



Assessment of the Cognitive Deficit and Quality of Life in Patients with Schizophrenia at the Department of Psychiatry - A Prospective Observational Study

Gorre Venkata Nagaraju*¹, Dinesh Kumar Upadhyay², Konda Ravi Kumar³

¹Department of Pharmacy Practice, School of Pharmaceutical Sciences, Jaipur National University, Jaipur, India.

²Professor, School of Pharmaceutical Sciences, Jaipur National University, Jaipur, Rajasthan, India.

³Professor & Vice-Principal, Faculty of Pharmacy, Hindu College of Pharmacy, Guntur, Andhra Pradesh, India.

Abstract

Schizophrenia is a debilitating mental disorder known for its diverse array of symptoms, including profound cognitive deficits that substantially affect individual's lives and overall quality of life. This 35-month prospective observational study focused on patients between the ages of 18 to 50 who had been on stable antipsychotic therapy for a minimum of three months, and were diagnosed with schizophrenia according to ICD-10 criteria. The primary objective of the study was to assess cognitive deficits and quality of life in these individuals, with a specific focus on understanding the long-term impact of stable antipsychotic therapy on their well-being. The data was collected from patient case sheets in the outpatient wards, and assessments were carried out using a structured questionnaire, the "Adenbrook Cognitive Examination Scale" (ACE-III-R), and the "WHO-Quality of Life Scale." The results revealed that Total ACE scores at all-time points, there were no statistically significant differences in mean scores between female and male groups, with p-values ranging from 0.2 to 0.63. The "Overall Quality of Life," substantial improvement was detected between T0-T1 (mean difference = -35.85, $p < 0.001$) and T0-T2 (mean difference = -64.32, $p < 0.001$), indicating a significant increase in the overall quality of life. These cognitive impairments were strongly associated with lower quality of life, affecting multiple aspects of well-being. In conclusion, this research underscores the persistence of cognitive deficits in schizophrenia, which have a profound impact on patient's quality of life. Tailored interventions are essential to address these deficits and offer the potential for enhanced well-being among individuals with schizophrenia. The study's outcomes emphasize the importance of holistic care to mitigate the impact of cognitive impairment on their lives, providing a foundation for improving the care and support offered to individuals with schizophrenia and enhancing their overall quality of life.

Keywords: Schizophrenia, Cognitive deficits, Quality of life, Antipsychotic therapy, Long-term impact, Tailored interventions

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*Corresponding Author, e-mail: drnagaraju.gv@gmail.com

1. Introduction

Schizophrenia, a severe and complex mental disorder, poses a significant challenge to both patients and healthcare professionals. It is characterized by a range of symptoms, including delusions, hallucinations, disorganized thinking, and impaired cognitive functions. This condition not only affects individuals' daily lives but also has a profound impact on their overall quality of life. Understanding the cognitive deficits and the associated changes in quality of life in patients with schizophrenia is of paramount importance for providing effective care and support. Cognitive deficits are a hallmark of schizophrenia, affecting various cognitive domains, such as attention, memory, and executive functions [1]. These cognitive

impairments contribute to the substantial functional disability experienced by patients, limiting their ability to work, maintain relationships, and engage in activities of daily living [2]. These deficits are not only pervasive but also enduring, making cognitive dysfunction a central target for interventions aimed at improving patients' lives [3]. Additionally, quality of life is a critical outcome measure in assessing the overall well-being of individuals with schizophrenia. It encompasses various aspects of life satisfaction, including physical and mental health, social relationships, and environmental conditions [4]. Schizophrenia is a highly heterogeneous disorder, and its course and outcomes can vary widely among individuals. Some patients experience a relatively stable course, while

others may exhibit fluctuating symptom severity and cognitive functioning over time. Understanding this variability is essential for tailoring treatment strategies to the specific needs of each patient. Research has consistently shown that individuals with schizophrenia often experience a significantly lower quality of life compared to the general population [5]. This decrease in quality of life is not solely attributed to the severity of psychotic symptoms but is also influenced by the degree of cognitive impairment [6].

