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ORIGINAL ARTICLE

Prevalence and Determinants of Medication Adherence in Patients with Multi-morbidities attending General Outpatient Clinics in Secondary Health Care Facilities in Kaduna State

Usman NO[1], Muhammad MI[2], Nwankwo B[1], Usman OA[3]

[1]Department of Community Medicine, College of Medicine, Kaduna State University, Kaduna, Nigeria.
[2]Department of Internal Medicine, Barau Dikko Teaching Hospital.
[3]Department of Internal Medicine, Daisy Hospital, Newry, United Kingdom.

Keywords

Determinants;

Medication adherence;

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ABSTRACT

Background: Multi-morbidity is a global public health issue which requires medication adherence to aid in the management. Poor adherence could lead to reduced quality of life, and mortality. This study was carried out to determine the prevalence and determinants of medication adherence among patients attending the general outpatient clinics in secondary health facilities in Kaduna State.

Methods: This was a hospital-based cross-sectional study carried out among 119 patients attending the general outpatient clinics in secondary health facilities in Kaduna State. Respondents were selected via multistage sampling technique. Data was obtained from the respondents using a pre-tested interviewer-administered questionnaire. Medication adherence was assessed with eight-item Morisky Medication Adherence Scale (MMAS-8). Data was analysed using IBM SPSS Statistics version 23. Statistical significance was set at a p-value of <0.05.

Results: Seventy-four (62.2%) of the respondents were aged at least sixty years. The mean age of respondents was 60.3±13.6 years. Seventy-six (63.7%) of the respondents had low medication adherence. The older age (≥60 years) of the respondents (AOR=6.19, 95%CI=1.42-4.81, p=0.001), lack of education (AOR=5.74, 95%CI=1.39-3.42, p<0.001), out-of-pocket spending (AOR=5.29, 95%CI=1.41-3.53, p<0.001), low monthly income (AOR=3.39, 95%CI=1.53-4.81, p=0.004) and taking over 4 medications (AOR=8.25, 95%CI=1.26-5.13, p=0.002) were found to be predictors of low medication adherence.

Conclusion: The finding of low adherence among majority of the respondents highlights the fact that achieving desired health outcomes will be a challenge. Improving this situation would require government interventions which are focused on social drivers of health as well as improving healthcare financing.

Correspondence to:
Nafisat Ohunene Usman
Department of Community Medicine,
Faculty of Clinical Sciences,
College of Medicine, Kaduna State University.
E-mail: nafisat.usman@kasu.edu.ng
Phone number: +2348035905729

INTRODUCTION

Chronic conditions are increasingly contributing to the global burden of disease with longer life expectancy and increased childhood survival rates.[1] Epidemiologic transition has caused a rise in chronic conditions especially in low and middle income countries.[2] Sub-Saharan Africa contributes significantly to the global burden of chronic diseases like diabetes, hypertension, cardiac

conditions, cancer, HIV/AIDS and mental health disorders.[1] By 2017, there were about 15.5 million people in sub-Saharan Africa living with diabetes and this number is expected to rise to 40.7 million by 2045.[3] Diabetes was the direct cause of about 1.5 million deaths, almost half of which occurred before the age of 70 years.[4] About 31% of the adult population in sub-Saharan Africa is hypertensive. The problem is growing among populations who were previously believed to be low risk such as rural dwellers and poor households.[5] Research shows that it is not uncommon for two or more chronic condition to occur in a patient; with the likelihood of this increasing with the patient's age. It also occurs at a higher rate in disadvantaged populations.[6] Multi-morbidity refers to the coexistence of multiple health conditions in a person.[7] These patients are at a higher risk of poor health outcomes - hospitalisation, mortality, etc.[8] This is due in part to the inadvertent need for polypharmacy which is linked to poor medication adherence. Other reasons found for these poor outcomes are advancing age, reducing cognitive function, poor health literacy and co-morbidity with conditions like depression or anxiety disorders.[7]

