Medication Non-adherence in Schizophrenia and Bipolar Affective Disorder: A Cross-sectional study From Two Tertiary Hospitals in South-South Nigeria

Abstract

Background: Symptoms remission and significant improvements in functionality is predicated on good medication adherence. Non adherence to medication in persons with bipolar disorder and schizophrenia is the main reason for frequent relapses and poor treatment outcomes.

Aims: This study was conducted to determine the prevalence of medication non-adherence in persons with schizophrenia and bipolar affective disorder and identify factors related to it.

Methods: This was a cross-sectional study conducted on a sample of out-patients with schizophrenia and bipolar affective disorder. One hundred and seventy two participants were enrolled into the studies March to June 2025. Adherence to medication was assessed on the basis of patients' self report. Socio-demographic and selected clinical variables were collected and compared between adherent and non-adherent participants. Logistic regression analysis was done to determine predictors of treatment non-adherence.

Results: The mean age was 35.47±10.6, and 47.7% of participants were males. 43.6% of the subjects were non adherent to medication. Factors that independently predicted non adherence to treatment on multivariate analysis were: high cost of medication (*OR=3.46, P=.005)*, non availability of

supervised treatment (*OR=0.159,P=.06*) high dosing frequency of medication (*OR=3.33,P=<.003)*, and a poor attitude to medication (*OR=0.47,P=.005)*

Conclusion: A high prevalence of medication non adherence was found amongst outpatients with schizophrenia and bipolar disorders in mental health services in south-south Nigeria. Interventional strategies are required to improve adherence to medication in these patients.

Key words*: Schizophrenia, Bipolar affective disorder, Medication adherence, antipsychotic medications, Nigeria.*

1.Introduction

Schizophrenia and Bipolar affective disorder are severe mental disorders characterized by chronicity, fluctuating courses, recurrent episodes and varying degrees of functional impairments leading to disabilities and low quality of life. Symptoms usually first appear in late adolescence or early adulthood with schizophrenia affecting about 23 million people and bipolar disorders affecting about 60 million people worldwide (Kaplan H et al., 1998, Same K et al., 2024, Faden J et al., 2023)

Current guidelines for treatment of patients with psychiatric disorders recommend antipsychotics as an essential part of long-term maintenance treatment for people with schizophrenia. Therefore, antipsychotic medications together with other psychosocial interventions represent the cornerstone of treatment for these patients. Although these agents have been shown to improve psychopathology,

reduce relapse, improve functioning, non-adherence to treatment is common (Barnes TR, 2011, Bighelli I et al., 2021, Correll CU et al., 2024)

Effective management of patients with these psychiatric illnesses requires continuous long-term treatment compliance in order to keep symptoms in remission and to prevent frequent relapses. Non-adherence to prescribed medications constitutes perhaps the most challenging aspect of managing patients with these diseases (Fatani BZ et al., 2017)

Medication adherence has been defined as "the extent to which a person's behaviour–taking medication, following a diet and/or executing life style changes, corresponds with agreed recommendations from a health care provider" Non adherence among patients with psychiatric disorders has become associated with frequent recurrence and relapses, increased psychopathology, increased economic and social cost and rehospitalisations (World Health Organisation 2003; Emsley R et al., 2013, Arango C et al., 2023).

Factors that potentially can contribute to medications non adherence may include factors due to medications, illness related factors, patient related factors, relationship with professionals and treatment characteristics, social/economic factors, Health care system factors (Li IH et al (2023).

Efforts to predict non-adherence in psychiatric illness have had limited success. For example, features of the disorder, such as age of onset, length of episode, polarity of bipolar illness episodes, negative attitude towards medication, chronicity of illness, complicated treatment regimens, side effects of medications, cost of medication,-and poor social functioning. have not been found to be consistently associated with poor adherence (Lysaker PH et al., 2013; Uhlmann C et al., 2014; Sajatovic M et al., 2021; Higashi K et al., 2013). Demographic factors such as race, age, and gender have been associated with non-adherence in some studies, but not others (Leclerc E et al., 2013; Clatworthy J et al., 2007). Many of these studies have been conducted in developed countries. Data on predictors of non adherence among patients with schizophrenia and bipolar disorder from a low and medium income (LMIC) country like Nigeria is scarce. Information in this regard will help in the design of effective interventions strategies to enhance adherence in persons with psychiatric disorders in a resource poor country setting prevalent in many developing countries.

