400), occupation (p0.466) monthly income (p0.605) and religion (p0.096). There were no significant differences statistically.

**Association between level of knowledge and level of adherence**

Results association between level of knowledge and level of adherence using chi-square showed that there is a significant association ( $\chi^2$ 36.290, p0.000) between level of knowledge and level of adherence. As the level of knowledge increases, the proportion of respondents with high level of adherence increases also.

**Table 1: Knowledge of the importance of adherence to haemodialysis n=200**

The overall level of knowledge on the importance of haemodialysis			
Classification	Score range	Frequency	Percentage
Poor	1-3	167	83.5%
Fair	4-6	21	10.5%
Good	7-10	12	6.0%

**Table 2: Overall Level of adherence**

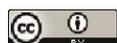
	Poor	Moderate	High
Treatment	166(83.0)	22(11.0)	12(6.0)
Medication	126(63.0)	22(11.0)	52(26.0)
Fluid	171(85.5)	15(7.5)	14(7.0)
Diet	103(51.5)	81(40.5)	16(8.0)
Composite adherence	147(73.5)	40(20.0)	13(6.5)



## Adherence to Haemodialysis

**Table 3: Association between socio-demographic characteristics and level of adherence**

	Level of Adherence		$\chi^2$	P
	Poor	Good		
<b>Age</b>				
18-30years	15(68.2)	7(31.8)	8.168	0.086
31-40years	37(66.1)	19(33.9)		
41-50years	25(71.4)	10(28.6)		
51-60years	47(74.6)	16(25.4)		
Greater than 60years	23(95.8)	1(4.2)		
<b>Gender</b>				
Male	92(73.6)	33(26.4)	0.002	0.967
Female	55(73.3)	20(26.7)		
<b>Marital Status</b>				
Married	50(66.7)	25(33.3)	7.226	0.065
Single	27(65.9)	14(34.1)		
Separated	38(82.6)	8(17.4)		
Widowed	32(84.2)	6(15.8)		
<b>Level of education</b>				
Not educated	31(77.5)	9(22.5)	2.943	0.400
Primary	34(75.6)	11(24.4)		
Secondary	59(67.8)	28(32.2)		
College/ university	23(82.1)	5(17.9)		
<b>Occupation</b>				
Self-employed	66(69.5)	29(30.5)	1.529	0.466
Public servant	39(76.5)	12(23.5)		
Unemployed	42(77.8)	12(22.2)		
<b>Monthly income</b>				
Lessthan50000	109(73.6)	39(26.4)	1.847	0.605
50000-100000	25(69.4)	11(30.6)		
More than 100000 to 200000	4(66.7)	2(33.3)		
More than 200000	9(90.0)	1(10.0)		
<b>Religion</b>				
Christian	115(71.0)	47(29.0)	2.763	0.096
Muslim	32(84.2)	6(15.8)		



**Table 4: Multivariate logistic regression associating socio-demographic characteristics and level of adherence**

	<b>P</b>	<b>O.R</b>	<b>95% C.I. for O.R</b>
<b>Age</b>			
18-30years	0.057	9.23	0.94-90.92
31-40years	0.038	9.83	1.14-85.03
41-50years	0.076	7.42	0.81-68.09
51-60years	0.062	7.70	0.90-65.84
Greater than 60years		1.00	
<b>Gender</b>			
Male	0.742	0.88	0.40-1.90
Female		1.00	
<b>Marital Status</b>			
			-
Married	0.219	2.04	0.65-6.39
Single	0.137	2.75	0.72-10.44
Separated	0.821	0.86	0.24-3.12
Widowed		1.00	
<b>Level of education</b>			
			-
Not educated	0.772	0.80	0.19-3.49
Primary	0.672	1.37	0.32-5.87
Secondary	0.219	2.18	0.63-7.53
College/university		1.00	
<b>Occupation</b>			
			-
Self-employed	0.458	1.42	0.57-3.54
Public servant	0.641	0.79	0.29-2.16
Unemployed		1.00	
<b>Monthly income</b>			
			-
Less than 50000	0.666	1.67	0.16-17.22
50000-100000	0.382	2.95	0.26-33.32
More than 100000 to 200000	0.358	3.94	0.21-73.23
More than 200000		1.00	
<b>Religion</b>			
Christian	0.046	2.97	1.02-8.67
Muslim		1.00	

Table 5 shows the multivariate logistic regression associating socio-demographic characteristics and level of adherence.



