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Symptomatic remission and its associated factors among patients with schizophrenia on risperidone or olanzapine at Amanuel mental specialized hospital, Addis Ababa, Ethiopia

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Abstract

Background Schizophrenia is a debilitating condition that affects 1% of the global population. Understanding the prevalence and the factors predicting schizophrenia remission is crucial for healthcare providers. This study aimed to determine the prevalence of remission and factors affecting the remission. Cross-sectional study was conducted at the Amanuel Mental Specialized Hospital from 3 October, 2022, to 31 August, 2023, and included 271 participants. Remission was measured using Remission in Schizophrenia Working Group (RSWG) symptom severity-based criteria. Data analysis was done using SPSS V.25.

Results The mean age of participants was 34.2 with standard deviation (SD) of 10.5 years. Most were male (90%), unmarried (63.8%), lived with their relatives (91.9%), and were unemployed (56.5%). Fifty-two percent achieved symptomatic remission. Remission in patients with medication switched to SGAs increased by 1.9 times compared to patients without medication switch (*AOR* 1.9, 95% *CI*: 1.1, 1.2). Adherent patients had 2.7 times higher odds of symptomatic remission as compared to non-adherent patients (*AOR* 2.7, 95% *CI*: 1.5,4.9), and for each unit increase in body mass index (BMI), the odds of achieving symptomatic remission were increased by 13% (*AOR* 1.13, 95% *CI*: 1.04, 1.23). The odds of symptomatic remission decreased by 71% in patients experiencing moderate-to-severe side effects compared to their counterparts (*AOR* 0.29, 95% *CI*: 0.1, 0.6).

Conclusions Our study revealed a symptomatic remission was achieved in 141 (52%) of the subjects. There is a possibility to improve symptomatic remission with counseling on the importance of adherence, monitoring and managing side effects, and switching medication to either risperidone or olanzapine. Measuring remission using RSWG time-based criteria is recommended.

Keywords Ethiopia, Remission, SGAs, Risperidone, Olanzapine

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Introduction

Schizophrenia is a severe mental disorder affecting 1% of the population [1]. While many individuals initially experience symptom improvement, most will encounter further episodes of psychosis [2]. The typical course of the disease includes recurrent phases of symptom worsening and improvement, with some patients not fully recovering from these episodes, leading to accumulating health issues [3].

The use of remission as an outcome measurement for schizophrenia is an essential step in research and clinical practice [4]. Various definitions have been employed thus far to characterize remission [5–7].

The Remission in Schizophrenia Working Group (RSWG) formulated expert consensus criteria for defining remission in schizophrenia in 2005 [8]. These criteria consist of two categories: a symptom severity-based criterion and a time-based criterion. They included eight items in the Positive and Negative Syndrome Scale (PANSS), including delusions (P1), conceptual disorganization (P2), hallucinatory behavior (P3), blunted affect (N1), social withdrawal (N4), lack of spontaneity (N6), mannerisms/posturing (G5), and unusual thought content (G9).

In RSWG remission criteria based on symptoms severity, a consensus has been reached that a score of 3 per item (a score of ≤ 3 in all criteria items selected) is required for classification of treatment outcome as having a remission [8–11]. Individuals in remission may still experience cognitive impairment, social isolation, unemployment, and marginalization. Slight fluctuations in symptoms, a common occurrence, could hinder some individuals from meeting these remission criteria [12]. This has prompted some experts to suggest that the term "symptomatic remission" might be more appropriate [13, 14].

The remission rates ranged from 17 to 78% in first-episode schizophrenia and from 16 to 62% in individuals with multiple episodes [9]. Research finding in Russia showed that 31.5% of the participants achieved remission based on RSWG criteria [15].