Medication adherence is "the extent to which a person's behaviour (taking medication, following a diet, and/or executing lifestyle changes) corresponds with agreed recommendations from a health care provider".[9] It consists of three main components: initiation, implementation and discontinuation. This term is often conflated with compliance which places the patient in a passive role regarding their treatment.[9] Poor medication adherence is a global health issue with developed countries having a medication adherence rate of about 50% while those in low and middle income countries have a disproportionally higher rate of poor adherence.[10,11] In view of the fact that medication adherence plays an integral role in the management of diseases, non-adherence will lead to dire health outcomes and affect the quality of life negatively as well as increase the costs of health care.[12] It should be noted that while access to medication is essential for adherence; this does not guaranty it. Non-adherence with medication is determined by a complex interrelationship of individual, medical, socio-cultural, environmental, health system and economic factors.[13] Research findings show that patients' knowledge on the importance of medication adherence as well as the positive perception and patient readiness to adhere are predictors of medication adherence.[14] In order to achieve optimal medication adherence, the collaborative efforts of the patient, health care provider, family and social support systems is required.

Research carried out on medication adherence commonly focuses on one disease,[15,16,17] however, there is a dearth of information on the unique challenges facing patients with multiple morbidities. This study was carried out to determine the prevalence and factors affecting medication adherence among patients attending general outpatient clinics in secondary health facilities in Kaduna State.

METHODOLOGY

Study Area

Kaduna State is located in the north-western region of Nigeria. It has twenty-three (23) local government areas (LGA). The two local government areas selected for this study were

Kaduna South and Chikun LGA. The population of Kaduna South, and Chikun LGA from the 2006 census was 402,731, and 372,272 respectively. With growth rate of 3%, the projected population of these LGAs by 2021 were 594,826 (Kaduna South) and 549,838 (Chikun). Kaduna South LGA is made up of 29 public healthcare centers (26 primary, 2 secondary and 1 tertiary healthcare centers) and over 112 private healthcare facilities. Chikun LGA is made up of 8 public healthcare facilities (7 primary and 1 secondary healthcare centers) with over 119 private healthcare facilities. The secondary health facilities in the two LGAs are named; Yusuf Dantsoho Memorial Hospital and Gwamna Awan General Hospital (Kaduna South Local Government Area), and General Hospital Sabon Tasha (Chikun Local Government Area). These facilities are headed by medical directors. They provide clinical services which are general and specialised (surgery, internal medicine, paediatrics, obstetrics and gynaecology), laboratory and radiological services. The general outpatient clinics (GOPC) operate from Mondays to Fridays. A range of 80 to 150 patients are seen daily at the GOPCs.

Study Design

This was a descriptive cross-sectional study carried out from November to December 2021.

Study Population

This consisted of patients with multi-morbidities attending the general outpatient clinics at secondary health facilities in Kaduna South and Chikun LGAs.

Inclusion criteria

Patients of all ages having two or more chronic diseases attending general outpatient clinics in selected secondary health care facilities.

Exclusion criteria

Patients who were newly diagnosed and had been placed on their medication less than one month prior to this study.

Sample Size Determination

This was determined using the formula for sample size estimation for cross-sectional studies,[18] where n is the minimum sample size; Z is the standard normal deviate set at 95% confidence interval (1.96); p is the proportion of respondents with good medication adherence (45%)[19] from a previous study in Maiduguri, Nigeria; q is the complimentary probability (1-p); d is the precision of the study set at 0.05. After which the formula for sample size when population is less than 10,000, nf= n/(1+n/N) was applied,[18] this gave a minimum sample size of 119 following the adjustment for a 10% non-response rate.

Sampling Technique

A multistage sampling technique was used. Stage 1: Selection of local government areas (LGAs). Two LGAs were selected from the 23 in Kaduna state by simple random sampling using the balloting method. Stage 2: One secondary health facility was selected from Kaduna South LGA via simple random sampling by balloting. The only secondary health facility in Chikun LGA was selected. Stage 3: The clinic records for three months prior to the study were checked for the number of patients with multi-morbidities seen routinely in both clinics. Based on this, the secondary health facility in Kaduna South saw an

average of 103 multi-morbidities monthly while the facility in Chikun LGA saw 88 monthly. A proportionate allocation was used to determine the total number of respondents to be recruited from each facility. This gave a total of 64 respondents from the facility in Kaduna South: and 55 respondents from the facility in Chikun. The list of patients with multi-morbidities was obtained from the patient list daily. Three respondents each were selected from the list via simple random sampling using the balloting method. This was done until the sample sizes were achieved. This took six weeks in Kaduna South and five weeks in Chikun LGA.