Past research has highlighted the importance of early intervention in schizophrenia to prevent or mitigate cognitive decline and improve overall quality of life. However, prospective studies tracking cognitive deficits and their impact on quality of life are limited, and there is a need to explore the potential mediating factors and long-term trajectories in a real-world clinical setting. This prospective observational study conducted at the Department of Psychiatry represents a pivotal step in advancing our understanding of schizophrenia, with the main objective of improving the lives of individuals grappling with this complex condition. By exploring the dynamic interplay between cognitive deficits and quality of life, this research sets the stage for more effective interventions and a more holistic approach to care for individuals living with schizophrenia.

2. Materials and Methods

The study was conducted at the outpatient wards of the Psychiatry departments at Government General Hospital, Guntur, Andhra Pradesh-522001. It was designed as a prospective and observational study involving the collection of case sheets and medication records of patients, without the use of invasive techniques such as blood sample collection. The study spanned 35 months. Before enrolling subjects into the study, ethical approval was granted by the institution under reference number GMC/IEC/179/2021. A total of 831 participants were included in this study. The sample size, determined by SPSS software, was set at 831, with a 5% margin of error and a 95% confidence interval, considering an expected response rate of 90%. Study participants were selected through a direct patient counselling and convenient random sampling method. Inclusion criteria encompassed patients aged between 18-50 years, diagnosed with Schizophrenia according to the ICD-10 criteria, and receiving stable antipsychotic therapy for at least three months. Patients willing to participate in the study were also considered eligible. Exclusion criteria excluded patients below 18 and above 50 years, those diagnosed with schizophrenia within the past year, individuals with co-morbid conditions, patients using psychoactive substances (excluding nicotine), and those unwilling to participate. The study data was sourced from the enrolled participant's case report forms and through a self-structured questionnaire, the Adenbrook Cognitive Examination Scale (ACE-III-R), and the WHO-Quality of Life Scale. This comprehensive methodology allowed for the collection of data to assess cognitive function and quality of life in the selected patient cohort, ensuring a robust foundation for the study's objectives and outcomes.

2.1. Statistical Analysis

The study data analysis was carried out utilizing the Statistical Package for Social Sciences (SPSS), specifically version 24.0 by IBM. Descriptive analysis was conducted to

calculate both percentages and frequencies. An alpha value of 0.05 or less was considered statistically significant.

3. Results

A total of 831 participants were recruited in the study, out of which 458 (55.11%) were females and 373 were males (44.88%), with mean age of 38.68 ± 9.813 (years). Table 1 presented a comprehensive analysis of the socio-demographic characteristics of the study participants, segmented by various variables. There were some demographic similarities between females and males. However, the occupation category exhibited a substantial gender disparity ($p < 0.001$), with a greater number of females being unemployed. In terms of monthly income, the data showed a significant difference ($p < 0.001$), with a higher percentage of males having a monthly income exceeding 10,000, while more females fell into the >5000 category. Table 1 underscores significant gender-based disparities in marital status, education, religion, occupation, and monthly income, which are essential findings to consider when analyzing the research outcomes.

Table 2 presents the outcomes of an analysis comparing attention orientation scores at different time points (T0, T1, T2) for the overall group, as well as for female and male subgroups. At T0, the mean Attention Orientation score for the overall group was 7.37 (SD = 3.311), with females scoring slightly lower at 7.2 (SD = 3.322) and males scoring slightly higher at 7.59 (SD = 3.29). However, the difference was not statistically significant ($p = 0.094$). Mean scores increased for all groups at T1 and T2, but gender differences remained non-significant ($p = 0.572$ and $p = 0.129$, respectively). Concerning Memory, mean scores did not significantly differ between females and males at all-time points, with p-values ranging from 0.29 to 0.59. Fluency scores exhibited similar patterns, showing no significant differences between females and males at any time point (p-values ranging from 0.961 to 0.991). For Language, mean scores at all time points were not significantly different between genders, with p-values ranging from 0.4 to 0.69. Visuospatial skills also did not show significant gender differences in mean scores at any time point, with p-values ranging from 0.26 to 0.44. The analysis of Total ACE scores indicated no statistically significant differences in mean scores between female and male groups at all-time points, with p-values ranging from 0.2 to 0.63. Thus, the results suggest that there were no significant gender-based differences in attention orientation, memory, fluency, language, visuospatial skills, and total ACE scores at various time points in the study population.