### Discussion

Findings from this study revealed that the participants have low knowledge of the importance of haemodialysis. This may be as a result of older age and fewer years of education. Because as one gets older, he/she tends to forget things easily and a low level of education may also hinder the ability to source information from other means besides interaction with the health care provider. The fact that these patients had inadequate knowledge despite receiving care in the medical and nephrology outpatients' clinics shows that there is inadequate patient education by health care professionals (including physicians and nurses). Therefore, there is a need to improve on the current educational strategies to meet the educational needs of the large number of patients with CKD. This finding may reflect a gap in patient-provider communication. It is either that these patients may not be receiving adequate education from the physicians and nurses or that they did not understand the information that was provided. Health care professionals' understanding of a patient's level of health literacy is crucial to improving the quality of their communication experience. This finding demonstrates the need for a change of education strategies and the provision of additional resources and health care personnel to support patient education in kidney disease.<sup>12</sup> Contrary to the present findings, previous studies conducted in the United States, the United Kingdom, and Australia had reported moderate knowledge.<sup>13 14 15 16</sup> This difference could be attributed to wide variations in the operation of the health care system in developing countries compared to the developed ones.

The findings from this study revealed low level of adherence among the participants as over 70% were found to have poor level of adherence. The level of poor adherence reported in the present study is far higher than that of previous studies that estimated 50% of patients on haemodialysis not adhering to at least part of their dialysis regimen<sup>17 19</sup> and that of Duong et al.<sup>20</sup> who revealed 42% of ESRD patients that missed their dialysis sessions, respectively. Contrary to the findings of the present study is the study in Brazil where a non-adherence rate of only 15% among ESRD patients was reported.<sup>9</sup> It cannot be overstated that non-adherence has significant poor health outcomes and therefore patients with ESRD and undergoing haemodialysis should be encouraged to

complete their dialysis sessions as prescribed. Findings of this study differ considerably from the findings of developed countries such as Japan and Sweden, where the missed dialysis sessions were nearly zero.<sup>19</sup> It is also noted that the shortening of dialysis session in the present study was observed in over 90% of the participants. This may be related to the technical problems faced by the dialysis machines and poor maintenance culture occasioned by bad governance in the country. This is a common characteristic feature in developing countries especially in Nigeria where the health care system is in shamble due to bad governance.

The findings from this study showed that financial constraints, lack of transportation, forgetfulness, advancing age, etc., were identified as perceived factors affecting adherence to haemodialysis. Respondents who earn more than 200,000 Naira monthly are three times more likely to adhere to haemodialysis compared to those who earn less than 50000 Naira. Furthermore, respondents 18 – 30years are nine times more likely to adhere than those who are greater than 60years, Males are 12% less likely to adhere than females. Married patients are twice more likely to adhere than those who are not, while respondents who are not educated are less likely to adhere than those with college/university certificates. These were supported by studies conducted in Burkina Faso and Zimbabwe which identified age, religion, etc. as factors affecting adherence to haemodialysis.<sup>21 22</sup> The government should see it as a duty especially in these severe economic conditions in Nigeria to strengthen the health insurance services thereby reducing out-of-pocket expenses. Haemodialysis should be included in the national health insurance scheme to reduce the burden on the common man this will further enhance and encourage adherence. Other factors affecting compliance as shown in the study are lack of counselling and attitude of medical personnel. It is therefore pertinent for health professionals especially physicians and nurses to improve their counselling skills and create time to counsel these patients on the need to stay adherent to their haemodialysis session as scheduled. If need be, the services of a professional counsellor should be sort for. Apart from nephrologists who are physicians, renal nurses (nephrology nurses) training should be given a high priority. In addition, attitudinal change is



very important among these health professionals' and should not be handled with levity.