Aim of the study was to assess the prevalence of treatment non-adherence in patients with schizophrenia and bipolar disorder and to identify factors associated with it.

2. Materials and Methods

2.1 Study Design and Study Setting:

This study was conducted at the Department of Mental Health, University of Uyo Teaching Hospital and Akwa Ibom State Psychiatric Hospital, Eket, which is a city in the oil rich south-south region of Nigeria. The Teaching Hospital is a 500 bedded tertiary healthcare referral centre in Uyo, a capital city also in the oil rich south–southern region of Nigeria. The mental health unit of the hospital runs clinic twice a week. The study was designed as a cross sectional descriptive study to determine the prevalence of medication adherence in psychiatric patients with schizophrenia and bipolar affective disorders and related factors.

All diagnoses made in the institution are according to the eleventh edition of the International Classification of Diseases and health-related disorders (ICD-11) criteria.

2.2 Participants:

The minimum sample size was computed using a public domain software available on-line (www.statpages.org) and using a prevalence of treatment non adherence as determined from a previous Nigerian studies (32.4%) (Danladi J et al., 2013). The sample consisted of 172 participants consisting of 102 subjects with schizophrenia and 70 subjects with bipolar disorder within a period of four months from March 2025 to June 2025. Data was collected from, by random sampling. A subject was randomly selected and enrolled into the study if the following eligibility criteria were met: a diagnosis of schizophrenia according to the International Classification of Diseases (ICD-11) diagnostic criteria had been on medications for at least 6 months prior to enlistment in the study, adults above the age of 18years, and who gave informed consent. The exclusion criteria were: presence of florid psychopathologies experiences capable of impairing a credible response, and co morbid psychoactive substance use or physical disorders.

2.3 Procedure

Ethical approval for the study was obtained from the Akwa Ibom State Ministry of Health with permission also obtained from Research and Ethical Committee of the University of Uyo Teaching Hospital. Informed consent was obtained from patients and their accompanying family members. Patients with schizophrenia and bipolar affective disoders accompanied to the clinic by their caregivers were consecutively recruited to participate in the study. A comprehensive psychiatric evaluation and diagnosis of the patients was conducted by postgraduate doctors in psychiatry according to ICD 11 criteria.

The Mini International Neuropsychiatric Interview (MINI) (Sheehan DV et al., 1998) schizophrenia and bipolar affective disorder modules were used to confirm the diagnosis of schizophrenia and bipolar disorders in the participants.

2.4 Measures

2.4.1Socio-demographic questionnaire

A socio-demographic questionnaire designed by the authors was used to obtain information Measures evaluated include socio-demographic details (age of the patient and family member, gender, educational status, marital status, religion, monthly family income, place of residence, occupation, duration of illness, and medication related variables (number of tablets taken per day, dosing frequency, monthly cost of medication etc)

For the purpose of this study, the presence of extra pyramidal symptoms including rigidity, tremors, upward rolling of the eyes etc were elicited verbally or from clinical documentations of the patients. Other medication side effects including sedation, sexual dysfunction, and hyperprolactinaemia were similarly obtained. The number of antipsychotic medications prescribed other than anticholinergics were also noted.

2.4.2 Drug Attitude Inventory (DAI 10)

Drug Attitude inventory (DAI-10) is self report instrument of false-true statement is used to assess the nature of patient's experience with taking psychotropic medications, patients feeling about medications and their attitudes and beliefs about medications. It consist of true-false statements about the perceived effects and benefits of medication with which the patients can agree or disagree. Each item ticked 'yes' is rated +1 and items ticked 'no' is rated as -1 (Hogan TP et a.1983) . Respondents with score less than six was considered to be having negative attitude towards treatment (Hogan TP et al 1983).

