Who Adheres to Antipsychotic Treatment? Demographic and Basic Clinical Characteristics Associated with Medication Adherence among Adults with Schizophrenia in Zimbabwe: A Cross-Sectional Study

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ABSTRACT

Antipsychotic medication is a mainstay in the management of schizophrenia but adherence over time is difficult to maintain. The study investigated if commonly accessible demographic and simple clinical factors independently differentiate medication adherence in persons with schizophrenia in Zimbabwe. A quantitative analytical cross-sectional study was carried out among 96 persons who were attending outpatient psychiatric care at the Annex Psychiatric Unit of Parirenyatwa Group of Hospitals, Harare. Participants were sequentially recruited and rated using the 10 item Medication Adherence Rating Scale (MARS). Scores of ≥6 were considered adherent while scores of <6 were considered non-adherent. The pre-specified factors were age, sex, education, employment, marital status, length of illness and previous psychiatric hospitalisation. Data were analyzed using descriptive statistics, Pearson's chi-square tests, independent samples t tests and multivariable binary logistic regression in IBM SPSS Statistics Version 29. Mean age was 41.81 years (SD 11.67); 52.1% were males. Thirty-seven (38.5%) participants were classified as adherent and 59 (61.5%) as nonadherent. No significant relationships were observed with sex, education, employment, marital status, age, length of illness or previous psychiatric hospitalization. The multivariable model was not statistically significant, LR χ^2 (12) = 5.23, p = .950, McFadden pseudo-R 2 = .041. Non-adherence was prevalent yet routine demographic and basic clinical factors had little discriminating value. Findings recommend individualized repeated assessment of medication-taking behavior and exploration of potentially modifying treatment-related, psychological, social and health system aspects.

Keywords: schizophrenia; antipsychotic medication; medication adherence; non-adherence; Medication Adherence Rating Scale; Zimbabwe; treatment engagement; psychiatric care

INTRODUCTION

Schizophrenia is a serious mental condition and can have a great effect on perception, thought, behavior, mood, cognition and social functioning. For many people, effective management involves long-term participation with treatment. Antipsychotic medication is a key therapeutic component because it can lessen psychotic symptoms and help avoid recurrence and functional recovery. However, current treatment guidance does not frame antipsychotic prescribing solely as a pharmacological activity. Decisions for antipsychotic medication should reflect clinical effectiveness, adverse effects, patient preferences and the broader context of treatment (World Health Organization [WHO], 2023). Thus, the effectiveness of prescribed treatment depends not only on whether an acceptable drug has been picked but also on whether patients are able and willing to continue taking it over time.

Therefore, medication adherence is one of the persistent issues in schizophrenia management. But the terminology used to characterize adherence has substantial ramifications for how the problem is interpreted. A restrictive interpretation can limit non-adherence to an individual patient's inability to follow professional directions. Such an approach risks disregarding the reality that medication-taking behavior is rooted in a complex link between sickness experience, treatment effects, personal views, socioeconomic situations, family relationships and interactions with health providers. In a recent meta-analysis of 20 trials, Guo et al. (2023) identified several areas relevant to medication adherence, including drug-related, disease-related, behavioral, personal, socioeconomic and social-support aspects. Their work supports the argument that no single patient trait properly explains adherence.

The clinical value of adherence is great. Medication adherence may be inconsistent, and this may lead to return of symptoms, relapse, rehospitalization and functional disruption. However, the existence of these outcomes should not lead clinicians to conclude that every incident of missing medicine has the same reason. A patient may stop therapy due to side effects, questions about the need, perceived ineffectiveness, stigma, inadequate insight, substance use, financial restrictions, difficulties in acquiring medicine or displeasure with contact with the treatment team. Another patient may have none of these problems yet may have difficulty in medication-taking regimens. The therapeutic role is therefore not only to ascertain whether medication has been taken, but also to understand why treatment engagement is succeeding or failing.

This divergence raises a practical difficulty for psychiatric care. A lot of demographic and basic clinical characteristics are easily accessible, without the need of specialized examination. Information about age, sex, education, employment status, marital status, length of illness and previous psychiatric hospitalization can, as a general rule, be gained during a routine psychiatric assessment. If these characteristics reliably identify individuals at elevated risk of non-adherence, they could help doctors discover a very inexpensive basis for early intervention. However, if their predictive power is inadequate, reliance on demographic profiling may give false confidence and potentially redirect therapeutic attention away from more proximal drivers of treatment behavior.

Evidence on demographic characteristics is inconsistent. Age has been associated with medication adherence in several studies, but directions and magnitudes of correlations differ between populations. In a one-year prospective analysis of 485 outpatients with schizophrenia, younger age, higher depressive symptoms, poorer insight, previous suicide attempt and alcohol-use disorder were related with poorer adherence (Misdrahi et al., 2023). Importantly, their results also indicated that adherence was not static. Among patients who had poor adherence at baseline, 42% had moved to good adherence at one year, whereas some participants who had strong adherence at baseline had deteriorated. Adherence thus appears to be changeable, contingent upon the clinical and personal conditions of the patient, rather than a stable trait.

