e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2025; 17(10); 460-465

Original Research Article

# Predictors of Functional Remission in Patients with Schizophrenia: A Cross-Sectional Study

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**Received: 01-07-2025 / Revised: 15-08-2025 / Accepted: 21-09-2025**
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**Conflict of interest: Nil**

**Abstract**

**Background:** Schizophrenia is a debilitating mental health disorder characterized by loss of reality, with functional remission being an important treatment goal beyond symptomatic improvement.

**Objective:** To assess functional remission in patients with schizophrenia and identify predictive factors associated with achieving functional remission.

**Methods:** A cross-sectional study was conducted among 100 patients with schizophrenia attending the outpatient department of Institute of Mental Health, Kilpauk, and Chennai. Participants were assessed using the Positive and Negative Syndrome Scale (PANSS), Global Assessment of Functioning (GAF) Scale, Clinical Global Impression (CGI) Scale, and Functional Remission of General Schizophrenia (FROGS) Scale. Functional remission was defined as achieving symptomatic remission (PANSS score <3), functional improvement (GAF score >60), and clinical remission (CGI score <3).

**Results:** Out of 100 participants, 45% achieved functional remission across all three domains. Education above 10th standard ($p=0.008$), skilled occupation ($p=0.013$), good social support ($p<0.001$), use of atypical antipsychotics ($p<0.001$), good drug compliance ($p<0.001$), and fewer hospitalizations ($p<0.001$) were significantly associated with functional remission. Gender, marital status, religion, type of family, comorbidities, and electroconvulsive therapy showed no significant association.

**Conclusion:** Social support, medication adherence, shorter duration of untreated illness, and fewer hospitalizations are key determinants of functional remission in schizophrenia. A multidimensional approach targeting symptomatic, functional, and psychosocial remission is essential for comprehensive treatment.

**Keywords:** Schizophrenia, Functional Remission, Social Support, Drug Compliance, Predictive Factors, Psychosocial Rehabilitation.

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## Introduction

Schizophrenia is a debilitating mental health syndrome marked by loss of reality, characterized by delusions, hallucinations, and disorganized behavior. The worldwide prevalence of schizophrenia ranges from 0.5 to 1%, with an incidence rate of 0.5 to 5 per 10,000 people per year. [1] As a chronic illness with persisting, relapsing, or deteriorating symptoms, schizophrenia offers limited hope for sustained remission and complete recovery of functioning.

The Schizophrenia Working Group (SWG) defines remission as "a state in which a person with schizophrenia experienced an improvement in core signs and symptoms that the remaining symptoms are of low intensity and no longer interfere significantly with behaviour and are below the threshold which are typically used in justifying the initial diagnosis of schizophrenia. [2] However, the heterogeneous course of schizophrenia means that patients who show clinical improvement do not necessarily function well in everyday situations, even with obvious symptomatic improvement. [3]

Functional remission in schizophrenia encompasses more than just symptomatic improvement. It includes symptomatic remission, regular or part-time engagement in work or studies, living independently without constant monitoring by family or caregivers, financial independence, and maintaining regular social relationships with friends. [4,5] Schizophrenic individuals with poor functional skills represent a significant burden to their families and communities, which can be

favorably reduced through comprehensive and continuous treatment, along with personal factors such as family support and good neurocognitive functioning. [6]

Multiple research studies have reported that patients who achieve symptomatic remission demonstrate better functioning levels. [7-10] However, only a small proportion of schizophrenic patients display adequate functional outcomes. Consequently, functional remission has emerged as an important treatment goal in schizophrenia management. Even during the remission phase, individuals with schizophrenia often demonstrate impaired functional outcomes and declined levels of daily activities. [11] A better understanding of underlying causative factors is crucial for developing effective treatment strategies.

The main focus in schizophrenia treatment should extend beyond symptom control to improving functional outcomes. Several studies have attempted to identify predictors of remission among patients with schizophrenia, as these predictors are relevant for overall treatment planning and rehabilitation to improve quality of life. Understanding these predictive factors can guide clinicians in developing individualized treatment plans and targeted interventions. Based on these objectives of our study is to assess functional remission in patients with schizophrenia using standardized assessment scales. Also to identify sociodemographic and clinical predictive factors associated with functional remission in patients with schizophrenia.