The findings of the study showed that age was not statistically significantly associated with adherence to haemodialysis. Age group 31 - 40 years reported a proportion of a good level of adherence. In this regard, participants aged 51-60 years were observed to be the majority. These results slightly deviate from the findings in Burkina Faso and Zimbabwe, where it was revealed that the average age of their patients was 45 and 46 years, respectively.<sup>2,15</sup> These results are not surprising as it is important to note that individuals at this stage of life are beginning to make a significant impact on their lives; some of them have families and adherence is paramount to be able to support their families. Also, in developing countries, ESRD affects the population of under 50 years who are economically productive. Consistent with other studies, the mean age of patients with ESRD in Palestine was 53 years,<sup>23</sup> whereas in the United State, ESRD is more frequent in adults above 70 years, mainly due to longer survival rates among ESRD patients.<sup>24</sup>

Again, the study results revealed that religion was also not significantly associated with adherence to haemodialysis. This deviates from a prospective study conducted in Brazil which established that religiosity is associated with adherence to dialysis.<sup>25</sup> Further findings in the present study show that majority of ESRD participants were males rather than females. This is similar to the study findings in Zimbabwe which revealed that the males were representing 57% and 43% were females.<sup>22</sup> Contrary to these findings are the findings in Haiti, which showed the predominance of females (65%).<sup>26</sup> Yet in the Vietnam study, the males represented 47% and gender was not associated with adherence to haemodialysis.<sup>20</sup> However, this is contrary to the study of Palestine where male patients had significantly higher overall adherence scores than females ( $p = 0.034$ ).<sup>27</sup>

Western education was not significantly associated with the level of adherence to haemodialysis among the ESRD population. This shows that ESRD affects both educated and non-educated people and that knowledge alone is not a predictor of adherence to hemodialysis.<sup>9,28</sup> However, a decreased level of education can contribute to reduced levels of understanding leading to non-adherence and poor level of following medical instructions in favour of

ESRD treatment.<sup>5</sup> On the contrary, an increased level of education facilitates capturing and conveyance of information regarding concerns of the disease ESRD as well as the importance of haemodialysis treatment. A little above One-quarter of the participants were unemployed meaning that they did not have any monthly income. Moreover, there was no significant association between occupation and adherence to haemodialysis among ESRD patients. Nevertheless, the respondents who earn 200,000 and above/month were found to be more compliant though this was not statistically significant. However, dialysis in low-income countries is an expensive procedure and it is more likely that patients from low and middle income countries who cannot afford the dialysis sessions will have to skip some sessions of dialysis due to low economic status.<sup>29</sup> Presently, in Nigeria, one session costs approximately over ₦100,000 which very few Nigerian in need of haemodialysis can afford. This is likely the major cause of non-adherence to haemodialysis among ESRD patients in Nigeria. As noted by Jha et al,<sup>30</sup> the high cost for haemodialysis treatment and lack of adequate health insurance, some patients ended up missing or withdrawing from the treatment. Findings showed that there is a significant association between level of knowledge and level of adherence ( $\chi^2 = 36.290$ ,  $p = 0.000$ ). As the level of knowledge increases, the proportion of respondents with a high level of adherence increases also. This is in contrast with the findings in Japan and the US, on patient knowledge and adherence to maintenance haemodialysis which reported that there is no significant relationship between knowledge and adherence to maintenance haemodialysis.<sup>31</sup>

### Conclusion

The result shows that majority of the participants had a low level of knowledge as well as low adherence and factors such as lack of transportation, financial constraint, forgetfulness, improved condition, long waiting time among others. Therefore, Government should create policies that can help subsidize haemodialysis therapy so that ESRD patients can regularly go for each of their dialysis schedules thereby increasing their quality of life. There is the need for a structured teaching programme to motivate individuals who have CKD and improve the knowledge of patients undergoing haemodialysis regarding dietary management and skincare in renal



failure thereby reducing poor outcomes. There should be government and stakeholder's awareness for establishing more dialysis centres in the community and country, for ESRD patients' accessibility and affordability.

### Conflict of interest

The researchers declare no conflict of interest.