This dynamic perspective has crucial consequences for population studies. A variable like age is very steady, while medication-taking behavior is not. A patient may not vary in age but may change in depression, insight, treatment satisfaction, side effects, substance use, family support or availability to medication. If these dynamic characteristics are closer to the act of taking medication, a static demographic variable would be less competent to determine current adherence status. Thus, the absence of a demographic link in one population should not be taken as evidence that demographics never matter. The question is not whether demographics are useful in general, but whether they are valuable enough for clinical decision-making in the population and situation under consideration.

The same logic applies to marriage and to work. Sometimes, marital status is viewed as a surrogate for social support and employment as an indicator of financial stability, routine or social functioning. These proxies aren't ideal. A married patient may have minimal practical help with medication, while an unmarried patient may have significant support from parents, siblings, children, friends or community networks. Similarly, having a job does not equate with stable income, being able to purchase medicine or reliable access to health care. Educational attainment may be associated with health literacy but does not directly evaluate beliefs about medicine, insight, perceived necessity, treatment concerns or quality of therapy interaction.

This subject becomes more crucial in the African environment. Evidence from high income countries cannot

be simply transferred to psychiatric services in sub-Saharan Africa without considering the differences in health system capacity, access to medication, socio-economic conditions, costs of treatment, the role of the family, stigma and cultural understandings of mental illness. Addisu et al. (2025) performed a comprehensive review and meta-analysis of 16 studies comprising 5,994 patients with schizophrenia, and estimated the pooled antipsychotic non-adherence in sub-Saharan Africa to be 45.30% (95% CI = 29.57–61.04%). However, heterogeneity was quite high (I 2 = 99.51%) indicating that estimates of adherence and factors associated with adherence vary widely among African settings. The review found that extrapyramidal symptoms, polypharmacy, substance use, alcohol use, perceived stigma and inadequate family support were related with non-adherence.

This heterogeneity is not a mere statistical nuisance. It's a reminder that adherence is based in local treatment environments. The factors that influence drug taking behavior in Zimbabwe may not operate in exactly the same way as those discovered in Ethiopia, Ghana, Uganda or other settings. African evidence is thus useful for comparison but cannot substitute for locally generated evidence.

Recent African research emphasizes the need to move beyond demographic definition. Kretchy et al. (2021) evaluated drug perceptions, adverse effects and adherence among 121 dyads of patients and their caregivers in Ghana. The researchers found that greater need for medication was associated with better adherence, while worries about medication and a greater burden of side effects were associated with poorer adherence. This is an important clinical message in that it shows the degree to which the meaning that patients ascribe to medication may be more directly related to drug-taking behavior than their demographic factors. Similarly, Ocansey et al. (2025) explored medication beliefs and medication adherence among people with schizophrenia in Ghana and found that medication necessity beliefs and doctor-patient communication were positively associated with medication adherence and communication moderated the association between medication beliefs and medication adherence. The study presents a particularly pertinent African example to the hypothesis that involvement with therapy is not only influenced by patient characteristics, but also by the quality of communication within the therapeutic interaction.

Additional evidence of the contextual character of adherence comes from Uganda. Kule and Kaggwa (2023) investigated 135 patients with schizophrenia on typical antipsychotics in a remote tertiary facility. The observed rate of non-adherence was lower than that reported in many other African studies, although poverty was substantially related with non-adherence. The study also addressed insight, medication attitudes, bad effects, contentment and the explanations given by health personnel, showing the necessity of including socioeconomic and therapeutic variables beside demographic parameters.

In measuring adherence itself one needs to be cautious. The Medication Adherence Rating Scale (MARS) is a 10-item self-report measure intended to examine medication adherence and drug-taking behavior in persons with psychotic illnesses. It is an interesting for clinical research due to its brevity and feasibility. The instrument has also received subsequent validation including a large-scale assessment by Fialko et al. (2008) and an African psychometric evaluation by Owie et al. (2018) among patients with schizophrenia in Nigeria. Owie et al. stressed the need of assessing adherence measures in African communities and of not expecting that psychometric performance observed elsewhere would automatically translate across contexts. MARS remains a self-report measure, however. It reflects self-reported medicine-taking behavior, not objective confirmation of medication ingestion. Responses may be subject to recall and/or social desirability effects. The threshold used in the current study should therefore be considered an operational research classification, not a biological evaluation of pharmaceutical exposure. This distinction is particularly essential when comparing estimates of adherence between studies using various instruments and thresholds and in different populations.

Despite growing evidence that medication adherence in schizophrenia is multidimensional, there is limited empirical evidence from Zimbabwe examining whether routinely available demographic and basic clinical characteristics can distinguish adherent from non-adherent patients. This study therefore examined whether age, sex, educational attainment, employment status, marital status, duration of illness and previous psychiatric hospitalisation were independently associated with antipsychotic medication adherence among adults with schizophrenia receiving outpatient psychiatric care in Zimbabwe.

METHODOLOGY

Study Design and Setting

This was a quantitative, cross-sectional analytical study carried out among persons with schizophrenia on outpatient psychiatric care at the Annex Psychiatric Unit of Parirenyatwa Group of Hospitals in Harare, Zimbabwe. The study was meant to explore whether adherence to antipsychotic medication was connected with commonly accessible demographic and basic clinical data.

A cross-sectional analytical design was appropriate for describing adherence status within the study sample and examining its cross-sectional associations with prespecified explanatory factors in the specified clinical group. The study was published according to the standards of transparent reporting for observational studies, including explicit disclosure of study design, participants, variables, statistical processes and limitations (von Elm et al., 2007).

