First Episode Schizophrenia: Psychiatric and Cognitive Study for The Patients and Their First-Degree Relatives

Abstract

Background: severe and persistent mental condition Adults have a lifetime prevalence of schizophrenia that ranges from 0.4 to 1%. The purpose of this study was to compare the cognitive function of first-episode schizophrenic patients to that of multiple schizophrenic patients, as well as to examine cognitive function in patients with first-episode schizophrenia and the impact of treatment on first-degree relatives of the patient

Methods: The 200 participants in this cross-sectional case-control study were of both sexes and ranged in age from 18 to 50. There were five groups created for the subjects: Group I (n=50): Schizophrenia in its initial episode. Group II (n=50): Relatives of schizophrenia patients experiencing their first episode. Group III (n=50): Schizophrenia with multiple episodes. Healthy volunteers make up Group IV (n=50). Group V (n=36): Group I was followed up with one year following therapy.

Results: Total IQ, attention, executive function, memory function, and social cognition were significantly different between patients and controls. First-degree relatives and the control group showed substantial differences in attention, executive function, and memory function. The Wisconsin Card Sorting Test (WCST) categories that were completed and the number of preservation errors, as well as the Trail Making Test (TMT) A and B, Mayer-Salovey-Caruso Perception and experiencing areas of emotional intelligence (MESCIT), mental control, logical memory, total number of digits, association learning, and visual reproduction are all measured by the Wechsler Memory Scale (WMS). Other than the perception branch and experiential region (social cognition), there was no statistically significant change in the overall IQ, WCST, Benton Visual Retention Test (BVRT), or MESCIT

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Conclusions: In terms of general intelligence, attention, executive function, memory function, and social cognition, first episode patients outperformed many episode patients

Keywords: Cognitive Study, First Episode Schizophrenia, First-Degree Relatives, Psychiatry

Introduction:

Kraepelin (1919) first used the term "dementia praecox" to describe the cognitive, social, behavioural, and personality alterations exhibited in young patients; Bleuler (1950) later changed the disorder's name to "schizophrenia." Frontal and/or temporal lobe dysfunctions were thought to result in cognitive impairments, but Kraepelin and Bleuler were unable to confirm this with the technology available at the time.[1].

Memory, attention, working memory, executive function, processing speed, and social cognition are the cognitive processes that are most frequently affected [2, 3]. These abnormalities may be present in a weaker form before the start of clinical symptoms in children who are at risk for schizophrenia or who are in the prodromal stage. [4].

Even among first-degree relatives who do not have the illness, cognitive impairment in schizophrenia has a genetic component. Despite the remission of psychosis, psychosocial functioning and social integration are severely compromised in people with schizophrenia, and these cognitive deficits last the patient's entire life. [5].

The occurrence of cognitive impairment before and immediately after psychosis suggests that some neurocognitive impairments are not causally related to psychosis. Studying the progression of cognitive impairments in the early stages may help to better understand the neurodevelopmental factors underlying schizophrenia. [6].

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The glutamate hypothesis might provide an explanation for the cognitive deficits that are typical of schizophrenia. According to certain research, an increase in glutamatergic transmission may contribute to neuronal degeneration and an increase in "residual symptoms" in addition to psychosis and outside influences. The parietal and motor cortical deficiencies grow over time in schizophrenia, whereas the prefrontal, supplementary motor, and temporal abnormalities first manifest or develop. The purpose of this study was to compare the cognitive function of first episode schizophrenic patients with that of multiple schizophrenic patients, as well as to examine cognitive function in patients with first episode schizophrenia and the impact of treatment on first degree

Patients and Methods:

This cross-sectional case-control study included 200 participants who were both sexes, between the ages of 18 and 50, had completed at least their primary education, were non-medicated, or had discontinued their treatment for at least one month due to non-compliance.

After receiving approval from Tanta University Hospitals' Ethical Committee, the study was carried out. The patients provided signed consent after being fully briefed.

Intellectual difficulties, the existence of medical or neurological conditions (such as epilepsy) or other psychiatric conditions (such as depression) that may affect cognition were exclusion factors, as well as drug use disorder.