Table 3 presents the paired differences, t-scores, and two-tailed p-values for various ACE variables measured at different time points (T0, T1, and T2), elucidating the significance of changes in study variables over time. In the domain of "Attention Orientation," significant improvements were observed between T0-T1 (mean difference = -2.55, $p < 0.001$) and T0-T2 (mean difference = -3.16, $p < 0.001$), indicating substantial enhancements in attention orientation scores over time. For "Memory," statistically significant changes were noted between T0-T1 (mean difference = -1.69, $p < 0.001$) and T0-T2 (mean difference = -3.82, $p < 0.001$), signifying a notable improvement in memory scores across the measured time points. "Fluency" scores also exhibited significant changes between T0-T1 (mean difference = -1.90,

$p < 0.001$) and T0-T2 (mean difference = -4.93, $p < 0.001$), signifying a significant improvement in fluency over time. For "Language," statistically significant changes were noted between T0-T1 (mean difference = -1.89, $p < 0.001$) and T0-T2 (mean difference = -3.85, $p < 0.001$), indicating a substantial improvement in language scores. In the "Visuospatial" domain, significant changes were observed between T0-T1 (mean difference = -1.90, $p < 0.001$) and T0-T2 (mean difference = -3.75, $p < 0.001$), reflecting a considerable improvement in visuospatial skills over time.

The "Total ACE score" exhibited significant changes between T0-T1 (mean difference = -9.92, $p < 0.001$) and T0-T2 (mean difference = -19.52, $p < 0.001$), highlighting a substantial enhancement in total ACE scores. Across all ACE variables, significant changes in scores were observed between different time points (T0, T1, and T2), suggesting a notable improvement in cognitive performance over time in each assessed domain. General Linear Model analysis, comparing male and female groups based on their physical and psychological health scores at different time points (T0, T1, T2) using the WHOQOL-BREF assessment was represented in table 4.

For "Physical Health," the analysis demonstrates that at T0, there was no significant difference between male and female groups ($p = 0.6$), indicating that both genders had similar physical health scores. However, at T1 and T2, statistically significant differences emerged, with females scoring higher at T1 ($p < 0.001$) and T2 ($p < 0.001$) compared to males, signifying that female exhibited better physical health at these time points. Similarly, in the domain of "Psychological Health," no significant differences were observed at T0 ($p = 0.7$). However, at T1 and T2, significant differences were detected, with females scoring higher at both time points ($p < 0.001$), implying that females experienced better psychological health. For "Social Relationships," there was no significant difference between male and female groups at T0 ($p = 0.15$). Nevertheless, at T1 and T2, the analysis revealed significant differences, with females scoring higher ($p < 0.001$), indicating better social relationships.

In terms of "Environmental Score," similar to social relationships, no significant differences were found at T0 ($p = 0.15$). However, at T1 and T2, significant differences were observed, with females scoring higher ($p < 0.001$), suggesting a more positive environmental perception. The analysis of "Overall Quality of Life" indicated a significant difference at T0 ($p = 0.043$), with females reporting a slightly lower overall quality of life. However, at T1 and T2, significant differences were observed, with females scoring higher ($p < 0.001$), reflecting an improvement in overall quality of life compared to males. These results revealed distinct gender-based patterns in physical and psychological health, social relationships, environmental perception, and overall quality of life at different time points. Females generally exhibited better well-being across these domains, particularly in the later time points (T1 and T2), suggesting improvements in their quality of life and overall well-being.

Table 5 illustrated the paired differences, t-scores, and two-tailed p-values for WHOQOL-BREF scores at different time points (T0, T1, T2). These statistics revealed the significance of changes in these scores over time. For

"Physical Health," the results indicate a substantial increase in scores between T0-T1 (mean difference = -8.93, $p < 0.001$) and T0-T2 (mean difference = -15.48, $p < 0.001$), reflecting a notable recovery in physical health. In the domain of "Psychological Health," significant increase was observed between T0-T1 (mean difference = -6.61, $p < 0.001$) and T0-T2 (mean difference = -14.16, $p < 0.001$), signifying an overall improvement in psychological well-being over time.

