
Research article

Medication adherence in schizophrenia patients undergoing outpatient treatment at a provincial psychiatric hospital in Vietnam: A cross-sectional study

Thi Anh Thu Dang^{1,*}, Ly Nam Ngo², Phuc Thanh Nhan Nguyen¹ and Van-Tuy Nguyen¹

¹ Hue University, University of Medicine and Pharmacy, Hue, Vietnam

² Quy Nhon Psychiatric Hospital, Gia Lai Province, Vietnam

* **Correspondence:** Email: thudang@hueuni.edu.vn; Tel: +84392591326.

Abstract: *Introduction:* Schizophrenia is a chronic mental disorder requiring long-term medication adherence to prevent relapse and improve quality of life. Poor adherence remains a significant challenge, particularly in low- and middle-income countries, such as Vietnam. This study aimed to assess medication adherence rates and associated factors among outpatient schizophrenia patients in Binh Dinh Province. *Methods:* A cross-sectional study was conducted on 420 schizophrenia patients undergoing outpatient treatment at Binh Dinh Provincial Psychiatric Hospital in 2024. Adherence was measured using the medication adherence rating scale (MARS-5). Data on demographics, clinical characteristics, and social support were collected via structured interviews and medical records. Univariate and multivariate logistic regression analyses were performed to identify factors associated with adherence. *Results:* The adherence rate was 59.3%, with a mean MARS-5 score of 23.2 ± 2.7 . Key factors associated with higher adherence in multivariate analysis included male gender (OR = 1.6, 95% CI: 1.1–2.6, $p = 0.028$), current employment (OR = 2.8, 95% CI: 1.7–4.7, $p < 0.001$), regular physical activity (OR = 1.6, 95% CI: 1.1–2.5, $p = 0.023$), family support in medication management (OR = 2.8, 95% CI: 1.5–5.3, $p = 0.003$), and absence of perceived stigma (OR = 2.2, 95% CI: 1.3–3.6, $p = 0.002$). *Conclusion:* Adherence remains suboptimal, influenced by sociodemographic and support-related factors. Interventions should focus on enhancing family involvement, promoting physical activity, and reducing stigma to improve outcomes.

Keywords: schizophrenia; medication adherence; MARS-5; Vietnam; outpatient treatment

1. Introduction

Schizophrenia is a severe, chronic psychiatric disorder characterized by hallucinations, delusions, disorganized thinking, and negative symptoms, affecting approximately 1% of the global population [1,2]. It imposes a substantial burden on individuals, families, and healthcare systems, with high rates of relapse and hospitalization if untreated [3]. Long-term antipsychotic medication is the cornerstone of management, reducing relapse risk by up to 70% when adhered to properly [4]. However, non-adherence rates range from 40%–60% worldwide, leading to poorer clinical outcomes, increased healthcare costs, and diminished quality of life [5].

In low- and middle-income countries (LMICs), such as Vietnam, adherence challenges are exacerbated by limited access to mental health services, stigma, economic constraints, and inadequate family support [6]. Although Vietnam has strengthened its mental healthcare system through national mental health policies and the expansion of community-based outpatient services, these improvements have primarily increased service availability rather than ensuring equitable access and continuity of care. Significant gaps remain, particularly in rural areas where shortages of mental health resources, long travel distances, and socioeconomic barriers continue to affect treatment adherence [7]. Binh Dinh Province, a central coastal region, exemplifies these issues, where outpatient schizophrenia patients face barriers such as long travel distances to hospitals and cultural misconceptions about mental illness.

Previous studies have identified multiple determinants of medication adherence among patients with schizophrenia, including demographic characteristics, medication side effects, illness insight, treatment beliefs, family support, perceived stigma, and socioeconomic status [7]. However, the relative importance of these factors varies across healthcare systems and sociocultural contexts. In Vietnam, existing studies have largely been conducted in northern and southern regions and in tertiary psychiatric hospitals, limiting the generalizability of their findings to provincial hospitals serving predominantly rural populations. Central Vietnam presents distinct challenges related to healthcare accessibility, economic conditions, caregiver involvement, and cultural perceptions of mental illness, all of which may influence treatment adherence. Therefore, rather than identifying entirely new determinants, this study aimed to evaluate medication adherence and examine whether previously reported associated factors are applicable in this understudied regional and healthcare setting. The findings provide region-specific evidence to guide targeted interventions and strengthen the evidence base for schizophrenia management in Vietnam.