Participants and Sampling

The final analytic sample included 96 persons with schizophrenia receiving outpatient psychiatric care at the study site. Consecutive sampling was used. Eligible patients attending the outpatient service during the study period were approached consecutively until the final sample was obtained. Participants were eligible if they were aged 18 years or older, had a confirmed clinical diagnosis of schizophrenia, were receiving outpatient psychiatric treatment, were prescribed antipsychotic medication at the time of assessment, had attended at least one follow-up appointment and were clinically stable enough to understand the study procedures and give informed consent. Patients having an acute psychotic episode, severe cognitive impairment or any condition that interfered significantly with informed consent or completion of the questionnaires were excluded. Eligibility and clinical stability were verified by the treating psychiatric team.

Study Variables

The primary outcome was antipsychotic medication adherence, assessed using the 10-item Medication Adherence Rating Scale (MARS). We considered seven pre-specified explanatory variables: 1. age, 2. sex, 3. educational level, 4. employment position, 5. marital status, 6. duration of illness, and 7. previous psychiatric hospitalisation. Age and length of illness were regarded as continuous variables. Sex, educational achievement, employment status and marital status were categorical variables. Previous psychiatric hospitalization was considered as a variable in the clinical history. These variables were purposely selected. They provide information that is available throughout the normal course of a typical psychiatric assessment and do not require specialized behavioral, psychological, or laboratory testing. So, in essence, their inclusion was a pragmatic clinical question: can routinely available demographic and basic clinical information accurately identify individuals at elevated risk of antipsychotic medication non-adherence?

The study did not presume that these characteristics provided a complete explanation for drug adherence. Instead, they were chosen to see whether readily available patient characteristics could differentiate between participants labeled as adherent and non-adherent. Existing evidence suggests adherence is multifaceted and may be influenced by medication-related, illness-related, behavioral, psychological, socioeconomic and social-support factors (Guo et al., 2023). Evidence from Sub-Saharan Africa also suggests non-adherence variables such as side effects, antipsychotic polypharmacy, substance use, perceived stigma and lack of family support (Addisu et al., 2025).

Additional clinical data, such as current antipsychotic medication and length of treatment, was accessible within the larger clinical evaluation, but was not incorporated into the primary regression model, as the analysis was prospectively constrained to the seven pre-specified demographic and basic clinical features. This difference is essential because the study was aimed to examine the discriminatory value of normally available data, and not to develop a comprehensive causal model of medication adherence. Therefore, the lack of a link between a demographic or fundamental clinical factor and adherence was not understood to mean that the variable could never influence treatment behavior. Instead, a nonsignificant

finding was viewed as insufficient evidence for an independent relationship given the present sample and study design. In addition to the cross-sectional design of the study, the explanatory variables could not be considered to cause or precede adherence behavior. This approach was in line with the main objective of the study which was to establish whether readily available demographic and basic illness-history characteristics could provide a clinically useful basis for identifying adherence risk amongst adults with schizophrenia receiving outpatient psychiatric care in Zimbabwe.

Measurement of Medication Adherence

The 10-item Medication Adherence Rating Scale (MARS) was used to assess self-reported medication-taking behaviour. Each item was scored according to the prescribed scoring direction, with item scores summed to give a total score from 0 to 10. Higher scores indicated better reported adherence. Participants with MARS scores of 6 or above were classified as adherent, while those with scores below 6 were classified as non-adherent for this study.

Because MARS is a self-report measure, the results represent participants' reported medication-taking behaviour and not direct confirmation that medication was taken. Responses may therefore be affected by recall difficulties or social desirability. The MARS classification was consequently treated as an operational research measure of reported adherence.

Data Collection

Demographic information was collected directly from participants. Clinical information was acquired from participant report and the clinical evaluation process available. After eligibility was determined, clinical stability was confirmed, and written informed consent was obtained, participants completed the study measures. Participant-reported information was suitable for demographic variables and self-reported medication-taking behavior, while it introduces possible recollection and reporting bias. These constraints were taken into account in the interpretation.

Statistical Analysis

Data were analysed using IBM SPSS Statistics Version 29. Continuous variables were summarised using means and standard deviations, while categorical variables were presented as frequencies and percentages. Pearson's chi-square tests were used to assess the association between categorical explanatory variables and medication adherence status. Independent-samples t tests were used to compare continuous variables between participants classified as adherent and non-adherent.

Multivariable binary logistic regression was used to examine whether the seven pre-specified demographic and basic clinical factors were independently associated with medication adherence. Categorical variables were entered using the selected reference categories. Odds ratios (ORs), 95% confidence intervals (CIs), and p-values were reported, with statistical significance set at $p < .05$. Of the 96 participants, 37 were classified as adherent. The regression model estimated 12 parameters, resulting in a relatively small number of adherence events in relation to the number of parameters included. The regression analysis was therefore considered exploratory. The findings were interpreted with caution because the small sample and limited number of adherence events may have reduced the precision of the estimates and increased the possibility of model overfitting.