Data Collection

It was a pre-tested structured interviewer administered questionnaire. The questionnaire comprised of four sections. Section A addressed the socio-demographic profile of the respondents; Section B was on their morbidities, Section C assessed their level of medication adherence using the eight-item Morisky Medication Adherence Scale (MMAS-8).[17] MMAS-8 is an eight item, validated, structured assessment used to assess medication adherence. The first seven questions address reasons why patients miss medication. These questions require dichotomous responses of 'yes' or 'no'. Each ''no" response is rated as ''1" and each ''yes" is rated as ''0" except for item 5, in which each response ''yes" is rated as ''1" and each ''no" is rated as ''0". For item 8, the responses were never, rarely, sometimes, usually, and always, which correspond to 0, 1, 2, 3 and 4, respectively. If a patient chooses response ''0", the score is ''1" and if they choose response ''4", the score is ''0". Responses ''1, 2, 3" are respectively rated as ''0.25, 0.75, 0.75". Total MMAS-8 scores can range from 0 to 8.[20]

Data Analysis

All completed questionnaires were clearly numbered by the researcher for completeness. Data was analyzed using IBM SPSS Statistics version 23 software package. For the descriptive aspect of the analysis, frequency distributions were generated for all categorical variables for socio-demographic variables such as age group, sex, educational status etc. Mean and standard deviations and other descriptive measures were determined for the quantitative variables such as age. Level of adherence was classified into three: high adherence (score = 8), medium adherence (score of 6 to < 8), and low adherence (score< 6). Bivariate analysis such as Chi-square test or Fishers Exact were used to test the association between independent variables like (age, level of education, healthcare financing) and the dependent variable (medication adherence). Multivariate ordinal logistic regression was used to find predictors of the outcome variable (medication adherence). The level of statistical significance was set at p-value of <0.05.

Ethical Considerations

Ethical approval (Protocol number: BDTH/2021/017/Vol.1) was obtained from the Ethics and Scientific Committee of Barau Dikko Teaching Hospital. Informed verbal consent was obtained from the respondents after the nature of research was duly explained to them. Respondents were assured of strict confidentiality of the responses provided. They were also told that they could withdraw from participating in the study at any point during the research.

Table1: Socio-demographic profile of the respondents

Variable	Frequency (n=119)	Percent
Age (years)		
20-29	7	5.9
30- 39	6	5.0
40-49	13	10.9
50-59	19	16.0
≥60	74	62.2
Gender		
Male	43	36.1
Female	76	63.9
Marital status		
Single	1	0.8
Married	89	74.8
Widowed	27	22.7
Divorced	2	1.7
Tribe		
Hausa	93	78.2
Yoruba	9	7.6
Fulani	6	5.0
Others	11	9.2
Religion		
Islam	78	65.5
Christianity	41	34.5
Level of education		
None	60	50.4
Primary	22	18.5
Secondary	26	21.8
Tertiary	11	9.3
Occupation		
Business	57	47.9
Housewife	31	26.1
Retired civil servant	6	5.0
Civil servant	4	3.4
Farmer	7	5.9
Tailor	3	2.5
None	3	2.5
Others	8	6.7
Healthcare Financing		
Out-of-pocket	94	79.0
Health Insurance	10	8.4
Family Contribution	15	12.6
Monthly Income (₦)		
<30,000	44	37.0
30,000-49,999	35	29.4
50,000-99,999	29	24.4
≥100,000	11	9.2