For "Social Relationships," significant improvement was noted between T0-T1 (mean difference = -10.06, $p < 0.001$) and T0-T2 (mean difference = -16.10, $p < 0.001$), indicating a decline in social relationship quality. In the "Environment" domain, significant improvement was observed between T0-T1 (mean difference = -10.03, $p < 0.001$) and T0-T2 (mean difference = -18.34, $p < 0.001$), suggesting an increase in the perceived environmental quality. In consideration of "Overall Quality of Life," substantial improvement was detected between T0-T1 (mean difference = -35.85, $p < 0.001$) and T0-T2 (mean difference = -64.32, $p < 0.001$), indicating a significant increase in the overall quality of life. The overall results summarized and stating that the study's socio-demographic analysis in Table 1 reveals significant gender-based differences in marital status, education, religion, occupation, and monthly income, which are critical factors for interpreting research outcomes. Moreover, the cognitive assessment using ACE scores demonstrates no significant gender-related variations in attention orientation, memory, fluency, language, visuospatial skills, or total ACE scores across different time points. However, a consistent improvement in cognitive performance is evident over time in all domains. The analysis of WHOQOL-BREF scores also highlights distinct gender-based patterns, with females exhibiting better physical and psychological health, social relationships, environmental perception, and overall quality of life, especially in the later time points (T1 and T2). Additionally, a significant improvement in overall well-being was observed over time in these domains, emphasizing the need for study of factors contributing to enhanced participants' quality of life and overall health.

4. Discussion

Schizophrenia is a complex mental disorder known for its diverse array of symptoms, including cognitive deficits that significantly impact the lives of affected individuals. Furthermore, schizophrenia is associated with a substantial effect on the quality of life experienced by those diagnosed with the disorder. In this prospective observational study, we sought to assess cognitive deficits and the quality of life in patients with schizophrenia who have been on stable antipsychotic therapy, with the aim of understanding the long-term impact of treatment on their well-being. The current study's socio-demographic analysis, as presented in Table 1, revealed significant gender-based disparities in marital status, education, religion, occupation, and monthly income among the study participants. These findings align with previous studies that have highlighted the influence of socio-demographic factors on the well-being and functioning of individuals with schizophrenia [7, 8, 9, 10].

Table 1. Socio-demographic details of participant

Demographic Parameters	Overall		Female (N=458)		Male (N=373)		P value
	N	%	N	%	N	%	
Gender	831	100	458	55.1	373	44.9	-
Age Mean (SD)	38.38 ± 9.6		38.14 ± 9.4		38.68 ± 9.8		
Residence							
Rural	498	59.93	269	58.7	229	61.4	0.82
Urban	333	40.07	189	41.3	144	38.6	
Family Type							
Joint	212	25.51	104	22.70	108	28.95	0.37
Nuclear	487	58.60	274	59.82	213	57.10	
Living alone	132	15.88	80	17.46	52	13.94	
Marital Status							
Married	676	81.35	368	80.3	308	82.6	0.043
Unmarried	87	10.47	48	10.5	39	10.5	
Divorced	38	4.57	24	5.2	14	3.8	
Widowed	30	3.61	18	3.9	12	3.2	
Educational status							
Graduate	196	23.59	115	25.1	81	21.7	0.021
Postgraduate	5	0.60	5	1.1	0	0	
Secondary education	439	52.83	241	52.6	198	53.1	
Illiterate	191	22.98	97	21.2	94	25.2	
Religion							
Christian	156	18.77	86	18.8	70	18.8	0.003
Hindu	630	75.81	348	76	282	75.6	
Muslim	35	4.21	18	3.9	17	4.6	
Others	10	1.20	6	1.3	4	1.1	
Occupation							
Skilled	151	18.17	92	20.1	59	15.8	<0.001
Semi-skilled	239	28.76	136	29.7	103	27.6	
Un-skilled	140	16.85	80	17.5	128	13.21	
Un-employed	260	31.29	132	28.8	60	16.1	
Daily labor	41	4.93	18	3.9	23	6.2	
Monthly income							
>10000	200	24.07	55	12.	98	26.3	<0.001
>5000	284	34.18	154	33.6	130	34.9	
5000-1000	145	17.45	102	22.3	90	24.1	
No-income	202	24.31	147	32.1	55	14.7	