Ethical considerations

Ethical approval to conduct the study was obtained from the Clinical Director of Parirenyatwa Group of Hospitals before commencement of the study. Administrative permission to conduct the study was also obtained from Parirenyatwa Group of Hospitals. All participants provided written informed consent before participation. Participation was voluntary, and participants were informed of their right to decline

participation or withdraw without consequences for their clinical care. Confidentiality and anonymity were maintained throughout the study, and research data were securely managed.

RESULTS

Participant Characteristics

The final analysis consisted of 96 persons with schizophrenia who were getting psychiatric outpatient care at the Annex Psychiatric Unit of the Parirenyatwa Group of Hospitals in Zimbabwe. Medication adherence was measured using the 10-item medication adherence rating scale (MARS). Participants with a score of 6 or above were categorized as adherent and those with a score of below 6 were classed as non-adherent. Overall, 37 participants (38.5%) were classified as adherent based on the operational definition while 59 (61.5%) were classified as non-adherent. The mean MARS score of the study population was 5.04 (SD = 1.67). On average, the sample was 41.81 years old (SD = 11.67). There were 50 (52.1%) male and 46 (47.9%) female participants.

Table 1. Demographic And Clinical Characteristics of Participants

Characteristic	Overall, n (%) / Mean (SD)
Total sample	96 (100.0)
Age, years	41.81 (11.67)
Male	50 (52.1)
Female	46 (47.9)
MARS score	5.04 (1.67)
Adherent (MARS ≥6)	37 (38.5)
Non-adherent (MARS <6)	59 (61.5)
Duration of illness, years	9.78 (5.74)
Previous psychiatric hospitalisations	3.05 (1.93)

Adherence according to categorical demographic characteristics

Bivariate analyses were undertaken to determine whether adherence status differed according to sex, educational attainment, employment status and marital status. Pearson's chi-square tests were used for categorical variables, with statistical significance defined as $p < .05$.

Table 2: Bivariate associations between categorical demographic characteristics and medication adherence

Variable	χ^2	df	p
Sex	0.88	1	.349
Education	2.06	3	.560

Employment	0.06	2	.968
Marital status	0.60	3	.896

Continuous demographic and clinical characteristics according to adherence status

Independent-samples t-tests were used to compare age, duration of illness and number of previous psychiatric hospitalisations between participants classified as adherent and those classified as non-adherent.

Table 3 Continuous demographic and clinical characteristics according to medication adherence status

Variable	Adherent Mean (SD)	Non-adherent Mean (SD)	t	p
Age, years	41.41 (12.27)	42.07 (11.38)	0.26	.792
Duration of illness, years	10.51 (5.63)	9.32 (5.81)	1.00	.322
Previous psychiatric hospitalisations	3.05 (2.03)	3.05 (1.89)	0.01	.994

Multivariable associations with medication adherence

Then a binary logistic regression model was performed to evaluate the independent association of demographic and basic clinical features with medication adherence controlling for the other variables in the model. Predictors included age, sex, educational attainment, work status, marital status, length of illness and previous psychiatric hospitalisation. Categorical variables were included using predefined reference categories.

Table 4 Multivariable logistic regression predicting medication adherence

Predictor	OR	95% CI	p
Age	0.993	0.957–1.031	.731
Female sex	0.642	0.257–1.601	.342
Primary education	0.443	0.128–1.542	.201
Secondary education	0.481	0.124–1.873	.292
Tertiary education	0.493	0.143–1.700	.263
Informal employment	0.913	0.297–2.813	.875
Formal employment	1.011	0.354–2.889	.984
Married	0.831	0.236–2.929	.774
Divorced	1.323	0.347–5.040	.682
Widowed	0.855	0.221–3.311	.821
Duration of illness	1.048	0.971–1.132	.226
Previous psychiatric hospitalisations	0.969	0.765–1.227	.793

Overall Pattern of Findings

The bivariate and multivariable analyses showed a consistent pattern. None of the demographic or basic clinical characteristics examined was statistically significantly associated with medication adherence. Sex, education, employment and marital status were not significant in the categorical analyses, while age, duration of illness and previous psychiatric hospitalisations were not significant in the continuous comparisons. Similarly, the multivariable model did not identify any independent predictor of adherence.

The odds ratios varied across the predictors, but several 95% confidence intervals were wide and included the null value, indicating uncertainty around some of the estimates. The overall model was not statistically significant, LR $\chi^2(12) = 5.23$, $p = .950$, with a McFadden pseudo-R^2 of .041. Given the small number of adherent participants relative to the 12 estimated regression parameters, the multivariable findings should be interpreted as exploratory.

DISCUSSION

Principal Findings

The aim of this study was to evaluate whether routinely accessible demographic and basic clinical data could distinguish persons with schizophrenia according to their antipsychotic medication adherence in a specialist outpatient psychiatric setting in Zimbabwe. Of the 96 participants, 59 (61.5%) were classified as non-adherent and 37 (38.5%) as adherent based on the specified MARS criterion. However, the bivariate analyses and the multivariable logistic regression model did not identify statistically significant associations between adherence and age, sex, education, employment status, marital status, duration of illness or previous psychiatric hospitalization. The overall regression model was also not statistically significant, LR $\chi^2(12) = 5.23$, $p = .950$, with a McFadden pseudo-R^2 of .041.