## Materials and Methods

A cross-sectional study was conducted among patients attending the outpatient department of Institute of Mental Health, Kilpauk, Chennai, over a period of two months. A total of 100 participants were recruited using consecutive purposive sampling technique from patients attending follow-up visits for schizophrenia.

Individuals diagnosed with schizophrenia according to ICD-10 criteria, aged between 18-50 years, and cognitively able to provide informed consent were included in the study. The exclusion criteria included individuals with other mental disorders, neurological disorders, substance dependence, and those refusing to give consent or unwilling to participate in the study. A semi-structured interview schedule was developed specifically for this study to collect sociodemographic details including age, sex, education, occupation, marital status, religion, income, socioeconomic status, type of family, and social support. Clinical profile data encompassing disease onset, illness duration, duration of untreated illness, number of hospitalizations, antipsychotics used, drug compliance, depot preparations, and electroconvulsive therapy were also collected through this schedule.

The Positive and Negative Syndrome Scale (PANSS) was used to assess symptomatic remission in patients with schizophrenia, with symptomatic remission defined as a PANSS score less than 3. The Global Assessment of Functioning (GAF) Scale was employed to assess functional remission, where a score above 60 was considered indicative of functional improvement. The Clinical Global Impression (CGI) Scale was utilized to assess symptom severity and clinical remission, with a score less than 3 indicating clinical remission. The Functional Remission of General Schizophrenia (FROGS) Scale was used to assess different domains of functional improvement including daily activities, self-care, relationships, social network, and financial management. Participants were considered functionally remitted if they met all three criteria: symptomatic remission (PANSS score <3), functional improvement (GAF score >60), and clinical remission (CGI score <3).

The study protocol and validated tools were scrutinized and approved by the institutional human ethics committee prior to commencement of data collection. Written informed consent was obtained from all eligible participants after explaining the nature and purpose of the study, voluntary participation, right to withdraw, confidentiality and security of patient information, data storage and dissemination, and potential benefits of the research. Descriptive statistics were used to summarize sociodemographic and clinical characteristics, while chi-square test was used to determine associations between various predictors and functional remission. A p-value of less than 0.05 was considered statistically significant.

## Results

The mean age of participants was 37.1 ± 7.48 years, with the majority (between 30-50 years). There was near equal gender distribution with 53% males and 47% females.

Although the majority of participants were literate, 53% were unemployed. Most participants were married (65%), indicating reasonable social support networks. Eighty-six percent belonged to Hindu religion, and 69% had good social support, with 55% living in joint families (Table 1).

**Table 1: Sociodemographic Features Among Study Participants (n=100)**

| Variable | Category | n | % |
|---|---|---|---|
| **Sex** | Male | 53 | 53% |
| | Female | 47 | 47% |
| **Education** | Below 10th standard | 41 | 41% |
| | Above 10th standard | 59 | 59% |
| **Occupation** | Unemployed | 53 | 53% |
| | Unskilled | 9 | 9% |
| | Skilled | 38 | 38% |
| **Marital Status** | Separated | 1 | 1% |
| | Divorced | 8 | 8% |
| | Married | 65 | 65% |
| | Unmarried | 25 | 25% |
| | Widower | 1 | 1% |
| **Religion** | Christian | 11 | 11% |
| | Hindu | 86 | 86% |
| | Muslim | 3 | 3% |

**Clinical Characteristics:** Among the participants, 39% were on both typical and atypical antipsychotics, 45% were on atypical antipsychotics alone, and 16% were on typical antipsychotics only. Drug compliance was good in 61% of patients, with 27% using depot formulations. Two-thirds of participants (66%) had a history of previous hospitalization, while only 2% required electroconvulsive therapy. Comorbidities were present in 7% of participants (Table 2).

**Table 2: Clinical Data of the Study Group (n=100)**

| Variable | Category | n | % |
|---|---|---|---|
| **Antipsychotics** | Typical | 16 | 16% |
| | Atypical | 45 | 45% |
| | Both | 39 | 39% |
| **Depot** | Yes | 27 | 27% |
| | No | 73 | 73% |
| **Drug Compliance** | Good | 61 | 61% |
| | Poor | 39 | 39% |
| **Hospitalization** | Yes | 66 | 66% |
| | No | 34 | 34% |
| **ECT** | Yes | 2 | 2% |
| | No | 98 | 98% |
| **Comorbid Illness** | Yes | 7 | 7% |
| | No | 93 | 93% |

**Functional Remission Rates:** Out of 100 patients, 70 achieved symptom remission (PANSS score <3), 60 scored above 60 on the GAF scale, and 54 attained clinical remission (CGI score <3).