RESULTS

A total of 119 questionnaires were administered and completed, giving a 100% response rate. The mean age of respondents was 60.3±13.6 years and majority 74 (62.2%) of them were aged sixty years and above. About two-thirds of them, 76 (63.9%) of them were female and 60 (50.4%) had no education. Majority of the respondents 94 (79%) paid for health services from out-of-pocket. More than a third, 44 (37%) of them earned less than the minimum wage of ₦30,000. (Table 1). Table 2 shows that all the respondents had hypertension co-existing with one or two other morbidities, with about half 60 (50.4%) of the respondents having hypertension and diabetes as their co-morbidities. About a fifth of the respondents 26 (21.9%) had

Table 2: Pattern of multi-morbidity and number of medications prescribed for the respondents

Comorbidities	Frequency (n=119)	Percent
Hypertension and diabetes	60	50.4
Hypertension and arthritis	26	21.9
Hypertension, diabetes and arthritis	14	11.8
Hypertension, diabetes and heart disease	8	6.7
Hypertension and kidney disease	5	4.2
Hypertension and liver disease	3	2.5
Hypertension and HIV/AIDS	3	2.5
Number of medications		
2	29	24.4
3	37	31.1
≥4	53	44.5

Table 3: Medication adherence of the respondents

Morisky Medication Adherence Scale (MMAS-8)	Frequency (n=119)	Percent
*Do you sometimes forget to take your medication?	75	63.0
*Over the past two weeks, were there any times you forgot to take your medication?	68	57.1
*Have you ever cut back or stopped taking your medication without telling your doctor because you felt worse or sick when you took it?	49	41.2
*When you travel or leave home do you sometimes forget to bring your medication	65	54.6
*Did you take all your medication yesterday	83	69.7
*When you feel your symptoms are under control, do you sometimes stop taking your medication?	63	52.9
*Do you feel hassled about sticking to your treatment plan?	61	51.3
How often do you have difficulty remembering to take your medication?		
Never	6	5.0
Rarely	11	9.2
Sometimes	67	56.3
Usually	28	23.5
All the time	7	5.9
Level of adherence grade		
Low adherence	76	63.7
Medium adherence	34	28.6
High adherence	9	7.6

**Only the 'yes' response was recorded*

arthritis and hypertension. Majority of the respondents 53 (44.5%) were taking ≥4 medications, while 29 (24.4%) were taking only two medications. A higher proportion 75 (63.0%) of the respondents sometimes forget to take their medication; 49 (41.2%) of them stop taking their medication when they felt worse or sick. About half 61 (51.3%) of the respondents felt hassled when sticking to taking their medications.

About two-thirds of the respondents, seventy-six (63.7%) had low medication adherence. (Table 3) Medication adherence had a statistically significant relationship with age (p=0.001), level of education (p<0.0001), health care financing (p=0.0021), monthly income (p<0.0001) and number of medication (p<0.0001) as revealed in table 4. Findings from table 5 show that respondents aged over 60 years were 6 times more likely to have low medication adherence than those

Table 4: Factors affecting medication adherence among respondents

Variables	Medication Adherence			
	Low (n=76) n (%)	Medium (n=34) n (%)	High (n=9) n (%)	Test statistic/p-value
Age (years)				
20-29	0 (0.0)	2 (28.6)	5 (71.4)	
30- 39	0 (0.0)	2 (33.3)	4 (66.7)	
40-49	3 (23.1)	10 (76.9)	0 (0.0)	12.247*/p=0.001
50-59	6 (31.6)	13 (68.4)	0 (0.0)	
≥60	67 (90.5)	7 (9.5)	0 (0.0)	
Gender				
Male	22 (51.2)	16 (37.2)	5 (11.6)	
Female	54 (71.0)	18 (23.7)	4 (5.3)	0.230*/p=0.891
Marital status				
Single	0 (0.0)	1 (100.0)	0 (0.0)	
Married	56 (62.9)	24 (27.0)	9 (10.1)	3.818*/p=0.148
Widowed	18 (66.7)	9 (33.3)	0 (0.0)	
Divorced	2 (100.0)	0 (0.0)	0 (0.0)	
Level of education				
None	57 (95.0)	3 (5.0)	0 (0.0)	
Primary	12 (54.5)	10 (45.5)	0 (0.0)	39.301*/p<0.0001
Secondary	7 (26.9)	18 (69.2)	1 (3.8)	
Tertiary	0 (0.0)	3 (27.3)	8 (72.7)	
Healthcare Financing				
Out-of-pocket	70 (74.5)	22 (23.4)	2 (2.1)	
Health Insurance	0 (0.0)	3 (30.0)	7 (70.0)	17.713*/ p=0.0021
Family Contribution	6 (40.0)	9 (60.0)	0 (0.0)	
Monthly Income				
<30,000	42 (95.5)	2 (4.5)	0 (0.0)	
30,000-49,999	22 (62.9)	13 (37.1)	0 (0.0)	32.139*/ p<0.0001
50,000-99,999	12 (41.4)	15 (51.7)	2 (6.9)	
≥100,000	0 (0.0)	4 (36.4)	7 (63.6)	
Number of medications				
2	3 (10.3)	18 (62.1)	8 (27.6)	
3	24 (64.9)	12 (32.4)	1 (2.7)	36.312*/p<0.0001
≥4	52 (75.0)	4 (25.0)	0 (0.0)	