The findings therefore suggest that the demographic and basic clinical characteristics examined in this study had limited value for distinguishing adherence status in this sample. However, this should not be interpreted as evidence that these characteristics can never be related to medication adherence. The regression model included 12 estimated parameters but only 37 participants were classified as adherent. This limited the precision of the estimates and increased the possibility of overfitting. The regression findings should therefore be regarded as exploratory.

The Burden of Non-Adherence in the Study Population

The classification of 61.5% of participants as non-adherent indicates a potentially important treatment-engagement concern in this specialist outpatient population. This is clinically important because all participants were already in contact with psychiatric services. Attendance at an outpatient psychiatric clinic therefore did not necessarily equate to consistent medication-taking behaviour.

This distinction is relevant in routine psychiatric treatment. A patient may attend appointments consistently, communicate effectively with clinicians and appear clinically stable while still taking medication inconsistently. Conversely, a patient who frequently misses appointments may still take medication relatively consistently. Clinic attendance should therefore not be treated as a substitute for direct assessment of medication adherence.

Demographic Profiling Did Not Identify an Adherence Phenotype

One of the main findings was the absence of statistically significant variation in adherence according to sex, education, employment and marital status. These characteristics are attractive as potential adherence markers because they are readily available during routine clinical assessment and are inexpensive to obtain. However, their availability does not necessarily mean that they have sufficient explanatory value.

The present findings are consistent with the broader view that medication adherence is influenced by several

interacting factors rather than by a single patient characteristic. Guo et al. (2023), for example, identified drug-related, disease-related, behavioural, personal, socioeconomic and social-support factors as relevant to adherence. Demographic characteristics may therefore provide background information without adequately explaining the patient's actual medication-taking behaviour.

Age: A Constant Property in a Dynamic Treatment Process

In the present study, adherence was not associated with age. The mean age was similar between adherent and non-adherent participants, with a difference of less than one year, and the adjusted odds ratio was close to 1 (OR = 0.993, 95% CI [0.957, 1.031]). This differs from some previous findings. For example, Misdrahi et al. (2023), in a large one-year prospective cohort of people with schizophrenia, found that younger age was associated with poorer medication adherence.

The difference may reflect the fact that age is a relatively stable characteristic, whereas medication-taking behaviour can change over time. Misdrahi et al. (2023) also found that adherence was not static, with some participants changing from poor to good adherence and others moving in the opposite direction. Factors such as depressive symptoms, insight, treatment satisfaction, side effects, substance use and social support may change over time and may be more closely related to current medication-taking behaviour than age itself.

The absence of an association with age in this study should therefore not be taken to mean that age is irrelevant in every setting. Rather, it suggests that age alone did not provide a useful basis for distinguishing adherence status in this particular sample.

Education: Formal Schooling Is Not the Same as Treatment Understanding

Educational level was not significantly associated with medication adherence in this study. Although the highest observed proportion of adherence was among participants with no formal education, this descriptive difference was not statistically significant.

This finding also cautions against using formal education as a direct measure of health literacy or treatment understanding. Educational attainment does not necessarily indicate whether a person understands schizophrenia, believes that antipsychotic treatment is necessary, recognises early warning signs of relapse, understands adverse effects or feels able to discuss treatment concerns with healthcare providers. These factors may be more directly connected to medication-taking behaviour than the number of years or level of formal schooling completed.

Employment Status and the Limits of Socioeconomic Proxies

The present study found very little relation between employment and adherence. Adherence was 39.4% among unemployed participants, 36.7% among those in casual employment and 39.4% among those in formal employment. The similarity of these proportions suggests that employment status was a poor stand-alone predictor of adherence in this group.

This finding should not be taken as evidence that economic circumstances do not affect medication-taking behaviour. Employment category does not directly measure income, financial stability, ability to pay for treatment, transport costs or access to medication. A person who is employed may still experience financial difficulties, while an unemployed person may receive substantial family or other support. Employment status may therefore be too broad a measure to capture the economic circumstances that influence adherence.

Marital Status Should Not Be Confused with Social Support

Marital status was not significantly associated with medication adherence. Married, single, divorced and widowed participants showed broadly comparable patterns of adherence.

This is important because marital status is sometimes used as a simple indicator of social support. However,

being married does not necessarily mean that a patient receives practical or emotional support with treatment. A married person may experience interpersonal difficulties or have little involvement from their spouse, while an unmarried person may receive considerable support from parents, siblings, adult children, friends or other community networks. Direct assessment of social support may therefore provide more useful information than marital status alone.

Factors Potentially Closer to Medication-Taking Behaviour

The lack of clear associations with the demographic and basic clinical variables examined in this study does not mean that medication adherence is unaffected by other factors. Rather, it raises the possibility that factors closer to the actual experience of taking medication may be more informative.

Kretchy et al. (2021), in a patient-caregiver dyad study in Ghana, found associations between medication beliefs, side effects and adherence. Greater perceived need for medication was associated with better adherence, while concerns about medication and greater side-effect burden were associated with poorer adherence. Ocansey et al. (2025) similarly found that medication necessity beliefs and doctor-patient communication were associated with adherence and that communication moderated the relationship between medication beliefs and adherence.

These findings suggest that what patients believe about their medication may be more directly related to medication-taking behaviour than characteristics such as age, education or marital status. They also highlight the role of the therapeutic relationship. Hsieh et al. (2022) found that therapeutic alliance and medication attitudes were important components of the relationship between insight and medication adherence. Adherence may therefore be influenced not only by who the patient is, but also by what happens during treatment and how the patient experiences interactions with healthcare providers.