Functional remission according to GAF score was found in 40% of the study population, while functional remission through CGI score was seen in 45% of patients.

However, only 45 patients (45%) achieved remission in all three domains and were classified as functionally remitted.

**Predictors of Functional Remission:** Among various predictors studied, education above 10th standard (p=0.008), skilled occupation (p=0.013), good social support (p<0.001), use of atypical antipsychotics (p<0.001), and good drug compliance (p<0.001) were found to be statistically significantly associated with functional remission. Additionally, fewer hospitalizations (p<0.001) and not requiring depot preparations (p<0.001) were associated with better functional outcomes. Factors such as gender (p=0.732), marital status (p=0.094), religion (p=0.743), type of family (p=0.084), presence of comorbidities (p=0.093), and treatment with electroconvulsive therapy (p=0.196) did not show statistically significant associations with functional remission (Table 3).

**Table 3: Association of Factors with Functional Remission (n=100)**

| Variable | Category | Functionally Remitted (n=45) | Functionally Non-Remitted (n=55) | p-value |
|---|---|---|---|---|
| **Sex** | Male | 23 (51.1%) | 30 (54.5%) | 0.732 |
| | Female | 22 (48.9%) | 25 (45.5%) | |
| **Education** | Below 10th Std | 12 (26.7%) | 29 (52.7%) | 0.008* |
| | Above 10th Std | 33 (73.3%) | 26 (47.3%) | |
| **Occupation** | Unemployed | 17 (37.8%) | 36 (65.5%) | 0.013* |
| | Unskilled | 4 (8.9%) | 5 (9.1%) | |
| | Skilled | 24 (53.3%) | 14 (25.5%) | |
| **Social Support** | Good | 43 (95.6%) | 26 (47.3%) | <0.001* |
| | Poor | 2 (4.4%) | 29 (52.7%) | |
| **Antipsychotics** | Typical | 10 (22.2%) | 6 (10.2%) | <0.001* |
| | Atypical | 29 (64.4%) | 16 (29.1%) | |
| | Both | 6 (13.3%) | 33 (60%) | |
| **Drug Compliance** | Good | 42 (93.3%) | 19 (34.5%) | <0.001* |
| | Poor | 3 (6.7%) | 36 (65.0%) | |
| **Hospitalization** | Yes | 18 (40.0%) | 48 (87.3%) | <0.001* |
| | No | 27 (60.0%) | 7 (12.7%) | |

**Duration of Untreated Illness:** Duration of untreated psychosis ranged from 7 days to 7 years. The mean duration was 3-4 months in remitted patients, while it was more than one year in functionally non-remitted patients.

**FROGS Scale Assessment:** Assessment using the FROGS scale showed that patients improved significantly in self-care and hygiene (daily activities), but scored lower in areas such as relationships, sexual life, financial management, and social network, indicating that even functionally remitted patients lagged in social relationships.

**Discussion**

This study examined functional remission in patients with schizophrenia using standardized assessment scales. Individuals who achieved remission in core symptoms (PANSS score <3), functional improvement (GAF score >60), and clinical remission (CGI score <3) were considered functionally remitted. The study identified several significant predictors of functional remission.

The mean age of the study group was 37 years, with both functionally remitted and non-remitted groups having similar mean ages. No significant gender differences were observed between remitted and non-remitted groups, which is consistent with some previous studies but contrasts with others suggesting gender-specific outcomes in schizophrenia.

Seventy-nine percent of the study population belonged to low socioeconomic status, with only 2% from high socioeconomic backgrounds. This distribution reflects the patient demographic of the government institutional hospital where the study was conducted. A study by Kelly et al. [12] suggested that patients from lower socioeconomic status had poor functional outcomes; however, this could not be established in our study due to the limited representation of higher socioeconomic groups. In this study, 25 participants were married, of whom 16 did not show functional improvement, but this association was not statistically significant. The literature presents mixed findings regarding the impact of marriage on schizophrenia outcomes, with some studies reporting favorable outcomes while others found no significant relationship.