***Fishers exact test*

in the age group 20-29 years. (AOR=6.19, 95%CI=1.42-4.81, p=0.001).

Those with no education are 5 times more likely to have low adherence than people with tertiary education (AOR=5.74, 95%CI=1.39-3.42, p<0.001). It also showed that those who used out-of-pocket spending on health care were five times more likely to have low adherence than those who had health insurance (AOR=5.29, 95%CI=1.41-3.53, p<0.001). Those with a monthly income of less than ₦30,000 were three times more likely to have low adherence than those who earned over ₦100,000 (AOR=3.39, 95%CI=1.53-4.81, p=0.004). Respondents who were taking ≥4 medications were 8 times more likely to have low medication adherence (AOR=8.25, 95%CI=1.26-5.13, p=0.002).

DISCUSSION

Adequate understanding of medication adherence and the nuanced relationship between the factors which affect it, would aid in reducing the prevalence of non-adherence. A WHO research conducted in low and middle income countries

Table 5: Multivariate ordinal logistic regression of predictors for low medication adherence

Variable	AOR	95% CI	p-value
Age (years)			
20-29	Ref		
30- 39	1.03	0.21-4.36	0.893
40-49	1.52	0.49-4.17	0.820
50-59	1.46	1.28-3.45	0.273
≥60	6.19	1.42-4.81	0.001
Gender			
Male	Ref		
Female	1.38	0.47-6.03	0.758
Marital status			
Single	Ref		
Married	1.14	0.21-8.03	0.342
Widowed	3.38	0.30-11.32	0.655
Divorced	4.26	0.29-9.48	0.711
Level of education			
None	5.74	1.39-3.42	<0.001
Primary	1.86	0.18-9.27	0.546
Secondary	2.15	0.25-7.54	0.421
Tertiary	Ref		
Healthcare Financing			
Out-of-pocket	5.29	1.41-3.53	<0.001
Family contribution	1.42	0.34-9.16	0.874
Health Insurance	Ref		
Monthly Income			
<30,000	3.39	1.53-4.81	0.004
30,000-49,999	1.65	0.26-8.53	0.362
50,000-99,999	0.84	0.42-8.12	0.475
≥100,000	Ref		
Number of medications			
2	Ref		
3	1.49	0.59-4.99	0.628
≥4	8.25	1.26-5.13	0.002

(Ghana, India, Mexico and South Africa) shows that elderly people are at an increased risk of multi-morbidity.[8] Findings from this study corroborate this with almost two-thirds of the respondents aged sixty years and above. A study in Brazil found that 67% of the respondents who were aged over sixty had multi-morbidities.[7,21] This was also the finding from a systematic review which showed an increase in the prevalence of multi-morbidity as the age of respondents increased.[13] A study in Ethiopia found that multi-morbidities were also found to be commoner in the older age group with the mean age of respondents from that study being 60.3 ±9.9 years.[22]