Table 2. Comparison of ACE scores between Genders

	Overall		Female		Male		P value	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation		
Attention Orientation								
T0	7.37	3.311	7.2	3.322	7.59	3.29	0.094	
T1	9.92	3.594	9.86	3.769	10	3.371	0.572	
T2	10.53	3.666	10.36	3.651	10.75	3.677	0.129	
Memory								
T0	8.97	5.983	8.77	5.867	9.21	6.122	0.29	
T1	10.66	5.729	10.56	5.74	10.77	5.715	0.59	
T2	12.79	6.523	12.66	6.502	12.96	6.554	0.51	
Fluency								
T0	6.24	3.711	6.23	3.627	6.24	3.816	0.961	
T1	8.14	3.832	8.14	3.701	8.14	3.993	0.991	
T2	11.17	6.498	10.81	6.106	11.61	6.932	0.079	
Language								
T0	9.92	5.573	9.78	5.677	10.1	5.444	0.4	
T1	11.81	5.654	11.67	5.726	11.98	5.566	0.42	
T2	13.77	6.43	13.69	6.641	13.87	6.167	0.69	
Visuospatial								
T0	6.77	3.042	6.84	3.059	6.68	3.023	0.43	
T1	8.67	3.174	8.74	3.178	8.57	3.171	0.44	
T2	10.52	4.942	10.69	5.044	10.31	4.812	0.26	
Total ACE scores								
T0	39.27	15.404	38.83	15.15	39.82	15.714	0.35	
T1	49.19	15.277	48.97	14.914	49.47	15.728	0.63	
T2	58.79	14.315	58.22	13.879	59.5	14.82	0.2	

Table 3. Paired differences for ACE score at different time points

ACE Variables		Paired Differences					% difference	t	P value
		Mean	SD	SE	95% CI of the Difference				
					Lower	Upper			
Attention Orientation	T0-T1	-2.55	2.49	0.09	-2.72	-2.38	-34.60	-29.48	<0.001
	T0-T2	-3.16	2.98	0.10	-3.36	-2.96	-42.88	-30.54	<0.001
Memory	T0-T1	-1.69	2.32	0.08	-1.85	-1.53	-18.84	-20.96	<0.001
	T0-T2	-3.82	5.30	0.18	-4.18	-3.46	-42.59	-20.80	<0.001
Fluency	T0-T1	-1.90	1.06	0.04	-1.97	-1.83	-30.45	-51.62	<0.001
	T0-T2	-4.93	5.81	0.20	-5.33	-4.54	-79.01	-24.46	<0.001
Language	T0-T1	-1.89	0.98	0.03	-1.95	-1.82	-19.05	-55.30	<0.001
	T0-T2	-3.85	4.26	0.15	-4.14	-3.56	-38.81	-26.04	<0.001
Visuospatial	T0-T1	-1.90	1.05	0.04	-1.97	-1.83	-28.06	-51.95	<0.001
	T0-T2	-3.75	4.38	0.15	-4.05	-3.45	-55.39	-24.67	<0.001
Total ACE score	T0-T1	-9.92	5.24	0.18	-10.28	-9.56	-25.26	-54.62	<0.001
	T0-T2	-19.52	8.01	0.28	-20.06	-18.97	-49.71	-70.21	<0.001

Table 4. Comparison of WHOQOL-BREF scores between genders

	Overall		Female		Male		
	Mean	SD	Mean	SD	Mean	SD	P value
Physical health							
T0	41.63	9.79	41.05	9.613	42.33	9.972	0.6
T1	50.56	10.639	52.43	10.273	48.25	10.643	<0.001
T2	57.1	11.689	59.58	10.169	54.07	12.689	<0.001
Psychological Health							
T0	40.09	8.309	39.62	8.177	40.67	8.443	0.7
T1	46.7	7.776	47.86	7.192	45.27	8.226	<0.001
T2	54.25	11.501	56.24	10.505	51.8	12.19	<0.001
Social relationship							
T0	43.39	10.913	42.9	10.861	43.99	10.96	0.15
T1	53.45	10.834	55.48	10.072	50.95	11.224	<0.001
T2	59.49	11.833	62.17	10.497	56.2	12.546	<0.001
Environmental score							
T0	40.81	10.08	40.36	10.065	41.37	10.084	0.15
T1	50.85	10.952	53.41	10.152	47.7	11.089	<0.001
T2	59.15	12.697	62.1	11.002	55.52	13.677	<0.001
Overall Quality of life							
T0	165.67	27.548	163.93	26.924	167.81	28.185	0.043
T1	201.53	30.256	209.18	26.934	192.14	31.476	<0.001
T2	230	40.732	240.1	34.272	217.59	44.486	<0.001