Five groups were formed by dividing the subjects:

Before receiving therapy, members of Group I (n=50) must have a first episode of schizophrenia and meet the DSM-5 criteria.

Group II (n=50) consists of the first episode patients' relatives with schizophrenia.Patients in Group III (n=50) with schizophrenia with two or more episodes.As a control group, Group IV (n=50) consisted of healthy volunteers without a history of mental illness.Group V (n=36): After a year of treatment, this group was the follow-up for group I.

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All were subjected to:

Structured Clinical Interview for DSM-5: SCID-5- CV [7]

Interview subjects may include psychological or medical patients, as well as people who do not identify as such, such as people who are participating in a community survey on mental illness or the relatives of people receiving psychiatric treatment.

Arabic version of the Wechsler Adult Intelligence Scale (WAIS)[8]:

A general intelligence test that measures linguistic and performance skills in people with a wide variety of cognitive capacities. Being standardised, the three IQ values have a mean of 100 and a standard deviation of 15. The verbal and performance IQ scores are determined using the results of the 11 subtests. The findings of the 11 subtests have a three standard deviation. The full-scale IQ, which accounts for both verbal and performance IQ, is derived from the IQ results on all subtests. This is the most reliable and authentic outcome for the WAIS test, and it takes 60 to 75 minutes to complete. In the context of the verbal and performance IQ tests, respectively, comprehension, digital span and similarity, picture completion, and digital symbol

.**Positive and Negative Syndrome Scale (PANSS) [9].**

For 30 items, ratings range from one to seven. Seven items make up the scale for measuring positive symptoms, whereas seven items make up the scale for measuring negative symptoms. The general psychopathology scale, a fourth indicator, adds the 16 remaining items to determine the overall severity of the schizophrenic condition.

The ratings of each of the scale's component items are added together to determine the results for these scales. The General Psychopathology Scale has a range of 16 to 112 points, whilst the Positive and Negative Scales have a range of 7 to 49 points

Wisconsin Card Sorting Test (WCST)[10].

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The following "frontal" lobe functions are to be measured: strategic planning, search organisation, utilisation of environmental information to alter one's cognitive framework, and goal-directed conduct.

The WCST consists of cards with geometric shapes that alter according on one of three perceptual dimensions (colour, shape, or number). Through a range of stimulus conditions, the subject must maintain this sorting principle (or set), ignoring the other - now irrelevant - stimulus dimensions. The classification principle abruptly shifts after 10 consecutive accurate matches, requiring a shift in set that is both flexible and adaptable

Wechsler Memory scale (WMS)[11]:

Five tasks that test short-term memory each take between 15 and 30 minutes to complete.

The foundation for the Attention and Concentration score is provided by the Mental Control and Digit Span tests. The patient must speak a series of numbers or letters for Mental Control to function. There are two components to the digit span: forward repetition and backward repetition.

Add the scores for both Verbal Memory (Logical Memory, Verbal Paired Associates) and Visual Memory (Analogous Memories) (Visual Reproduction) to obtain the General Memory score. The number of trials is limited to six in order to aid students in remembering the pairings. For visual reproduction, it is necessary to draw geometric patterns

Benton Visual Retention Test (BVRT) [12]:

The participant is shown a picture for 10 seconds every 10 seconds. A challenge in which participants must sketch the image from memory follows each visual presentation. Each drawing is categorised as correct or incorrect for evaluation purposes, and the number of errors in each incorrect drawing is noted. The findings are not expected to be influenced by the participants' drawing skills

Trail Making Test (TMT) parts A and B[13]:

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The TMT, which has two components, focuses on tests of visual attention and task switching. Component A gauges a person's ability to pay attention in multiple settings at once. The objective of this exam is to quickly connect numbered circles in a numerical order. On the second form B, the patient is shown circles with numbers and letters. To finish the activity, the patient must quickly and alternately connect circles in a numerical and alphabetical order.

The Arabic version of Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEITV2.0)[14].

The ability to generate and use emotions in order to express feelings or use them in other cognitive processes is measured with 141 questions and eight ability subscales that take into account four different facets of emotional processing. Each of the four divisions will be responsible for two duties.

The total score is determined by summing the proportions of each section's 141 parts.