2. Materials and methods

2.1. Study design and setting

This cross-sectional study was conducted at the outpatient clinic of Binh Dinh Provincial Psychiatric Hospital, Binh Dinh Province, Vietnam, from January to December 2024. Following Vietnam's administrative reorganization on July 1, 2025, Binh Dinh Province and Gia Lai Province were merged into the new Gia Lai Province, and the hospital was administratively renamed Quy Nhon Psychiatric Hospital, Gia Lai Province. The hospital serves as the primary mental health facility for the province, managing approximately 1900 schizophrenia outpatients annually.

2.2. Participants

Inclusion criteria were: (1) aged ≥ 18 years, (2) diagnosed with schizophrenia per ICD-10 criteria [8], (3) stable outpatient treatment for ≥ 3 months, (4) no acute psychotic episode in the past 3 months, and (5) informed consent from patient or guardian. Exclusion criteria included: (1) severe cognitive impairment preventing interview participation, (2) comorbid substance abuse disorder, or (3) refusal to participate.

Sample size was calculated using the Eq 1 for prevalence estimation:

$$n = Z^2 \frac{p \times (1 - p)}{d^2} \quad (1)$$

where $Z = 1.96$ (95% CI), $p = 0.611$ (assumed adherence rate), and $d = 0.05$. This yielded a minimum of 385 participants, and 420 were recruited to account for 10% dropout. Consecutive sampling was used.

During the study period, all patients attending the outpatient clinic for scheduled follow-up visits were consecutively screened for eligibility by trained psychiatrists. Eligibility was assessed according to the predefined inclusion and exclusion criteria using medical records and clinical evaluation. All eligible patients were invited to participate consecutively during their routine outpatient visits. Patients who agreed to participate provided written informed consent prior to enrollment. Consecutive sampling was continued until the target sample size was achieved.

2.3. Data collection

Data were collected via structured interviews and medical record reviews. The questionnaire covered demographics, clinical history, social support, and adherence. Interviews lasted 20–30 minutes and were conducted by trained psychiatrists.

Medication adherence was assessed using the medication adherence report scale (MARS-5), a validated self-report instrument widely used in patients with schizophrenia because of its good psychometric properties, ease of administration, and suitability for outpatient clinical settings. MARS-5 was selected as the primary adherence measure because objective methods, such as pharmacy refill records, pill counts, electronic medication monitoring, and therapeutic drug monitoring, were not routinely available in our study setting. Given the large sample size and cross-sectional design, MARS-5 provided a practical and standardized approach for evaluating medication adherence [9]. Total scores range from 5 to 25, with higher scores indicating better medication adherence. A cutoff score of >23 was used to classify participants as adherent based on previous validation studies [10].

The questionnaire was designed based on factors consistently reported in previous studies of medication adherence among patients with schizophrenia and adapted to the local outpatient setting. Variables were selected to capture key demographic characteristics, clinical history, lifestyle behaviors, family support, and perceived stigma, as these factors have been shown to be important determinants of adherence and could be reliably obtained through structured interviews and medical record review. The selection of variables also reflected the feasibility of data collection within routine clinical practice at a provincial psychiatric hospital.

2.4. Ethical considerations

The study was approved by the Ethics Committee of Hue University of Medicine and Pharmacy (Approval No. H2024/012). Written informed consent was obtained, with confidentiality assured.

2.5. Statistical analysis

Data were analyzed using SPSS 26.0. Descriptive statistics summarized variables. Chi-square tests examined univariate associations. Multivariate logistic regression identified independent predictors of adherence ($p < 0.05$ entry criterion). Odds ratios (OR) with 95% confidence intervals (CI) were reported. $P < 0.05$ was significant.