2.4.3 Morisky Medication Adherence Scale (MMAS)

The compliance level of patients was defined by the application of the MMAS-8. The MMAS is a reliable and validated 8 items; self reported measure of medication use patterns. Each item on the MMAS measures a specific medication taking behaviour. Each of the items is presented in a "yes or no" format. The subjects were asked about the extent and tendency to forget taking their medications and their discontinuance of medications upon feeling improved or alternatively upon feeling a worsened clinically. Answers were scored as 0 or 1, with score 1 corresponding to positive answers. The item scores obtained are summed up to indicate an overall level of medication adherence. The MMAS scores range from zero to eight and have been stratified into three levels to classify adherence levels: high adherence- MMAS score of 8, moderate adherence-MMAS scores of 5>7 and low adherence-MMAS score of less than or equal to 4 (Morisky D.E et al., 2008)

Data Analysis

Descriptive statistics such as frequencies, median, mean and standard deviation were computed for socio-demographic and clinical characteristics of the participants and other variables as appropriate. Relevant inferential statistics such as chi-square was used to determine the relationship between outcome and independent variables. Binary logistic regression was then conducted to determine the independent predictors of non-adherence among the subjects. Significance was computed at $p <$

0.05. The Statistical package for the social sciences 20 (SPSS Inc., Chicago, IL, USA) program was used for statistical analysis.

3. Results

Characterization of study participants

The mean age of the participants was 35.47±10.6 years and more than half of them (52.3%) were females. The majority of the participants were single (73.3%,) and more than half of them (76.7%) had secondary education and above as the highest level of education attained. Most of the participants were Christian (92.5%) and about (39.0%) was employed. About 83.7% of participants lived in an urban setting. Those that lived in the same house/ home environment with someone else were 83.7%. while those who had some form of supervision during medication use were 47.0%.

The distribution of clinical variables respondents show that the mean duration of illness was 9.99±7.3 years. The mean number of tablets per day 5.13±1.25. Those with positive attitude to medication were 55.2%. About 56.4% participants were classified as having good medication adherence.

Table 1: Socio-demographic characteristics of respondents

Characteristics	Participants N(%)
Mean age	35.47±10.6
Age in years	
<40years	97(56.4)
>40 years	75(43.6)
Sex	
male	82(47.7)
female	90(52.3)
Marital status	
Single	126(73.3)
Married	46(27.7)
Educational status	
Primary	13(7.6)
Secondary	90(52.3)
Tertiary	69(40.1)
Employment status	
Employed	67(39.0)
Unemployed	105(61.0)
Living in supported housing	
With someone	144(83.7)
Alone	28(16.3)
Supervision of treatment	
Supervised	81(47.1)
Not supervised	91(56.4)

Distribution of medication related Variables

About 39.4% of respondents were prescribed conventional antipsychotic medications. The commonly prescribed first generation antipsychotics were: haloperidol (43.2%), chlorpromazine (47.5%) and trifluperazine (25.3%). About 25% were on mood stabilizers which are Carbamazepine (75.2%) and Sodium Valproate (24.8%). Atypical antipsychotics were prescribed for 41.7% of subjects and 18.9% were on combined conventional and atypical medications.

The commonly prescribed atypical antipsychotics were Olanzapine (59.3%) Risperidone (33.6%). The mean number of tablets taken by respondents was 5.86±2.29. Among the respondents, 41.9% had more than 5 tablets of medication per day and 45.9% had a dosing frequency of more than once per

day. About 55.2% of participants had positive attitude to medication and 27.9% had supervision of treatment.