Additionally, findings from the European Group of Functional Outcomes and Remission in Schizophrenia project (EGOFORS) identified that 44% of subjects achieved symptomatic remission [16]. A report from the Worldwide Schizophrenia Outpatient Health Outcomes (W-SOHO) study also revealed that clinical remission was attained by 66.1% of participants, ranging from 60.1% in North Europe to 84.4% in East Asia [17]. A finding from Egypt revealed that 37.6% of study participants were remitters based on the symptom severity criteria [10].

Studies on the course and outcomes of schizophrenia in Ethiopia have also documented a substantial proportion of patients experiencing persistent symptoms. The 5-year clinical course and outcome study findings revealed that 45% of the participants exhibited ongoing symptoms. About 20% had experienced continuous remission [18], and in the 10-year follow-up study, almost 14.0% of individuals experienced continuous psychotic symptoms, while only 18.1% attained complete remission [19].

Enhanced premorbid functioning, less severe symptoms at the initial, prompt response to treatment, and a shorter period of untreated psychosis were identified as predictors of remission [9]. A study from Egypt showed a lower score on lack of judgment, or insight item of PANSS was a significant predictor of remission [10]. Failure to comply with antipsychotic medication was a significant issue, and discontinuation of treatment was often attributed to the perceived presence of side effects in Ethiopia [20]. Factors such as early treatment response, younger age, being employed, shorter duration of illness, shorter length of current episode, and lower levels of psychopathology at baseline were predictors for remission [21].

Data are scarce regarding symptomatic remission in schizophrenia treatment in low- and middle-income countries (LMICs) [22], and some scholars have raised doubts about whether schizophrenia genuinely exhibits a more favorable course and outcome in LMICs [23, 24]. This gap should be addressed since individuals with schizophrenia often require consistent, long-term medication plans, making remission a vital aspect of their management and well-being. Understanding the specific factors predicting schizophrenia remission in Ethiopia is crucial for healthcare providers and policymakers. Therefore, this study was done to determine the prevalence of achieving symptomatic remission and identify factors associated with the achievement of symptomatic remission.

Methods

Study setting, design, and patients

The study was conducted at the Amanuel Mental Specialized Hospital (AMSH), Addis Ababa, Ethiopia. Cross-sectional study design was conducted from October 3, 2022, to August 31, 2023, and included 271 participants using a simple random sampling technique.

The source population comprised all individuals attending AMSH enrolled in the Neuropsychiatric Genetics in African Populations (NeuroGAP-Psychosis) project [25]. The study population consisted of schizophrenia patients who had been using risperidone or olanzapine for a minimum of 3 months and met the inclusion criteria

throughout the study period. Participants included in the study had no concurrent physical complications or other psychiatric disorders and showed no history of resistance to antipsychotic treatment. Concomitant use of medications was limited to benzodiazepines in case of anxiety or agitation and to anticholinergics in case of extrapyramidal side effects, age greater or equal to 18 years, and voluntary participation in the study. Exclusion criteria employed were individuals experiencing acute psychotic episodes; those diagnosed with severe, unstable medical or neurological conditions; individuals with mental retardation; and those exhibiting severe cognitive deterioration that might hinder their ability to comprehend the study questions.

Outcome measures

We defined symptomatic remission according to operational criteria set up by the RSWG using PANSS eight (PANSS-8) items selected from PANSS-30. PANSS is a widely used clinical instrument in psychiatry, assesses symptom severity in schizophrenia patients, and was developed in 1987. It is a 30-item scale, with individual item scores from 1 to 7, 1 for absence, and 7 for extreme symptom severity. Total scores range from 30 to 210 [26].

We used RSWG symptom severity criteria given the cross-sectional design of the study. The RSWG symptomatic severity criteria consist of eight core PANSS items (PANSS-8) with good reliability ($\alpha = 0.85$) in which Cronbach's alpha values ≥ 0.70 are often considered to show acceptable reliability, and for its value, ≥ 0.8 is even a more appropriate cutoff in most studies [8, 27, 28]. Symptomatic remission was achieved when all eight specified items of PANSS had a score of ≤ 3 [8, 9].