Table 5. Paired differences for WHOQOL-BREF score at different time points

Health Score Parameters		Paired Differences					% mean difference	t	Sig. (2-tailed)
		Mean	SD	SE	95% CI of the Difference				
					Lower	Upper			
Physical health	T0-T1	-8.93	10.71	0.37	-9.66	-8.20	-21.45	-24.04	<0.001
	T0-T2	-15.48	12.70	0.44	-16.34	-14.61	-37.18	-35.13	<0.001
Psychological health	T0-T1	-6.61	7.94	0.28	-7.15	-6.07	-16.48	-23.98	<0.001
	T0-T2	-14.16	12.21	0.42	-14.99	-13.33	-35.31	-33.42	<0.001
Social relationships	T0-T1	-10.06	11.18	0.39	-10.82	-9.30	-23.18	-25.93	<0.001
	T0-T2	-16.10	12.73	0.44	-16.97	-15.23	-37.11	-36.46	<0.001
Environment	T0-T1	-10.03	11.07	0.38	-10.79	-9.28	-24.59	-26.13	<0.001
	T0-T2	-18.34	13.73	0.48	-19.27	-17.40	-44.93	-38.50	<0.001
Overall quality of life	T0-T1	-35.85	29.96	1.04	-37.9	-33.82	-21.64	-34.49	<0.001
	T0-T2	-64.32	42.48	1.474	-67.215	-61.43	-38.83	-43.64	<0.001

Marital status, education, and income have been recognized as determinants of quality of life and functioning in this population [11, Nutakor JA]. These socio-demographic factors played a crucial role in shaping the unique challenges and needs of patients with schizophrenia. The cognitive assessment of present study using ACE scores, however, provided contrasting results when compared to previous studies. Unlike some earlier research that reported gender-related differences in specific cognitive domains [12, 13, 14], this study did not find significant gender-based variations in attention orientation, memory, fluency, language, visuospatial skills, or total ACE scores at various time points. This suggests that in our study population, these cognitive domains did not show substantial gender-related differences. These results challenge previous findings, emphasizing the importance of considering the heterogeneity within the schizophrenia population [14].

However, a consistent increase in cognitive performance over time was observed in all assessed domains, while a body of research highlighting the progressive nature of cognitive deficits in schizophrenia [16, 17]. This study results underscore the enduring and impactful nature of cognitive deficits in schizophrenia, emphasizing the need for tailored interventions to address these deficits and mitigate their impact on patients' lives [18]. In the analysis of WHOQOL-BREF scores, our study reveals distinct gender-based patterns, with females generally exhibiting better well-being across physical and psychological health, social relationships, environmental perception, and overall quality of life, particularly in the later time points (T1 and T2). These findings are consistent with previous research indicating that females with schizophrenia often report better quality of life and well-being [13, 19]. However, the study also highlights a significant improvement in well-being over time in these domains with the use of schizophrenia drugs. The existing literature showing that the course of schizophrenia can have a deteriorating impact on the quality of life, while an appropriate clinical intervention can show a notable improvement in the disease symptoms and overall quality of life [20].

Therefore, these study findings have important clinical and research implications. The gender-based differences in quality of life and the progression of cognitive improvement emphasize the need for personalized interventions and long-term follow-up care for patients with schizophrenia. Tailored treatments and support may be crucial in addressing the specific needs of individuals with schizophrenia.

5. Conclusions

In summary, our research contributes to the expanding pool of knowledge on schizophrenia, providing insights into the socio-demographic factors, cognitive impairments, and quality of life affecting individuals with the disorder. Although gender-related differences in socio-demographic aspects were apparent, cognitive enhancements were consistent regardless of gender, and a notable improvement in quality of life was noted over the study period. These results emphasize the intricate nature of schizophrenia and emphasize the necessity for holistic care and assistance for those grappling with this demanding condition.

6. Study Limitations

This study's limitations include a potentially limiting sample size, selection bias due to convenient sampling, reliance on retrospective data, 35-month study duration, the absence of a control group, unaccounted external factors, subjective self-reported measures, and unassessed treatment variations. These limitations should be addressed in future research for a more comprehensive understanding of schizophrenia-related cognitive deficits and quality of life.

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Conflict of Interest

Authors are declared that no conflict of Interest

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Ethical Approval

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Inform Consent

Inform consent was taken from the patient

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