### Contribution of Authors

Timothy A Ehwarime: Conceived and designed the study, Preparation, editing of manuscript and data analysis. Blessing Awhim; Collection of data and editing of the manuscript

### References

1. Deif HI, Elsawi K, Selim M, NasrAllah MM, "Effect of an educational program on adherence to therapeutic regimen among chronic kidney disease stage5 (CKD5) patients under maintenance haemodialysis," *Journal of Education and Practice*, 2015; 6 (5):21-33.
2. American Kidney Foundation. Barriers to treatment adherence for dialysis patients; 2018 report; available on; <https://www.kidneyfund.org>.
3. Chootipongchaivat S, Tritasavit N, Luz A, Teerawattananon Y, Tantivess S. Policy brief and working paper; Conducive factors to the development of Health Technology assessment in Asia. Health intervention and technology assessment programme (HITAP) 2016
4. Kustimah K, Gimmy A, Siswadi P Djunaidi, A, Iskandarsyah, A. Factors Affecting Non-Adherence to Treatment in End Stage Renal Disease (ESRD) Patients Undergoing Haemodialysis in Indonesia. *The Open Psychology Journal* 2019; 12. 141-146. Doi:10.2174/1874350101912010141
5. Chironda G, Bhengu B. Contributing Factors to Non- Adherence among Chronic Kidney Disease (CKD) Patients: A Systematic Review of Literature," *Medical & Clinical Reviews*, 2016: 2(4). doi: 10.21767/2471-299X.1000038
6. Mukakarangwa M Chironda G Bhengu B Godfrey C Katende E. Adherence to Haemodialysis and Associated Factors among End Stage Renal Disease Patients at Selected Nephrology Units in Rwanda: A Descriptive Cross-Sectional Study", *Nursing Research and Practice*, 2018, 8. <https://doi.org/10.1155/2018/4372716>
7. Ozen N, Cinar FI, Askin D, Mut D, Turker T. Non-adherence in Haemodialysis Patients and Related Factors: A Multicenter Study. *J Nurs Res*.2019; 27(4): e36. doi: 10.1097/jnr.0000000000000309. PMID: 30720548; PMCID: PMC6641098.
8. Agustina F Yetti K, Sukmarini L. Contributing factors to haemodialysis adherence in Aceh, Indonesia. *Enferm Clin*. 2019; 29(2): 238-242.doi: 10.1016/j.enfcli.2019.04.028.
9. Nakao RT, Gorayeb R, and DaCosta JA. Factors associated with treatment adherence of Brazilian patients undergoing haemodialysis," *Actualidades en Psicología*, 2016; 30 (121):77. Doi:10.15517/ap.v30i121.23289
10. Dada SA, Ajite BA, Ibitoba FA, Thomas AA, Dada OE, Deji-Dada OO. Challenges of haemodialysis: A single centre experience in South West Nigeria. *J Clin Nephrol*. 2019; 3: 055-060. DOI: 10.29328/journal.jcn.1001026
11. Kim Y, Evangelista LS, Phillips LR, Pavlish C, Kopple JD. The End-Stage Renal Disease Adherence Questionnaire (ESRD- AQ): Testing the Psychometric Properties in Patients Receiving In-Center Haemodialysis *Nephrol Nurs J*. 2010; 37(4): 377-393
12. Okoro RN, Ummate I, Ohieku JD, Yakubu SI, Adibe MO, Okonta MJ. Evaluation of medication adherence and predictors of sub-optimal adherence among pre-dialysis patients with chronic kidney disease *Medicine Access @ Point of Care*, 2020;00(0):1-7 DOI: 10.1177/2399202620954089 [journals.sagepub.com/home/map](https://journals.sagepub.com/home/map)
13. Inkeroinen S Koskinen J Karlsson M Kilpi T Leino-Kilpi H Puukka P Taponen R Tuominen R, Virtanen H. Sufficiency of Knowledge Processed in Patient Education in Dialysis Care Patient Preference and Adherence *Dove Press* 2021;15:1166: 1175:<https://www.dovepress.com/by197.210.226.179>,doi.org/10.2147/PPA.S304530
14. Welch JL, Ellis RJB, Perkins, SM, Johnson CS, Zimmerman LM, Russell, CL, Decker BS. Knowledge and awareness among patients with chronic kidney disease Stage 3. *Nephrology Nursing Journal*; 2016, 43(6), 513-519.