3. Results

3.1. Sociodemographic characteristics of the study population

A total of 420 outpatients diagnosed with schizophrenia were included in the final analysis. The mean age of participants was 45.2 ± 12.3 years, with the majority aged over 35 years. Male patients constituted nearly two-thirds of the sample (65.7%). Almost all participants were of Kinh ethnicity (99.3%), reflecting the ethnic composition of the study area. Most patients resided in rural settings (81.0%), while a smaller proportion lived in urban or mountainous/island areas. Educational attainment was generally low, with 62.1% having completed secondary school or less. More than half of the participants were unmarried, divorced, or widowed (58.6%). Unemployment was highly prevalent, affecting 71.9% of the cohort. Detailed sociodemographic characteristics are presented in Table 1.

Table 1: Demographic characteristics of participants (N = 420).

Characteristic		n	%
Age	≤35 years	95	22.6
	>35 years	325	77.4
	Mean ± SD	45.2 ± 12.3 years	
Gender	Male	276	65.7
	Female	144	34.3
Ethnicity	Kinh	417	99.3
	Other	3	0.7
Residence	Urban	74	17.6
	Rural	340	81.0
	Mountainous/island	6	1.4
Education	≤Secondary	261	62.1
	>Secondary	159	37.9
Marital status	Married	174	41.4
	Single/divorced/widowed	246	58.6
Employment	Employed	118	28.1
	Unemployed	302	71.9

3.2. Clinical characteristics and treatment profile

The clinical characteristics of the study population are summarized in Table 2. Schizophrenia was long-standing in most participants, with a mean disease duration of 12.4 ± 8.6 years and 90.5% reporting illness duration longer than five years. The mean number of lifetime relapses was 4.8 ± 3.2 , with approximately one-quarter of patients experiencing more than five relapses. Undifferentiated schizophrenia was the most frequently observed subtype (54.0%), followed by paranoid schizophrenia (32.1%).

Antipsychotic-related side effects were reported by 29.3% of patients, most commonly weight gain (16.4%) and extrapyramidal symptoms such as tremors (12.4%). The vast majority of patients were treated with atypical antipsychotics (88.8%), reflecting current clinical practice in outpatient schizophrenia management.

Table 2: Clinical characteristics of participants (N = 420).

Characteristic		n	%
Disease duration	≤5 years	40	9.5
	>5 years	380	90.5
	Mean ± SD	12.4 ± 8.6 years	
Relapses (total)	≤5	310	73.8
	>5	110	26.2
	Mean ± SD	4.8 ± 3.2	
Subtype	Paranoid	135	32.1
	Undifferentiated	227	54.0
	Other	58	13.9
Side effects	None	297	70.7
	Weight gain	69	16.4
	Tremors	52	12.4
	Other	38	9.0
Antipsychotics	Atypical	373	88.8
	Typical	47	11.2

3.3. Medication adherence level and non-adherence behaviors

Medication adherence assessed by the MARS-5 scale showed a mean score of 23.2 ± 2.7 . Using the validated cutoff score of >23, 249 patients (59.3%) were classified as adherent, while 171 patients (40.7%) were classified as non-adherent. Adherence levels, MARS-5 item responses, and reported reasons for non-adherence are detailed in Table 3.

Forgetting to take medication was the most commonly reported non-adherence behavior, with 45.0% of patients reporting occasional missed doses. Other non-adherence behaviors included dose adjustment without medical advice (9.9%) and temporary discontinuation of medication (8.2%). Among non-adherent patients, the most frequently cited reason for missed medication was forgetting (36.0%), followed by lack of reminders (12.4%). Misbeliefs regarding being cured and distrust in medication were reported less frequently but remained relevant contributors.

Table 3: Adherence levels and reasons for non-adherence (N = 420).

Parameter		n	%
MARS-5 score	>23	249	59.3
	≤23	171	40.7
	Mean ± SD	23.2 ± 2.7	
Common behaviors (occasional)	Forgetting doses	189	45.0
	Dose adjustment	42	9.9
	Stopping temporarily	33	8.2
Reasons for non-adherence	Forgetting	151	36.0
	No reminders	52	12.4
	Belief in cure	31	7.4
	Distrust	21	5.0
	Other	22	5.2

3.4. Factors associated with medication adherence

Univariate analysis identified several factors significantly associated with medication adherence, including male gender, employment status, regular physical activity, family support in medication management, and absence of perceived stigma (all $p < 0.05$). No statistically significant associations were observed between adherence and age, education level, place of residence, disease duration, schizophrenia subtype, or antipsychotic side effects. Results of the univariate analysis are presented in Table 4.