The average of the two subscales for a branch makes up the branch score, i.e. Since the instrument was initially designed inside a western cultural context, this scoring method seemed to be the most advantageous one at this time.

Statistical analysis

IBM Inc., Chicago, Illinois, USA, used SPSS v26 to conduct the statistical study. The ANOVA (F) test with the post hoc test (Tukey) was used to compare quantitative variables between the three groups. Quantitative variables were provided as mean and standard deviation (SD). The Chi-square test was used to analyse qualitative data, which were reported as frequency and percentage (%). Statistical significance was defined as a two tailed P value 0.05.

Results:

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Age, marital status, and occupational position varied between groups in a statistically significant way. Patients with first episodes tend to be younger than other populations. Patients with schizophrenia are frequently single and unemployed. Table 1

Table 1: Age, marital status and employment of the studied groups

		Group I			Group II			Group III			Group IV			Sig. test	P
Age		24.9	±	3.4	33.4	±	8.4	33.1	±	4.1	30.0	±	5.2	**24.789**	**0.0001***
Group Comparison		**P1**			**P2**			**P3**			**P4**			**P5**	**P6**
		0.001*			**0.001***			**0.001***			**7350.**			**0.00*3**	**0.00*7**
Education		14.2	±	2.1	14.2	±	2.1	13.3	±	2.3	14.6	±	2.6	**2.829**	**0.040***
Group Comparison		**P1**			**P2**			**P3**			**P4**			**P5**	**P6**
		9650.			***500.0**			**4060.**			**550.0**			**0.381**	**50.00***
Sex	**Male**	31		62.0%	35		70.0%	32		64.0%	25		50.0%	**4.456**	**0.216**
	Female	19		38.0%	15		30.0%	18		36.0%	25		50.0%		
Employment	**Non-employed**	36		72.0%	20		40.0%	33		66.0%	8		16.0%	**39.776**	**0.001***
	Employed	14		28.0%	30		60.0%	17		34.0%	42		84.0%		
Marital status	**Single**	40		80.0%	13		26.0%	14		28.0%	15		30.0%		
	Married	7		14.0%	35		70.0%	32		64.0%	33		66.0%	**49.446**	**0.001***
	Divorced	3		6.0%	1		2.0%	4		8.0%	1		2.0%		
	Widow	0		0.0%	1		2.0%	0		0.0%	1		2.0%		
Smoking	**Smoker**	18		36.0%	15		30.0%	18		36.0%	7		14.0%	**8.444**	**0.077**
	Non-smoker	32		64.0%	35		70.0%	32		64.0%	43		86.0%		

Data are presented as mean ± SD or frequency (%).

Positive symptoms (higher in the first episode group) and negative symptoms (higher in the many episode group) showed a statistically significant difference. Table 2

Table (2): Symptoms comparison between first episode schizophrenia and multiple episode schizophrenia groups.

PANSS	Group I			Group III			t	P
							8.974	
PANSS P	26.1	±	3.9	20.0	±	2.9		**0.001***
PANSS N	20.4	±	4.5	27.4	±	3.7	**8.580-**	**0.001***
PANSS G	32.8	±	4.4	32.5	±	3.9	**0.313**	**0.755**
PANSS T	78.9	±	7.2	79.9	±	5.4	**0.798-**	**0.427**

Data are presented as mean ± SD

In the Wisconsin Card Sorting, Trail Making Test A and B, Wisconsin Card Sorting, and BVRT tests, there were statistically significant differences between the groups, with the

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exception of the number of preservation errors. In addition, there were no statistically significant differences between groups I and II, I and III, or II and IV for the Wisconsin Card Sorting's number of correct cards, nor were there any statistically significant differences between groups II and IV for the BVRT's number of correct cards. Table 3

Table (3): Cognitive assessment by Wechsler Adult Intelligence Scale (WAIS), Trail Making Test A and B, Wisconsin Card Sorting, BVRT Test among study groups.