Adverse Effects, Polypharmacy and Treatment Burden

Treatment burden is another important area that was not examined directly in the present model. Medication adherence cannot be separated completely from the experience of taking medication. Antipsychotic treatment may involve adverse effects, while polypharmacy and complex treatment regimens may increase the burden associated with treatment.

Ayenew et al. (2021) reported on antipsychotic polypharmacy in African settings and highlighted its relationship with treatment complexity and clinical severity. Addisu et al. (2025) also identified polypharmacy and extrapyramidal symptoms among factors associated with non-adherence in sub-Saharan Africa. These findings provide possible explanations for why demographic characteristics alone may have limited value in identifying patients who struggle with medication-taking.

Importantly, these factors were outside the primary scope of the present study. They should therefore be considered possible explanations suggested by previous research rather than explanations demonstrated by the current data.

The African Context

The present findings should also be considered alongside evidence from other African settings. Research from Ghana, Uganda, Ethiopia and Tanzania indicates that medication adherence is influenced by varying combinations of psychological, therapeutic, socioeconomic and social factors. Kretchy et al. (2021) highlighted medication beliefs and adverse effects, while Kule and Kaggwa (2023) identified socioeconomic and treatment-related factors. Mohammed et al. (2024) reported factors including insight and substance use, while Tamene et al. (2024) identified treatment duration, substance use, polypharmacy and extrapyramidal symptoms. Addisu et al. (2025) also found substantial heterogeneity across sub-Saharan African studies.

This variation is important when interpreting the present findings. The evidence does not provide one consistent African profile of medication adherence. Differences in health service organisation, access to

medicines, socioeconomic circumstances, family involvement and treatment experiences may influence how adherence is expressed in different settings. Evidence from other African countries is therefore useful for comparison, but it cannot replace locally generated evidence from Zimbabwe.

Interpretation of the Null Regression

The multivariable analysis did not identify statistically significant independent associations between the seven demographic and basic clinical variables and medication adherence. However, the results should not be interpreted from p-values alone. Several of the 95% confidence intervals were wide and included the null value, indicating uncertainty around the size and direction of some of the estimated associations.

The overall model was also not statistically significant, LR $\chi^2(12) = 5.23$, $p = .950$, with a McFadden pseudo-R^2 of .041. The model therefore explained little of the variation in adherence status in this sample. At the same time, only 37 participants were classified as adherent in a model estimating 12 parameters. The findings may consequently reflect limited statistical precision as well as the absence of strong associations. The results are best understood as showing that no clear independent associations were detected in this sample, rather than demonstrating that the examined characteristics have no relationship with medication adherence.

Clinical Implications

The findings have practical implications for psychiatric services. If demographic characteristics do not reliably distinguish adherence status, adherence assessment should not be selectively provided only to patients who appear to be at high risk based on age, sex, marital status, education or employment.

Clinicians should instead consider asking routinely about medication-taking behaviour among patients receiving long-term antipsychotic treatment. Where non-adherence is identified, the assessment should go beyond establishing that doses have been missed and should explore possible reasons for the behaviour. This may include concerns about medication, adverse effects, perceived need for treatment, difficulties obtaining medication and other treatment-related or social barriers.

The findings therefore support an approach that focuses less on demographic risk profiling and more on understanding the individual patient's experience of treatment.

Implications for Intervention Development

Evidence from previous research suggests that adherence interventions may need to address different types of barriers. Cahaya et al. (2022) found considerable variation in interventions designed to improve medication adherence in schizophrenia, while Loots et al. (2021) identified educational, behavioural, organisational and therapeutic approaches among the strategies used.

The Tanzanian pilot study by Mbwambo et al. (2022) is particularly relevant to the African context. The study demonstrated the feasibility of combining customised adherence enhancement with long-acting injectable antipsychotic treatment among poorly adherent patients with chronic psychotic disorders. Such approaches may be useful for Zimbabwean services, but they would need to be evaluated within the local healthcare and treatment context rather than simply transferred from another setting.

Overall, the present findings suggest that interventions should be based on the barrier identified in the individual patient rather than on demographic characteristics alone.

Overall Interpretation

Taken together, the findings show that routinely available demographic and basic clinical characteristics did not provide a clear adherence profile in this Zimbabwean specialist outpatient sample. This is important because such characteristics are easy to collect and may appear attractive as simple indicators of adherence

risk. However, the results suggest that their practical value for identifying current adherence status may be limited.

At the same time, the findings should be interpreted within the limitations of the study. The cross-sectional design prevents conclusions about cause or direction, the MARS assessment was self-reported, and the small number of adherent participants relative to the 12 estimated regression parameters limits the precision of the multivariable findings. The study also did not directly measure several potentially important factors, including medication beliefs, adverse effects, insight, substance use, stigma, social support, therapeutic communication, treatment accessibility and treatment complexity.

The main contribution of the study is therefore not that demographic characteristics are unimportant. Rather, it adds Zimbabwean evidence showing that these readily available characteristics did not provide sufficient independent discriminatory value for medication adherence in this particular clinical setting. This supports the need for a broader approach in which adherence is assessed as a treatment behaviour that may change over time and may be influenced by the interaction between the patient, medication, illness, social environment and health system.