In multivariate logistic regression analysis (Table 5), male gender remained independently associated with higher adherence (OR = 1.6, 95% CI: 1.1–2.6). Employment showed the strongest association with adherence (OR = 2.8, 95% CI: 1.7–4.7). Regular physical activity was also a significant predictor (OR = 1.6, 95% CI: 1.1–2.5). Patients receiving family support in medication management were nearly three times more likely to adhere to treatment (OR = 2.8, 95% CI: 1.5–5.3). In contrast, perceived stigma was a strong negative determinant; patients without stigma perception had significantly higher odds of adherence (OR = 2.2, 95% CI: 1.3–3.6).

Table 4: Univariate associations with adherence (selected factors).

Factor		Adherent n (%)	Non-adherent n (%)	p-value
Gender	Male	177 (64.1)	99 (35.9)	0.005
	Female	72 (50.0)	72 (50.0)	
Employment	Employed	94 (79.7)	24 (20.3)	<0.001
	Unemployed	155 (51.3)	147 (48.7)	
Physical activity	Regular	49 (75.4)	16 (24.6)	0.007
	None/occasional	200 (56.5)	155 (43.5)	
Family support	No	179 (53.4)	156 (46.6)	<0.001
	Yes	70 (82.4)	15 (17.6)	
Stigma perception	None	234 (62.9)	138 (37.1)	<0.001
	Present	15 (32.6)	31 (67.4)	

Table 5: Multivariate logistic regression for adherence predictors.

Predictor	OR (95% CI)	p-value
Male gender	1.6 (1.1–2.6)	0.028
Employed	2.8 (1.7–4.7)	<0.001
Regular physical activity	1.6 (1.1–2.5)	0.023
Family support in management	2.8 (1.5–5.3)	0.003
No perceived stigma	2.2 (1.3–3.6)	0.002

4. Discussion

This study provides comprehensive evidence on medication adherence and its associated factors among outpatient schizophrenia patients in central Vietnam. The adherence rate of 59.3% indicates a moderate level of adherence, exceeding some previously reported Vietnamese estimates ranging from 39.6% to 56% [7], and aligning with adherence rates reported in other LMICs [11,12]. Despite ongoing improvements in outpatient mental health services, non-adherence remains a substantial challenge with implications for relapse prevention and long-term outcomes.

Forgetting medication emerged as the predominant non-adherence behavior and reason for missed doses. This pattern is consistent with international findings showing that unintentional non-adherence is more common than intentional refusal among stable schizophrenia outpatients [5,13]. Cognitive deficits, impaired executive function, and disrupted daily routines are well-recognized contributors to this phenomenon [14]. These findings support the implementation of reminder-based interventions, simplified dosing regimens, and caregiver-assisted medication supervision.

Male gender was independently associated with better adherence, a finding reported in several but not all previous studies [15]. In the Vietnamese context, this association may reflect differences in caregiving dynamics, illness perception, or social expectations. However, gender-related adherence disparities remain complex and likely context-dependent.

Employment status was the factor most strongly associated with medication adherence in our study. However, given the cross-sectional design, this finding should be interpreted as an association rather than evidence of a causal relationship. Employment may promote adherence by providing daily structure, financial stability, and social integration, all of which reinforce engagement with treatment [16,17]. Conversely, unemployment has been associated with poorer treatment adherence and increased social isolation in schizophrenia [14]. These findings suggest that vocational rehabilitation and supported employment may represent promising areas for future intervention studies aimed at improving medication adherence among patients with schizophrenia.

Regular physical activity was also independently associated with improved adherence. Previous studies have demonstrated that physical activity can alleviate negative symptoms, improve cognitive performance, and enhance overall functioning in schizophrenia, which may indirectly support sustained medication use [18,19]. Our findings suggest that physical activity promotion may warrant further investigation as a potential component of comprehensive community mental health programs.