		Group I	Group II	Group III	Group IV	Sig. test	P
WAIS		106.2±9.9	108.9±10.1	99.8±11.7	112.0±11.1	**11.641**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.197	**0.004***	**0.007***	**0.001***	**0.158**	**0.001***
TMT A		57.2±15.7	46.9±7.7	77.0±20.5	40.4±8.1	**64.72**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.001*	**0.001***	**0.001***	**0.001***	**0.021***	**0.001***
TMT B		130.7±28.5	96.7±11.2	185.4±38.9	83.9±13.2	**156.666**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.001*	**0.001***	**0.001***	**0.001***	**0.001***	**0.001***
WCST	**No. of categories completed**	3.3±1.2	4.6±.9	2.8±1.4	5.1±0.7	**64.042**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.001*	**0.015***	**0.001***	**0.001***	**0.019***	**0.001***
WCST	**No. Of preservative errors**	9.6±4.7	8.4±3.9	10.7±7.0	6.8±2.1	**6.086**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.208	**0.266**	**0.004***	**0.018***	**0.094***	**0.001***
WCST	**Percent of Conceptual Level Responses**	57.7±14.7	74.5±9.2	50.8±18.8	78.1±6.0	**49.621**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.001*	**0.010***	**0.001***	**0.001***	**0.169**	**0.001***
BVRT	**No. of correct cards**	6.4±1.2	7.3±1.0	5.7±1.3	7.4±1.2	**22.471**	**0.0001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.001*	**0.003***	**0.001***	**0.001***	**0.731**	**0.001***
BVRT	**No. of errors**	5.2±1.6	3.6±1.3	6.1±1.7	3.4±1.2	**38.022**	**0.0001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.001*	**0.002***	**0.001***	**0.001***	**0.495**	**0.001***

Data are presented as mean ± SD

With the exception of the perception branch, there were statistically significant differences between the groups in MESCIT and WMS. However, there were no statistically significant differences in the experiential, strategic, experiential, management, understanding, facilitating, or perception branches, or in the mental control and associate learning between groups II and IV or between group I and group II. Table 4

Table (4): Cognitive assessment by MESCIT and WMS.

		Group I	Group II	Group III	Group IV	Sig. test	P
MESCIT	**Perception**	48.2±4.0	49.5±3.7	48.2±2.8	51.2±5.4	**6.061**	**0.001***

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	branch						
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.111	**0.961**	**0.001***	**0.100**	**0.043***	**0.001***
MESCIT	**Facilitating branch**	40.8±3.64	1.1±3.8	38.4±3.5	42.5±3.6	**11.077**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.647	**0.001***	**0.020***	**0.001***	**0.060**	**0.001***
MESCIT	**Understanding branch**	44.4±4.0	44.9±3.1	42.7±3.1	46.2±4.4	**7.463**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.428	**0.021***	**0.013***	**0.003***	**0.073**	**0.001***
MESCIT	**Management branch**	46.6±4.1	47.4±4.7	43.5±4.1	48.6±3.6	**13.364**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.343	**0.001***	**0.019***	**0.001***	**0.161**	**0.001***
MESCIT	**Experiential area**	44.5±2.4	45.5±2.7	43.4±2.4	46.8±3.8	12.576	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.098	**0.046***	**0.001***	**0.001***	**0.025***	**0.001***
MESCIT	**Strategic area**	45.4±3.5	46.2±3.6	43.1±3.1	47.4±3.4	**14.658**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.302	**0.001***	**0.004***	**0.001***	**0.062**	**0.001***
MESCIT	**MSCEIT total**	45.0±2.3	46.2±3.8	43.2±2.4	47.2±2.8	**18.622**	**0.001***
Group Comparison		**P1 0.037***	**P2 0.002***	**P3 0.001***	**P4 0.001***	**P5 0.086**	**P6 0.001***
		P1 0.037*	**P2 0.002***	**P3 0.001***	**P4 0.001***	**P5 0.086**	**P6 0.001***
WMS	**Information**	5.1±0.3	5.2±0.4	5.1±0.2	5.2±0.4	**3.510**	**0.016***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.024*	**0.776***	**0.048***	**0.011***	**0.776**	**0.024***
WMS	**Orientation**	5.0±0.0	5.0±0.0	4.8±0.4	5.0±0.0	**12.250**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		1.00	**0.001***	**1.00**	**0.001***	**1.00**	**0.001***
WMS	**Mental control**	6.2±0.8	6.7±0.9	5.4±0.6	7.1±0.5	**66.640**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.619	**0.001***	**0.001***	**0.001***	**0.001***	**0.001***
WMS	**Logical memory**	5.5±0.9	8.9±0.9	4.7±1.1	10.2±0.5	**429.175**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.001*	**0.001***	**0.001***	**0.001***	**0.001***	**0.001***
WMS	**Digits total**	9.1±2.1	10.7±1.0	8.4±1.4	12.0±1.1	**64.737**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.001*	**0.016***	**0.001***	**0.01***	**0.001***	**0.001***
WMS	**Associate learning**	17.3±1.4	17.7±1.1	14.7±1.3	19.2±0.9	**121.967**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.080	0.001*	0.001*	0.001*	**0.001***	**0.001***
WMS	**Visual reproduction**	8.4±0.9	10.6±0.7	6.7±0.7	11.6±0.8	**380.058**	**0.001***
Group Comparison		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
		0.001*	**0.001***	**0.001***	**0.001***	**0.001***	**0.001***