Multi-morbidities are generally chronic conditions which are caused by a complex interrelationship between certain modifiable and non-modifiable risk factors.[2,23] Epidemiological transition is responsible for the current rising prevalence of non-communicable diseases which present in the later years.[2] Multi-morbidity is associated with poor quality of life, poor health outcomes, increased admission rates and mortality.[8] Against this backdrop, it is recognised as a public health issue which affects a significant proportion of the population globally.[24] It should be noted that the elderly are generally found to be a socio-economically disadvantaged group (especially in developing countries);[14] thereby compounding the

already poor outcomes. Multi-morbidity must be tackled to ease the burden on the individual, society and health system. Findings from a previous survey show that 54.7% of the population in north-west Nigeria have no education.[25] This is similar to the finding from this study where about half of them had received no education. Education has been found to be associated with increased understanding of health information and adoption of healthy behaviour.[26]

Majority of the respondents had two co-existing morbidities; with hypertension and diabetes being the predominant profile. Research conducted in the United States of America (USA) shows that up to 75% of patients with diabetes have hypertension as a co-morbidity.[27] The presence of these two conditions concurrently increases the likelihood of complications such as heart disease, blindness, kidney failure; gangrene in lower extremities or stroke.[28,29] Therefore the findings from this study point to the fact these respondents are at an increased risk of the occurrence of adverse health outcomes such as disability, reduction in the quality of life especially when left uncontrolled, as well as a reduction in the life expectancy of the patients.[30] Adequate management of the various co-morbidities is hinged on primordial, primary and secondary preventive measures. Most of the cases require prolonged (sometimes lifelong) drug treatment to achieve the desired health outcomes.[2] However, multi-morbidity management is associated with increased likelihood of polypharmacy; increased prevalence of adverse effect of the prescribed medications, hospitalisation and mounting cost of healthcare.[8,30]

Majority of the respondents from this study had low adherence. These findings are lower than that from a study in Ireland where low adherence was about 40%.[12] This difference could be attributed to the stark disparity in the socio-cultural and economic characteristics of both study areas. It is however, similar to study carried out in a rural area in China where 66.6% of the respondents had poor medication adherence.[31] Medication adherence plays an integral role in the management of diseases.[13] The disconcerting findings from this study will likely form the basis for the poor health outcomes among patients attending these health facilities. The psychological, social and economic effects are far-reaching affecting not just the patients but their families and communities at large.[2] Improving medication adherence among these patients would require close monitoring of their medication-taking behaviour.

The older age of the respondents, lack of education, out-of-pocket spending, low monthly income and taking ≥4 medications were found to be predictors of low medication adherence. A study conducted in Ilorin found that older patients are more likely to have low medication adherence.[32] A systematic review also determined that older age was a predictor of poor adherence.[13] Patients with multi-morbidities are usually expected to adhere to complex drug regimens; this is harder for older patients to achieve. A cross-sectional study conducted in Ghana[33] as well as a study conducted in south-east Nigeria[34] found that a higher educational level is associated with high medication adherence. Higher educational level is associated with better health outcomes and increased likelihood of adopting desired health behaviour.[26] Studies have found that out-of-pocket expenditure which in sub-Saharan Africa often leads to catastrophic health expenditure is

associated with low medication adherence.[35] Low average monthly income has also been found to be associated with low medication adherence.[8] This is due to the fact that a large proportion of the population live below the poverty line and are unable to afford the required medication in a sustainable way. A study conducted in Spain found that a large number of medications is associated with low medication adherence.[36]

Limitations of the study: In view of the fact that the medication adherence tool used is self-reported, the information obtained could not be verified. Patients might have been tempted to give responses which they deemed acceptable by the researcher. They were informed prior to data collection that the information would remain confidential, and the study findings would be used to improve medication adherence.

Conclusion: There was a high prevalence of low medication adherence. The older age of the respondents, lack of education, out-of-pocket spending, low monthly income and taking four or more drugs prescribed were found to be predictors of low medication adherence. Government policies should target improving social drivers such as education, poverty alleviation and ensuring universal health coverage for all.

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