Skilled occupation was significantly associated with functional remission (p=0.013), while unemployment was associated with poor remission in patients with schizophrenia. This may be attributable to work-related factors such as type of work and workplace stress that could lead to behavioral disturbances and poor functional outcomes. Milton et al. [13] found that unemployed patients were more aggressive and showed poor prognosis. Similarly, Valencia et al. [6] predicted that being employed (p=0.010) resulted in good functional remission, supporting our findings.

Social support demonstrated a highly significant association with functional remission (p<0.001). In our study, 96% of functionally remitted patients had good social support, while only 47% of non-remitted patients had good support. This finding aligns with the International Pilot Study of Schizophrenia (IPSS) and Determinants of Outcome of Severe Mental Disorders (DOSMED) studies, which demonstrated the crucial role of cultural factors in schizophrenia outcomes.

Verghese et al. [14,15] predicted remission in 66% of patients and found that lack of financial difficulties, short illness duration, drug compliance, and supportive family and societal attitudes were associated with positive outcomes. Saravanan et al. [16] from Vellore attributed the good prognosis and

improved functional outcomes in South India to local cultural factors, insight, family support, and community support prevailing in high-context cultures. The favorable outcomes in non-Western countries like India can be explained by factors such as family support, positive attitudes among family members and society, interaction styles, longstanding marriages, non-stressful and unskilled work environments, and supportive networks of relatives, friends, and colleagues. Our results, when compared with international studies, support the significant impact of cultural factors and social support on functional remission.

Good drug compliance ($p<0.001$) and fewer hospitalizations ($p<0.001$) showed highly significant relationships with functional remission. Studies by Rebecca et al. [17] and Nasrallah [18] produced similar findings, reinforcing that good medication adherence and minimal hospital admissions favor functional remission. These findings emphasize the importance of strategies to improve medication compliance and community-based interventions to reduce hospitalization rates.

Duration of untreated illness has been consistently reported to significantly impact remission outcomes. In our study, the mean duration of untreated psychosis was 3-4 months in remitted patients compared to more than one year in functionally non-remitted patients. This finding underscores the critical importance of early detection and intervention in schizophrenia.

PANSS scores had a significant positive role in functional remission. Low positive and negative symptom domains influenced functional outcomes in patients with schizophrenia. As PANSS scores increased, GAF scores declined, indicating an inverse relationship between symptom severity and functional capacity. While some studies have reported contrary findings, our study clearly demonstrates that functional remission is achievable primarily in patients who attain symptomatic remission.

The FROGS scale assessment revealed that while patients improved in self-care and hygiene (daily activities), they scored poorly in relationships, sexual life, financial management, and social networks. This indicates that even functionally remitted patients struggle with social relationships and community integration. This finding highlights the need to revise criteria for functional remission and adopt a multidimensional approach in future studies and treatment planning.

## Limitations

This study has several limitations. The cross-sectional design limits our ability to establish causal relationships between predictors and functional remission. The sample was drawn from a single government hospital, potentially limiting generalizability. The predominance of patients from lower socioeconomic backgrounds prevented meaningful comparison with higher socioeconomic groups. Additionally, the relatively small sample size may have limited the statistical power to detect some associations.

## Conclusion

This study identified several key determinants of functional remission in patients with schizophrenia. Social support, shorter duration of untreated illness, good medication compliance, and fewer hospitalizations emerged as significant predictors of functional remission. Higher symptomatic remission showed a significant relationship with functional remission, emphasizing the importance of effective symptom management.

Functional remission is a dynamic and multifactorial construct encompassing symptomatic, functional, and psychosocial dimensions. The finding that functionally remitted patients still struggle with social relationships underscores the need for comprehensive rehabilitation programs addressing social functioning beyond symptom control.

The multifactorial nature of functional remission in schizophrenia necessitates a holistic treatment approach that extends beyond pharmacological interventions to include psychosocial rehabilitation, family psychoeducation, vocational training, and community support programs. Developing appropriate tools to measure these multidimensional outcomes will be essential for improving treatment strategies and enhancing quality of life for individuals with schizophrenia.

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