Family support in medication management was a key determinant of adherence, consistent with extensive evidence demonstrating the effectiveness of family involvement and psychoeducation in reducing non-adherence and relapse [20]. In Vietnam, where family-centered care remains central to mental health management, strengthening caregiver education and engagement is particularly relevant.

Perceived stigma had a pronounced negative impact on adherence. Patients experiencing stigma were significantly less likely to adhere to treatment, consistent with prior studies showing that stigma contributes to concealment of illness, reduced healthcare engagement, and treatment discontinuation [21,22]. Addressing stigma through public education and community-based interventions may represent a promising strategy; however, prospective studies are needed to determine whether such interventions improve medication adherence.

Notably, clinical factors, such as illness duration, schizophrenia subtype, and antipsychotic side effects, were not independently associated with adherence. Similar findings have been reported in recent meta-analyses, suggesting that social and psychosocial determinants may outweigh clinical severity in influencing adherence among stable outpatients [14].

Several limitations should be considered when interpreting our findings. First, medication adherence was assessed using the self-reported MARS-5 questionnaire [9,10]. Although MARS-5 is a validated and widely used instrument for evaluating adherence among patients with schizophrenia, self-reported measures are subject to recall bias and social desirability bias, which may lead to overestimation of actual adherence levels. Objective measures of adherence, such as pharmacy refill data, pill counts, electronic medication monitoring, and therapeutic drug monitoring, were not available in our study setting. Future studies should consider integrating validated self-report instruments with objective adherence measures to provide a more accurate and comprehensive evaluation of medication adherence.

Second, the cross-sectional design of this study limits the ability to establish temporal relationships or causal associations between the identified factors and medication adherence. Therefore, the observed associations should be interpreted as correlates rather than causal determinants. Longitudinal and interventional studies are needed to clarify causal pathways and evaluate whether modifying these factors can improve medication adherence.

Third, although this study included several demographic, clinical, and psychosocial factors known to influence medication adherence, other potentially relevant determinants were not assessed. These include medication regimen complexity, polypharmacy, healthcare accessibility, patient-provider relationships, health literacy, medication beliefs, cognitive function, and psychological status. The absence of these variables may have resulted in residual confounding and limited the ability to fully characterize the multifactorial nature of adherence behavior in patients with schizophrenia.

Finally, treatment burden and disease burden were not comprehensively evaluated. Although information regarding antipsychotic classes and treatment-related adverse effects was collected, detailed data on the number of prescribed medications, medication regimen complexity, polypharmacy, and comorbid chronic medical conditions were not systematically available. These factors may influence adherence and could have contributed to residual confounding in our analyses. Future studies should incorporate comprehensive assessments of treatment burden, comorbidity, and healthcare-related factors to improve understanding of medication adherence determinants and support more individualized interventions for patients with schizophrenia.

5. Conclusions

This study identified several demographic and psychosocial factors associated with medication adherence among outpatients with schizophrenia in Central Vietnam. Although these findings provide region-specific evidence and contribute to the understanding of medication adherence in an

understudied population, the cross-sectional design precludes causal inference. Therefore, the observed associations should be considered hypothesis-generating. Future longitudinal and interventional studies are warranted to confirm these findings and evaluate whether interventions targeting these associated factors can improve medication adherence and clinical outcomes.

Author contributions

Thi Anh Thu Dang conceived and designed the study, supervised all stages of the research, drafted the manuscript, critically revised the content, and takes full responsibility for the integrity and accuracy of the work. Ly Nam Ngo was responsible for data collection and performed the initial statistical analyses. Phuc Thanh Nhan Nguyen and Van-Tuy Nguyen contributed to data analysis, data visualization, and drafting sections of the manuscript. All authors reviewed and approved the final version of the manuscript.

Use of AI tools declaration

The authors used ChatGPT (OpenAI) solely for language editing and improvement of grammar, clarity, and readability of the manuscript. The final manuscript was processed for language editing using ChatGPT in May 2026. The AI tool was not used for study design, data collection, data analysis, interpretation of results, or generation of scientific conclusions. All authors reviewed and revised the manuscript as necessary, approved the final version, and take full responsibility for its content.

Conflict of interest

The authors declare no conflict of interest.

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