Researchers also prepared questionnaires to collect sociodemographic data from the study participants. These questionnaires aimed to gather data about the patient's background, including age, gender, education, occupation, and other sociodemographic variables that might be associated with remission. A data abstraction format was developed and designed to systematically extract clinical information from the patient's medical charts. This format was used to gather details about the specific medications prescribed to the patients, their dosages, and any relevant clinical data that might impact their remission status.

Data collection process and quality assurance

The NeuroGAP project's data administration office provided us access to a database containing comprehensive information on patients diagnosed with schizophrenia who are currently undergoing treatment with either olanzapine or risperidone. Upon obtaining the identification numbers of these patients, their contact details, including phone numbers, are retrieved to enable direct communication. Patients who consent to participate in the study have their medical charts retrieved from the hospital's card office. This research specifically targets individuals who have been under monotherapy treatment with either risperidone or olanzapine for a minimum of 3 months and meet the predefined inclusion criteria. During this initial contact, the study's objectives were clearly explained. Patients willing to participate were invited to the hospital, where their medical charts were retrieved from the archives.

Rigorous data quality assurance measures were implemented, including scrutiny of the questionnaire's clarity, training for data collectors, and meticulous checks for completeness. The principal investigator provided ongoing supervision to address challenges and ensure data integrity throughout the study.

Statistical analysis

The data underwent a comprehensive cleaning to address completeness issues, followed by coding, entry, and subsequent analysis utilizing Statistical Package for Social Science (SPSS) version 25. Descriptive statistics were computed, presenting frequency and percentage for categorical data and mean for continuous variables.

Binary logistic regression analysis was employed to identify predictors of symptomatic remission. Model fitness was tested using the Hosmer and Lemeshow test. A nonsignificant p-value was obtained, suggesting that there is no significant difference between the predicted and observed values, indicating that the model fits the data well. The PANSS total, subscales, and PANSS-8 sum score were excluded as predictor variables, given their inherent relationships with RSWG criteria. Candidate variables for the multivariable binary logistic regression analysis were selected based on a p-value less than 0.25 from the univariate analysis. Following adjustment, independent variables with a p-value less than 0.05 were considered significantly associated with the outcome variable, and these associations were reported using adjusted odds ratios (AOR) accompanied by 95% confidence intervals.

Results

The study participants' sociodemographic characteristics are presented in the following table. Most participants were male (90.0%), and around half were aged 30–44, accounting for 47.2%, with a mean of 34.2 and standard deviation (SD) of 10.5 years. The educational level showed that most of them completed high school (71.6%). The place of residence indicates predominant urban dwellers (78.6%). Around two-third of them were

Table 1 Sociodemographic characteristics of patients with schizophrenia on risperidone or olanzapine at AMSH, Addis Ababa, Ethiopia, October 3, 2022, to August 31, 2023 ($N=271$)

Sociodemographic variables	Overall (*N*, %)	Remission (*N*, %)	Non-remission (*N*, %)
Gender			
Male	244 (90)	123 (50.4)	121 (49.6)
Female	27 (10)	18 (66.7)	9 (33.9)
Age			
18–29	103 (38)	52 (50.5)	51 (49.5)
30–44	128 (47.2)	71 (55.5)	57 (45.5)
≥45	40 (14.8)	18 (45)	22 (55)
Level of education			
Completed high school	194 (71.6)	105 (54.1)	89 (45.9)
Not completed high school	77 (28.4)	36 (46.8)	41 (53.2)
Place of residence			
Urban	213 (78.6)	108 (50.7)	105 (49.3)
Rural	58 (21.4)	33 (56.9)	35 (43.1)
Marital status			
Unmarried	173 (63.8)	94 (54.3)	79 (45.7)
Married	98 (36.2)	47 (48)	51 (52)
Health service fee			
Paying out of pocket	45 (16.6)	26 (57.8)	19 (42.2)
CBHI or free	226 (83.4)	115 (50.9)	111 (49.1)
Employment status			
Employed	118 (43.5)	64 (54.2)	54 (45.8)
Unemployed	153 (56.5)	77 (50.3)	76 (49.7)
Living arrangement			
Independent living	22 (8.1)	13 (59.1)	9 (40.9)
Assisted living	249 (91.9)	128 (51.4)	121 (48.6)
Religion			
Orthodox Christian	128 (47.2)	66 (51.6)	62 (48.4)
Muslim	104 (38.4)	48 (46.2)	56 (53.8)
Protestant	34 (12.5)	25 (73.5)	9 (26.5)
Others[a]	5 (1.8)	2 (40)	3 (60)