STRENGTHS AND LIMITATIONS

Strengths

A key strength of the study is that it addresses a specific, clinically relevant and under-studied Zimbabwean group. The data came from persons with schizophrenia receiving care in the Zimbabwean public psychiatric system rather than from evidence drawn mainly from high-income countries. This provides local evidence on medication adherence in a Zimbabwean clinical setting.

The study also used the Medication Adherence Rating Scale (MARS) to assess medication adherence. MARS has been widely used in psychosis research (Thompson et al., 2000; Fialko et al., 2008), with additional evidence from an African schizophrenia population (Owie et al., 2018).

Another strength is that the explanatory variables were defined before the analysis rather than selected because they showed statistical significance in the data. The study therefore examined a clear set of routinely available demographic and basic clinical characteristics. This also kept the analysis focused on the original study question.

The analysis considered the findings at several levels. Descriptive statistics were used to describe the sample, bivariate tests examined individual associations, and multivariable logistic regression assessed the variables together. This allowed the same general pattern to be examined using different statistical approaches.

The interpretation of the findings was also cautious. The study does not suggest that demographic variables are irrelevant to medication adherence. Rather, it found that the variables examined did not show sufficient independent association with adherence in this sample.

Limitations

The main limitation of the study is the small sample size. Only 37 participants were classified as adherent. The multivariable regression model estimated 12 parameters, resulting in a relatively small number of adherence events in relation to the size of the model. This limits the precision of the estimates and means that smaller associations may not have been detected. It also raises the possibility of model overfitting and unstable coefficient estimates. The multivariable findings should therefore be considered exploratory rather than definitive. The cross-sectional design is another limitation. The study provides information about the variables at the time of data collection, but it cannot show whether one factor influenced another or how adherence changed over time. Causal conclusions therefore cannot be drawn from the findings.

The study was conducted at one specialist psychiatric outpatient facility in Harare. The findings may therefore not represent people with schizophrenia receiving care in other parts of Zimbabwe, particularly those in rural areas, primary-care settings or private psychiatric services. They may also not represent people who are not regularly engaged with mental health services. The findings should therefore be understood mainly in relation to the study population and setting rather than generalised to all people with schizophrenia in Zimbabwe. Studies involving several sites and different levels of mental health care would help to determine whether similar findings are seen more widely.

Medication adherence was assessed using MARS, which is a self-report measure. Participants had to remember and report their medication-taking behaviour, so some may have forgotten missed doses or reported their behaviour in a way they considered more acceptable. Recall and social-desirability bias may therefore have affected the classification of adherence. The study also did not use pharmacy dispensing records, pill counts, electronic monitoring or another objective method to confirm medication exposure. The adherence rate should therefore be understood as MARS-based self-reported adherence rather than direct confirmation of medication ingestion.

The study was deliberately focused on demographic and basic clinical characteristics. It therefore did not directly assess several factors that may have a closer relationship with medication-taking behaviour, including medication beliefs, adverse effects, insight, stigma, substance use, therapeutic relationship, communication, social support, polypharmacy and treatment accessibility. The study cannot determine whether these factors were associated with adherence among the participants. Future Zimbabwean studies should examine these factors, particularly using larger samples that can support a more detailed multivariable analysis.

These limitations are important when interpreting the findings. The results apply to the sample and setting studied and to the variables that were examined. Larger, multicentre and more detailed studies are needed to determine which factors are most closely related to antipsychotic medication adherence in Zimbabwe.

CONCLUSION

This study examined whether routinely accessible demographic and basic clinical variables could distinguish adults with schizophrenia according to their antipsychotic medication adherence in a Zimbabwean outpatient psychiatric setting. In this sample, age, sex, educational attainment, employment status, marital status, duration of illness and previous psychiatric hospitalization were not statistically significantly associated with medication adherence. Based on the predetermined MARS threshold, 59 (61.5%) of the 96 participants were classified as non-adherent and 37 (38.5%) as adherent. The high proportion classified as non-adherent is clinically noteworthy, particularly because all participants were receiving specialist psychiatric outpatient care. Attendance at psychiatric services should therefore not be assumed to indicate consistent medication-taking behaviour.

The absence of statistically significant associations should be interpreted with caution. Only 37 participants were classified as adherent, while the regression model estimated 12 parameters. This limits the precision of the estimates and means that smaller associations may not have been detected. The cross-sectional design also means that the study cannot establish causal relationships or changes in adherence over time.

The findings were consistent across the bivariate and multivariable analyses. No significant associations were found for the categorical demographic variables, the continuous characteristics did not differ significantly according to adherence status, and the overall regression model had little explanatory power. Within this clinical setting, routinely available demographic and basic illness-history data therefore did not provide a useful basis for identifying patients who were more likely to be classified as adherent or non-adherent.

This does not mean that demographic characteristics have no relevance to adherence. Rather, the findings suggest that greater attention may need to be given to factors that are more directly connected to the experience of taking medication. These may include medication beliefs, adverse effects, insight, substance

use, social support, therapeutic alliance, communication with healthcare providers, treatment access and treatment burden. Such factors were not directly assessed in the present study and should therefore be examined in future research rather than assumed to explain the current findings.