Table 2: Clinical characteristics of respondents

Characteristics	Participants N(%)
Cost of medication	
≤#5000	60(34.9)
>#5000	112(65.1)
Dosing frenquency of medication	
Once daily	100(58.1)
More than once daily	72(41.9)
Medication side effects	
Extrapyramidal side effects	36(37.1)
Sedation	20(20.6)
Weight gain	28(28.9)
Hyperprolactin	4(4.1)
Anticholinergic	6(6.2)
Sexual dysfunction	3(3.1)
No side effects	75(43.6)
Treatment supervision	
Supervised	81(47.0)
Not supervised	91(52.9)
Mean duration of illness (years)	9.99±7.3
Duration of illness in years	
≤10years	123(71.5)
>10years	49(28.5)
Tablets taken per day	
≤5tablets	93(54.1)
>5tablets	79(45.9)
Rating scales	
Adherence to medication	
Yes	97(56.4)
No	75(43.6)
Attitude to treatment	
Positive	95(55.2)
Negative	77(44.8)

Prevalence of Medication Non adherence.

The point prevalence of medication adherence in this study was 56.4% using an MMAS cut-off score of ≤7 adapted for this study. 31.5% of the subjects were categorized as having low adherence, while 12.1% were categorized as having medium adherence. The subjects with schizophrenia had adherence rate of 54.5% while subjects with bipolar disorder had 58.3% adherence rate. The subjects with schizophrenia were as likely as the subjects with bipolar disorder to be non adherent to medication (*p=.09*).

Table 3: Associations between socio-demographic variables and adherence to medication

Variables	Adherent (n%)	Non adherent (n%)	Statistics X^2	P-value
Age				
≤40years	65(55.1)	32(59.3)	0.23	*.62*
>40 years	53(44.9)	22(40.7)		
Gender				
Male	51(62.2)	31(37.8)	2.1	*.17*
Female	46(51.1)	44(48.9)		
Marital status				
Married	31(67.4)	15(32.6)	3.09	*.08*
Single	66(52.4)	60(47.6)		
Educational level				
≤12years	61(59.2)	42(40.8)	0.84	*.43*
>12 years	36(52.2)	33(47.8)		
Employment				
Employed	44(65.7)	23(34.3)	3.8	*.05*
Not employed	53(50.5)	52(49.5)		
Living arrangement				
Alone	12(49.2)	16(57.1)	2.49	*.15*
With someone	85(59.0)	59(41.0)		
Supervision of treatment				
Supervised	66(81.5)	15(18.5)	39.18	*<.001*
Not supervised	31(34.1)	60(65.9)		

Table 4: Associations between Clinical variables and adherence to medication

Variables	Adherent (n%)	Non adherent (n%)	Statistics X^2	P-value
Duration of illness				
≤10 years	68(55.3)	55(44.7)	0.22	*.73*
>10 years	29(59.2)	20(40.8)		
Attitude to Medication				
Positive	65(68.4)	30(31.6)	12.48	*.001*

Negative	32(41.6)	45(58.4)		
Pill burden (no of tablets taken in a day)				
≤5 tablets	71(76.3)	22(23.7)	32.8	< .001
>5 tablets	26(32.9)	53(67.1)		
Medication cost ($=#1400)				
≤#5000 per month	45(75.0)	15(25.0)	12.97	<.001
>#5000 per month	52(46.4)	60(53.6)		
Side effects profile				
Yes	53(54.6)	44(45.4)	11.1	.001
No	53(70.7)	22(29.3)		
Dosing frequency				
Once daily	71(71.0)	29(29.0)	20.7	<.001
More than once daily	26(36.1)	46(63.9)		

Association between independent variables and non adherence.

Univariate analysis showed that the degree of available treatment supervision *(P=<.001)* positive attitude towards medication *(P=.001)*, a lower medication cost *(P=<.001)* and being employed *(p=.005)* all promoted medication adherence amongst study participants. Participants with poor medication adherence were more likely to have poorer attitude to medication (P=0.001). They were less likely to be supervised during medication use *(P<.001)* and on the average used more number of daily tablets compared to those with good medication adherence *(P<.001)*. No significant differences were seen in terms of years of formal education *(P=.43)*, gender *(P=.17)*, age *(p=.62),* duration of illness *(P=.73)*, living in supported housing *(P=.15)* See Table 3 and 4