[a] Catholic, no religion, *AMSH* Amanuel Mental Specialized Hospital, *CBHI* Community Based Health Insurance

unmarried (63.8%). Most study participants get their medication through community-based health insurance (CBHI) or for free 83.4%. Employment status depicts that most participants were unemployed (56.5%). Living arrangements were primarily with assisted living conditions (91.9%), and almost half of participants' religious affiliations were Orthodox Christian, 47.2% (Table 1).

The results of clinical characteristics revealed that the predominant prescribed antipsychotic was risperidone, constituting 57.2%. Nearly half of the participants took less than 300-mg chlorpromazine (CPZ) equivalent dose, 50.9%. About 46.9% of the respondents used at least one substance, and a substantial proportion engaged in khat (*Catha edulis*) use, 39.9%. Hospitalization was prevalent, 94.1%. The majority of patients have greater or equal to 5 years of illness, and the predominant number of study participants had less than 1 year of duration of untreated psychosis (DUP), 70.1%. The majority of the patients had a medication switch history, 54.6%. About one-third of the participants had manifested moderate-to-severe medication side effects, 26.2%, and nonadherent to treatment, 31.4%. The PANSS scores provided a nuanced understanding of symptoms experienced by the participants, which encompassing mean and SD of total (71.1 ± 35.9), negative (17.2 ± 9.6), positive (17.5 ± 9.7), and psychopathology (36.4 ± 19.6). The mean dose of risperidone and olanzapine was 4.9 mg with SD (± 2.4) and 13.5 mg with SD (± 5.0), respectively, and the mean and SD of length of hospital stay (LOS) for hospitalized patients were 27.4 ± 20.7 (Table 2).

Table 2 Clinical characteristics of patients with schizophrenia on risperidone or olanzapine at AMSH, Addis Ababa, Ethiopia, October 3, 2022, to August 31, 2023 ($N=271$)

Clinical characteristics	Overall (*N*, %)	Remission (*N*, %)	Non-remission (*N*, %)
Medication type			
Risperidone	155 (57.2)	83 (53.5)	72 (46.5)
Olanzapine	116 (42.8)	58 (50)	58 (50)
CPZ equivalent dose			
< 300 mg	138 (50.9)	73 (52.9)	65 (47.1)
300–600 mg	132 (49.1)	68 (51.1)	65 (48.9)
Substance use			
Yes	127 (46.9)	60 (47.2)	67 (52.8)
No	144 (53.1)	81 (56.3)	63 (43.8)
Comorbidity			
Yes	13 (4.8)	6 (46.2)	7 (53.8)
No	258 (95.2)	135 (52.3)	123 (47.7)
Hospitalization			
Yes	255 (94.1)	132 (51.8)	123 (48.2)
No	16 (5.9)	9 (56.3)	7 (43.8)
Duration of illness			
< 5 years	120 (44.3)	62 (51.7)	58 (48.3)
≥ 5 years	151 (55.7)	79 (52.3)	72 (47.7)
DUP			
< 1 year	190 (70.1)	97 (51.1)	93 (48.9)
≥ 1 year	81 (29.9)	44 (54.3)	37 (45.7)
Duration of treatment			
< 5 years	135 (49.8)	71 (52.6)	64 (47.4)
≥ 5 years	136 (50.2)	70 (51.5)	66 (48.5)
Medication switch			
Yes	148 (54.6)	86 (58.1)	62 (41.9)
No	123 (45.4)	55 (44.7)	68 (55.3)
Adherence status			
Adherent	186 (68.6)	110 (59.1)	76 (40.9)
Nonadherent	85 (31.4)	31 (36.5)	54 (63.5)
Side effects			
Absent/mild	200 (73.8)	116 (58)	84 (42)
Moderate/severe	71 (26.2)	25 (35.2)	46 (64.8)