For clinical practice, the main message is that adherence should be assessed directly rather than inferred from demographic characteristics. A younger, unemployed or unmarried patient should not automatically be considered at greater risk of non-adherence, just as an older, employed or married patient should not automatically be considered adherent. Asking patients about their actual experience of taking medication may provide more useful information for identifying and addressing adherence difficulties.

Further Zimbabwean research should use larger and more diverse samples, preferably across several healthcare settings and over longer periods of follow-up. Future studies should also combine self-reported adherence with pharmacy, dispensing or other objective measures where possible, while examining the treatment-related, psychological, social and health-system factors that may influence medication-taking behaviour.

RECOMMENDATIONS

Clinical Practice Recommendations

Routine assessment of medication adherence

Medication adherence should be assessed routinely as part of outpatient care for people with schizophrenia. In this study, demographic characteristics did not reliably distinguish adherence status. Assessment should therefore not be limited to patients considered to be at higher risk because of age, sex, employment status, marital status or educational level.

Explore the reasons for non-adherence

Where non-adherence is identified, clinicians should explore the reasons behind it rather than treating non-adherence as a single behaviour. A structured discussion can include patterns of missed doses, concerns about medication, adverse effects, perceived benefits and necessity of treatment, treatment expectations, and practical difficulties in obtaining medication.

Assess beliefs and views about medication

Patients should be given an opportunity to discuss what they believe their medication does, why they think it is needed, any concerns they have about treatment, and what they expect to happen if treatment is stopped. Evidence from Ghana suggests that medication beliefs are associated with adherence and may interact with doctor-patient communication (Kretchy et al., 2021; Ocansey et al., 2025).

Actively assess adverse effects

Adverse effects should be asked about routinely rather than waiting for patients to raise concerns themselves. Where clinically appropriate, treatment should be reviewed when undesirable effects affect a patient's willingness or ability to continue treatment.

Strengthen therapeutic communication

Clinicians should encourage collaborative discussions in which patients can raise concerns and participate in decisions about their treatment. Therapeutic alliance and attitudes towards medication have been associated with medication adherence (Hsieh et al., 2022).

Assess family and social support directly

Marital status should not be used as a substitute for assessing social support. Where appropriate and with the

patient's agreement, family members and other important support persons can be involved in psychoeducation and treatment planning.

Identify practical barriers to treatment

Clinicians should consider practical barriers such as medication availability, transport costs, treatment costs, clinic attendance requirements and other difficulties within the health system. Employment status alone is not a sufficient measure of a patient's ability to access and continue treatment.

Recommendations for Future Research

Future Zimbabwean research should:

- recruit larger samples from a broader range of psychiatric and primary-care settings;
- use longitudinal designs to examine changes in medication adherence over time;
- assess treatment attitudes and medication beliefs directly;
- examine therapeutic alliance and doctor-patient communication;
- investigate treatment burden and adverse effects;
- assess insight, substance use and depressive symptoms;
- use direct measures of social support rather than marital status as a proxy;
- examine medication availability, affordability and other treatment-access barriers;
- investigate antipsychotic polypharmacy and treatment complexity, including dose burden;
- combine MARS with pharmacy records, dispensing information or other objective measures of medication adherence where feasible; and
- develop and evaluate culturally and contextually appropriate adherence interventions for patients with schizophrenia in Zimbabwe.

Recommendations for Future Intervention Development

Future interventions should focus on the mechanisms underlying non-adherence rather than on demographic characteristics. Instead of developing one intervention for supposedly high-risk demographic groups, clinicians and researchers should identify the specific barrier experienced by each patient and tailor the intervention accordingly.

Depending on the barrier identified, this may include psychoeducation to address misconceptions, collaborative medication review where adverse effects are problematic, behavioural strategies where difficulties with medication-taking are identified, family interventions where social support is limited, improved communication where the therapeutic relationship needs strengthening, or service-level interventions where access to medication is the main difficulty.

The Tanzanian experience of customised adherence enhancement combined with long-acting injectable treatment provides one example of an intervention approach used in an African setting among patients with ongoing adherence difficulties (Mbwambo et al., 2022). Such approaches should be evaluated within the Zimbabwean healthcare and treatment context rather than simply transferred into local practice.

Declarations

Ethics Approval and Consent To Participate

Ethical approval to conduct the study was obtained from the Clinical Director of Parirenyatwa Group of Hospitals before commencement of the study. Administrative permission to conduct the study was also obtained from Parirenyatwa Group of Hospitals. All participants provided written informed consent before participation. Participation was voluntary, and participants were informed of their right to decline participation or withdraw without consequences for their clinical care. Confidentiality and anonymity were maintained throughout the study, and research data were securely managed.

Consent for Publication

Not applicable. This study does not contain individually identifiable personal information or images requiring consent for publication.

Availability of Data and Materials

The datasets generated and/or analysed during the current study are not publicly available because they contain potentially identifiable clinical information from participants receiving psychiatric care. Data may be made available from the corresponding author on reasonable request and subject to applicable ethical, institutional and confidentiality requirements.

Competing interests

The authors declare that they have no competing interests.

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Authors' Contributions

TM conceived the study, developed the research protocol, collected and analysed the data, and prepared the manuscript. **JC** contributed to study supervision, methodological review and critical revision of the manuscript. Both authors reviewed and approved the final manuscript.

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