Table 5: Predictors of adherence by logistic regression analysis

Variables	**OR**	**95% C.I**	**P-value**
Employment status	0.51	0.23-1-13	.09
Dosing frequency	3-33	1.50-7.40	.003
Supervision of treatment	0.21	0.04-0.92	.038
Cost of medication	3.46	1.46- 8.16	.005
Tablets taken per day	1.133	0.78- 0.80	.08
Attitude towards medication	0.47	0.22-1.02	.05
Medication side effects	0.10	0.008-0.20	.07

Predictors of Treatment Non Adherence

The signicant variables were fitted into logistic regression model for multivariate analysis. Multivariate analysis showed that the main factors that were found to be associated with a greater risk of medication non adherence were lack of treatment supervision (*P=0.038*), having a poor attitude to medication (P=*.05*) and having a high dosing frequency of medication *(P=.003)* and a high cost of medication (*P=.005)*. See table 5.

4. Discussion

This study examined the role of some risk factors for medication non-adherence among outpatients with major psychiatric disorder like schizophrenia and bipolar disorders. This is important because such knowledge could become specific targets for interventions to improve adherence to medications. The prevalence of treatment non-adherence in this study for all participants was 56.4%. For subjects with schizophrenia medication non adherence was 54.5% and for subjects with bipolar disorder non adherence rate was 58.3% respectively.

This non adherence rate for all study participants implies that about two in three patients did not comply with their medications as prescribed. This prevalence falls within the range reported from previous Nigerian studies (Adewuya AO et al 2009, Ibrahim,A.W et al 2015, Adeponle AB et al 2009) where patient's self report was used to estimate adherence. However, it is in disagreement with other

studies (Amr M et al., 2013; Diaz E et al., 2004; Copeland LA et al., 2008) that have reported much higher prevalence rates of treatment non-adherence.

The wide variations in reported non-adherence rates across different studies may in part be attributed to differences in study designs and self report instruments used. It is also to be noted that self report used to estimate adherence in this study may underestimate the actual prevalence of non-adherence, compared to direct adherence measurement method like micro-electronic monitoring method which usually shows 15-20 percent higher prevalence of non-adherence (George CF et al 2000). This is worrisome because this level of non-adherence certainly translates to poorer treatment outcomes, recurrences and relapses, increased psychopathology and more hospitalisations (Hiwot S et al., 2018) for a high proportion of study participants.

Demographic variables have not been consistently associated with medication non adherence in patients with psychiatric disorders. In this study, no significant relationship was found between age, gender and educational status of respondents and treatment adherence and therefore in support of studies which did not find such association (Uhlmann C et al 2014, Sajatovic M,et al 2021). The employment status of study participants modulated medication adherence in our sample. The participants who are employed were significantly more likely to likely to adhere to medications. This is partly because patients who are employed were more likely to contribute to healthcare services cost than those who are unemployed especially in a low income setting like ours where healthcare services is largely financed by patients and their relations.

The cost of medication and the dosing frequency were the most significant predictors of medication non adherence in this study. These are cost related medication variables that negatively impacts on medication adherence as reported in a previous study by Ibrahim,A.W et al 2015,

Most of the study participants are from a low socioeconomic background. A high proportion of participants (61.0%) were unemployed and majority (59.9%) has 12 years or less of formal education resulting in low socio-economic placements in many societal opportunities including job placements. The cost of healthcare services is an important factor hindering good treatment adherence for many patients with chronic mental illness in many developing countries. The resource poor setting of many of these low and medium income countries which often lacks universal and comprehensive medical insurance scheme makes healthcare services unaffordable for many service users. Funding for

healthcare services is mainly out-of-pocket by patients and their relations in a society experiencing increasing economic hardship and high poverty rate. In Nigeria, about 60% to 70% on the inhabitants live below the one dollar per day benchmark (United Nations Development Programme, 2013). This finding is in consonance with study by Kane JM et al. (Kane JM et al., 2013) which have reported that socioeconomic factors play important role in adherence as patients who are poor or live on fixed income may become non-adherent because of their inability to pay for the cost of prescribed medications (Saeed F et al.; 2011, United Nations Development Programme. 2013). Other cost related medication variables that impacted on medication adherence were a high pill burden and a high dosing frequency of medications.