AMSH Amanuel Mental Specialized Hospital, *BMI* Body mass index, *CPZ* Chlorpromazine, *LOS* Length of hospital stay, *DUP* Duration of untreated psychosis

Study participants were grouped into two based on their scores for PANSS-8 items according to the RSWG's criteria for severity. The key finding from this study indicated that a substantial % of the participants, 52%, achieved symptomatic remission using RSWG symptoms severity criteria with a rating of ≤ 3 on all items. In contrast, the remaining 48% who scored ≥ 4 on at least one item formed the non-remission group. The mean and SD of PANSS-8 were 19.8 and 10.3, respectively.

Multivariate logistic regression analysis was performed to determine predictors of symptomatic remission. The following table presents the multivariate binary logistic regression findings. The likelihood of remission among study participants with medication switch was 1.9 times higher than participants without medication switch (*AOR* 1.9, 95% *CI*: 1.1, 1.2; $P=0.03$). The BMI of the patients also showed a significant association with remission. For each unit increase in BMI, the odds of remission were increased by 13% (*AOR*, 1.13, 95% *CI*: 1.04, 1.23; $P=0.004$). In addition, adherent patients to their prescribed medication had 2.7 times higher odds of achieving remission than nonadherent patients (*AOR*: 2.7, 95% *CI*: 1.5, 4.9; $P=0.001$). The odds of symptomatic remission decreased by 71% in patients experiencing moderate-to-severe side effects compared to their counterparts (*AOR* 0.29, 95% *CI*: 0.1, 0.6; $P=0.0004$) (Table 3).

Table 3 Multivariate binary logistic regression analysis of predictors of remission in patients with schizophrenia on risperidone or olanzapine at AMSH, Addis Ababa, Ethiopia, October 3, 2022, to August 31, 2023 (*N* = 271)

Variables	COR (95% *CI*)	AOR (95% *CI*)
Gender		
Male	1	
Female	2 (0.85, 4.55)	1.4 (0.4, 4.9)
Medication switch		
No	1	
Yes	1.7 (1.06, 2.78)	1.9 (1.1, 1.2)*
Substance use		
No	1	
Yes	0.69 (0.43, 1.13)	0.9 (0.5, 1.6)
BMI	1.12 (1.05, 1.19)	1.13 (1.04, 1.23)*
LOS (days)	1.01 (1.01, 1.03)	1 (0.99, 1.03)
Side effects		
Absent or less	1	
Moderate to severe	0.39 (0.22, 0.69)	0.29 (0.1, 0.6)*
Adherence status		
Nonadherent	1	
Adherent	2.5 (1.48, 4.28)	2.7 (1.5, 4.9)*
Religion		
Orthodox	1	
Muslim	0.8 (0.48, 1.35)	0.9 (0.5, 1.5)
Protestant	2.6 (1.13, 6.03)	2.6 (1.0, 6.4)
Others	0.63 (0.10, 3.88)	0.8 (0.1, 6.0)
CPZ equivalent dose (mean & SD)	0.99 (0.99, 1.00)	0.99 (0.9, 1.0)

* $p < 0.05$. *AOR* Adjusted odds ratio, *AMSH* Amanuel Mental Specialized Hospital, *BMI* Body mass index, *CPZ* Chlorpromazine, *COR* Crude odds ratio, *SD* Standard deviation