15. Wembenyui CF. Examining Knowledge and Self-Management of Chronic Kidney Disease in a Primary Health Care Setting: Validation of Two Instruments. Queensland University of Technology [M. Phil thesis]; 2017.
16. Miyata KN, Shen JI, Nishio Y, Haneda M, Dadzie KA, Sheth NR, Kuriyama R, Matsuzawa C, Tachibana K, Harbord NB, and Winchester JF, *Clin Exp Nephrol.* 2018; 22(4): 947-956. doi:10.1007/s10157-0
17. Clark-Cutaia MN, Hoffman Burke LE, Sevick MA. Adherence to Haemodialysis Dietary Sodium Recommendations: Influence of Patient Characteristics, Self-Efficacy and Perceived Barriers *J Ren Nutr.* 2015; 24(2): 92-99. doi: 10.1053/j.jrn.2013.11.007.
18. Geldine CG, Bhengu B, Manwere A. Adherence of adult Chronic Kidney Disease patients with regard to their dialysis, medication, dietary and fluid restriction," *Research Journal of HealthSciences*,2107:5(1):3.
19. Duong CM, Olszyna DP, Nguyen PD, Mclaws ML. Challenges of haemodialysis in Vietnam: experience from the first standardized district dialysis unit in Ho Chi Minh City. *BMC Nephrol*; 2015; 16 : (1):122. <https://doi.org/10.1186/s12882-015-0117-2>.
20. Gérard C, Augustin DS, Rogeretal KA. Epidemiological Profile of Chronic Hemodialysis Patients in Ouagadougou," *Open Journal of Nephrology*, 2016, 6, (2):29-36.
21. Chironda G, Manwere A, Nyamakura R, Chipfuwa T, Bhengu B. Perceived health status and adherence to haemodialysis by End Stage Renal Disease patients: A case of a Central hospital in Zimbabwe. *IOSR Journal of Nursing and Health Science*, 2014; 3(1):22-31.
22. Zyoud SH, Daraghmeh DN, Mezyed DO. Factors affecting quality of life in patients on haemodialysis: A cross-sectional study from Palestine," *BMC Nephrology*, 2016;17(1):257.
23. Saran R, Li Y, Robinson B. US renal data system 2015 annual data report: epidemiology of kidney disease in the United States," *American Journal of Kidney Diseases*, 2016;67(3): A7-A8.
24. Freire de Medeiros CMM, Arantes EP, Tajra RD, Santiago HR, Carvalho AF, Libório AB. Resilience, religiosity and treatment adherence in haemodialysis patients: a prospective study, *Psychology, Health & Medicine*, 2017;22(5):570-577.
25. Burkhalter F Sannonb H, Mayra M, Dickenmanna M, Ernstb S. Prevalence and risk factors for chronic kidney disease in a rural region of Haiti,"*Swiss Medical Weekly*,2014:144, Article IDw14067.
26. Naalweh KS, Barakat MA, Sweileh MW, AL-Jabi SW, Sweileh WM, Zyoud SH. Treatment adherence and perception in patients on maintenance haemodialysis: a cross-sectional study from Palestine. *BMC Nephrol*, 2017(18):178 <https://doi.org/10.1186/s12882-017-0598-2>
27. Ibrahim S, Hossam M, and Belal D. Study of non-compliance among chronic haemodialysis patients and its impact on patients' outcomes, "Saudi journal of kidney diseases and transplantation :an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia, 2015;26(2)243-249.
28. Mushi L, Marschall P, Fleša S. The cost of dialysis in low and middle-income countries: A systematic review," *BMC Health Services Research*, 2015;15, (1):506.
29. Jha V, Arici M, Collins AJ. Understanding kidney care needs and implementation strategies in low- and middle-income countries: conclusions from a "Kidney Disease: Improving Global Outcomes" (KDIGO) Controversies Conference," *Kidney International*, 2016;90(6):1164-1174.

**Cite this Article as:** Ehwarieme TA., Awhim B. Adherence to Haemodialysis Among Chronic Renal Failure Patients of a Tertiary Health Facility, Benin City, Edo State. *Bo Med J* 2021;18(2):1-10 **Source of Support:** Nil, **Conflict of Interest:** None declared