A high dosing frequency can reduce adherence to medication probably related to the inconvenience of daily ingestions of a high number of oral medications. It may also be related to unpleasantness from experience of side effects. According to Peas et al, 1997 in their study, reported that a high dosing frequency of medication will result in decrease medication compliance and also, that most deviations in medication-taking behaviour by patients occur more often as omission of doses. Finding from this study indicate that for majority of study participants a high dosing frequency coupled with high cost of medication were the main reasons for treatment non adherence and therefore in agreement with previous studies that identified medication related variables as main drivers of non aherence (Ibrahim,A.W et al 2015).

The side effects burden of medication was a significant statistical predictor of medication non adherence. This is in consonance with previous studies that had reported that for many patients, extra pyramidal side-effects (EPS), weight gain, and sexual dysfunction are especially likely to decrease adherence (Ibrahim,A.W et al., 2015, Leucht S et al, (2024)

The role of family member's involvement in promoting medication adherence was explored in this study. We found that the quality of social support in terms of good medication supervision predicted adherence to medication. A high proportion of participants (83.7%) reported living with members of their family. Residential status by itself did not lead to increased medication adherence. However, the quality of social support given to patients reflected in the regular supervision of medication use was a significant predictor of medication adherence. This is in agreement with previous studies (Olfson M et al,. 2000;Higashi K et al., 2014) which have reported significant association between social support,

supervision and treatment adherence. Similarly, other studies (Josep MH et al 2011) have also reported that refusal of the patient's families to become involved in treatment predicted non-adherence. This may be related to the fact that family members do ensure patients keep treatments appointment, provide supervised treatment and provide finances required for patients to buy drug especially when they are unemployed and lack finances to fund healthcare cost themselves. Improved treatment outcomes in developing nations have partly been attributed to cultural factors like stronger family bonds (Josep MH et al 2011)

.Regarding attitude to medication, we found that respondent with positive attitude to medication were significantly more likely to adhere to prescribed medications. This is in consonance with a previous Nigerian studies that reported similar finding (Adewuya AO et al 2006). Previous studies (Naber D et al., 2005; Adewuya AO et al., 2006) have reported that patients' compliance with medication was predicted by attitudes towards medication. Among the factors that affect attitude towards medications and adherence are negative beliefs about medicines and illness related knowledge which are common beliefs prevalent in a given society. For example beliefs about spiritual causation of mental illness is common and widely held in the Nigerian society.

A positive attitude to medication can be inculcated in patients through regular family and patient psychoeducation programs, to teach patient about their illness, medication and adverse effects and relapse prevention (Velligan DI et al., 2009).

Conclusion: A high prevalence of medication non adherence is found among out-patients with schizophrenia and bipolar disorder in mental health services centre in south-south Nigeria. The risk factors for medication non adherence in this study should be taken into account in intervention protocols for improving adherence in patients' management.

Limitations

Our study has some limitations. First being a cross-sectional study and cannot confirm associations between the factors studied, the value must be limited to the descriptive and its exploratory nature. Also, treatment adherence was measured using indirect scale. Patient self reports that are used to estimate adherence usually overestimate their adherence.(Josep MH et al., 2011)

Authors' contributions

This work was carried out in collaboration among all authors. Authors JHE conceptualized the study and performed the study design. Author OSS collected the data. Authors AFU and AEE did data analysis. Authors UIA drafted the manuscript. All authors read and approved the final manuscript.

Consent

As per international standards or university standards, Participants' written consent has been collected and preserved by the author(s).

Ethical Approval

Ethical approval was obtained from the research ethical committee, Ministry of Health, Akwa Ibom State, Nigeria.

Disclaimer (Artificial Intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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