Discussions

In this study, we determined the prevalence and predictors of symptomatic remission among patients with schizophrenia at AMSH, Ethiopia, using symptom severity criteria of RSWG (PANSS-8), given the cross-sectional study design of the present study. To our knowledge, this is the first study in Ethiopia to determine the status of symptomatic remission of schizophrenia patients using the standardized remission criteria. The internal reliability of PANSS-8 was evaluated using Cronbach's alpha and found good reliability ($\alpha = 0.89$). This is in line with other studies in which Cronbach's alpha values ≥ 0.70 are often considered to show acceptable reliability, and its value ≥ 0.8 is even a more appropriate cutoff in most studies [27, 28].

The study participants were grouped into remission and non-remission using the RSWG symptom severity criteria [8], and their clinical and demographic characteristics were compared. A binary logistic regression analysis was performed using symptomatic remission status (remission vs non-remission) as the dependent variable to determine each variable's independent contribution in predicting remission status.

The present study revealed that almost half, 141 (52%), of participants achieved symptomatic remission. This finding is in line with the report from previous studies in which the prevalence of achieving symptomatic remission was 20–60% [11] and 51% [29].

In contrast, our finding is lower than the W-SOHO study, 66.1% [17]. This variation might be attributed to the differences in sample size (11,078 participants), multicenter (37 countries), geographical difference, and variation in the tool employed to measure symptomatic remission.

However, our finding is higher than the reports from the EGOFORS study (44%) [16], Sweden (38%) [30], Israel (37%) [31], Russia (31.5%) [15], Egypt (37.6%) [10], and Indonesia (27%) [22]. The observed variation could be ascribed to the disparity in sample sizes, with our study comprised a larger sample size than others.

Better information about factors reliably predicting remission would be precious in clinical settings. Such knowledge could assist clinicians in determining whether to continue with a specific treatment or consider alternative options [32]. In this study, multivariate binary logistic regression analysis identified predictors of symptomatic remission, and we identified factors associated with symptomatic remission. These predictors include medication switching to either risperidone or olanzapine, adherence status, occurrence of medication side effects, and BMI of the study participants.

Patients who had medication switch to either risperidone or olanzapine exhibited 1.9 times higher odds of experiencing symptomatic remission (i.e., remitters) compared to those who had not a medication switch (*AOR* 1.9, 95% *CI*: 1.1, 1.2; $P = 0.03$). This finding aligns with other studies that showed that switching to SGAs results in a better remission rate [33, 34]. Another study also found that after a switch from previous treatment, more than half of the patients achieved remission [35]. The possible explanation could be attributed to the better efficacy of SGAs [36, 37], the occurrence of fewer side effects in SGAs than FGAs [36], the patient's preference for SGAs [33], and improved quality of life in SGAs [38], and lack of efficacy might be the reason for medication switch [39].

Likewise, the likelihood of symptomatic remission among adherent patients was 2.7 times higher odds than among nonadherent patients, and the association is statistically significant (*AOR* 2.7, 95% *CI*: 1.5, 4.9; $P = 0.001$). This is in line with other findings indicating that nonadherence causes delayed remission [33, 40]. Similar findings were reported elsewhere that adherent patients

showed higher percentages of symptomatic remission than nonadherent [10].

Regarding the association of occurrence of medication side effects and symptomatic remission, the odds of symptomatic remission among patients experiencing moderate-to-severe side effects was lower by 71% than those patients grouped with less or absent medication side effects and found to be significantly associated with lower rates of remission (*AOR* 0.29, 95% *CI*: 0.1, 0.6; $P=0.0004$). This might be attributed to the occurrence of side effects that can lead to nonadherence that, in turn, causes a lower rate of symptomatic remission. This report is in line with the previous studies suggesting that the occurrence of side effects can reduce remission [41]. Similar findings were also reported in previous studies and explained that individuals experiencing intense psychotic symptoms may be given higher doses of antipsychotic medication, leading to a worsening of medication side effects. Another plausible interpretation is that those with severe psychotic symptoms may be prone to expressing distress, which in turn is reflected in their responses to the adverse medication side effects [42, 43].

The logistic regression analysis with BMI as a continuous variable showed a significant predictor of symptomatic remission. In this study, the investigators found that for each one-unit increase in BMI, the odds of achieving symptomatic remission were increased by 13% (*AOR* 1.13, 95% *CI*: 1.04, 1.23; $P=0.004$). This implies a positive association between increasing BMI and the likelihood of remission. The positive association between higher BMI and an increased likelihood of achieving symptomatic remission could be attributed to adherence to these antipsychotics. Increased BMI means that the patient is adherent to medication and manifesting side effects. This argument was supported by other researchers who explained that higher BMI was associated with lower illness severity, which could be mediated by better treatment adherence, causing weight gain [44, 45].

When considering sociodemographic data, we found no significant association between age, social drug use, marital status, employment status, educational status, ways of getting health service fees, and living arrangements with symptomatic remission. Similar findings were reported elsewhere [21, 46]. In this study, gender was also not found to be a predictor of remission. Though a significant association was not found between gender and remission in the present study, males were higher than females, which can be explained by the fact that males are more likely to develop schizophrenia than females [19, 29, 33, 47], and another possibility is that males are brought to medical services more often than females. The severity of the symptoms in females is less, hindering them from visiting health facilities [10, 48, 49].

Study limitations

The current study has limitations. Measuring adherence status and medication side effects relied on self-reports that might introduce recall bias. Furthermore, the cross-sectional study design needs more capacity for patient follow-up, hindering the establishment of causal relationships. Additionally, the study's single-centered nature may restrict the generalizability of findings. There might be missed variables in our study that could have been affecting the remission status of patients. Despite these limitations, the present study possesses strengths. The robust sample size, facilitated by the cross-sectional study design, has helped mitigate the risk of patient loss to follow-up that might occur in a prospective cohort study and define remission rate based on RSWG symptom severity criteria, which is best for cross-sectional study design.

Conclusion

This study found that around half, 141 (52%), of the study participants achieved symptomatic remission. There is the possibility to improve achieving symptomatic remission by switching medication to risperidone or olanzapine, improving adherence, and monitoring and managing medication side effects. It is important to note that achieving remission in schizophrenia does not always imply a complete absence of symptoms but rather a significant reduction in their intensity and impact on daily functioning. Further research involving genetic variability and environmental factors related to symptomatic remission is warranted that might identify clinically relevant predictors. To our knowledge, this is the first study in Ethiopia to report symptomatic remission using RSWG symptom severity criteria. This finding must be supported by prospective studies determining symptomatic remission using RSWG time-based criteria.

Abbreviations

AOR	Adjusted odds ratio
AMSH	Amanuel Mental Specialized Hospital
BMI	Body mass index
CBHI	Community-based health insurance
CPZ	Chlorpromazine
COR	Crude odds ratio
DUP	Duration of untreated psychosis
LOS	Length of hospital stays
PANSS	Positive and Negative Syndrome Scale
RSWG	Remission in Schizophrenia Working Group
SGAs	Second-generation antipsychotics

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Authors' contributions
MGB, conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, software, supervision, validation, visualization, writing — original draft, and writing — review and editing. ST, conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualization, and writing — review and editing. TGF, conceptualization, data curation, formal analysis, investigation, methodology, project administration, software, supervision, validation, visualization, and writing — review and editing.

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Availability of data and materials
The raw data supporting the conclusion of this article will be made available by the authors without undue reservation.

Declarations

Ethics approval and consent to participate
We obtained ethical approval from the Institutional Review Board (IRB) of Addis Ababa University, College of Health Sciences (Approval Number: AAUMF 03–008), and the Ethical Review Committee (ERC) of Amanuel Mental Specialized Hospital (AMSH) (Approval Number: AM/140/2/48). Informed consent was taken from the study participants.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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