Data are presented as mean ± SD

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Positive symptoms, overall psychopathology, and total score were statistically significantly different (higher in the initial episode group), while negative symptoms were statistically significantly different (higher after one year of follow-up). Table 5

Table (5): Symptoms follow up after one year.

PANSS	Mean ± S.D			Range			T	P
PANSS P							**6.157**	
Group I	26.7	±	4.2	20.0	-	37.0		**0.001***
Group V	23.8	±	3.2	18.0	-	32.0		
PANSS N								
Group I	19.8	±	4.4	13.0	-	29.0	**-3.169**	**0.001***
Group V	21.7	±	3.6	13.0	-	29.0		
PANSS G								
Group I	34.1	±	4.0	25.0	-	40.0	**7.496**	**0.001***
Group V	30.3	±	3.0	22.0	-	37.0		
PANSS T								
Group I	80.1	±	7.0	55.0	-	89.0	**3.559**	**0.012***
Group V	75.7	±	6.7	61.0	-	87.0		

Data are presented as mean ± SD

Total IQ, TMT B, number of categories, number of preservative errors, percentage of conceptual level, number of accurate cards, comprehension and management branch, strategic area, and information (higher in the follow-up group) were all statistically different. Table 6

Table (6): Cognitive follow up by Wechsler Adult Intelligence Scale (WAIS), Trail Making Test A and B, Wisconsin Card Sorting test, BVRT, MESCIT, WMS.

		Group I	Group V	t	P
WAIS		105.1±10.3	106.8±9.5	**-2.264**	**0.030***
TMT A		58.1±15.7	55.4±12.9	**1.516**	**0.139**
TMT B		133.6±27.9	122.9±22.9	**7.303**	**0.001***
WCST	**No. of categories completed**	3.2±1.2	3.5±1.0	**-3.247**	**0.003***
	No. Of preservative errors	10.4±5.1	8.8±3.2	**2.580**	**0.014***
	Percent of Conceptual Level Responses	55.1±14.7	57.6±14.0	**-2.120**	**0.041***
BVRT	**No. of correct cards**	6.3±1.1	6.5±0.9	**-3.174**	**0.003***
	No. of errors	5.4±1.6	5.3±1.4	**1.861**	**0.071**
MESCIT	**Perception branch**	48.4±3.2	47.7±3.7	0.465	0.645

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	Facilitating branch	40.5±3.5	41.0±3.6	1.668	0.104
	Understanding branch	42.5±2.0	43.4±2.5	-8.350	0.001*
	Management branch	45.3±3.8	46.7±3.4	2.269	0.030*
	Experiential area	44.5±2.2	44.4±2.2	1.750	0.089
	Strategic area	43.8±2.4	45.0±2.6	-2.911	0.006*
	MSCEIT total	44.1±1.9	44.7±1.9	-1.727	0.093
WMS	**Information**	5.1±0.3	5.2±0.4	**-2.092**	**0.044***
	Orientation	5.0±0.0	5.0±0.0		
	Mental control	6.3±0.8	6.3±1.0	**0.925**	**0.361**
	Logical memory	5.4±0.9	5.8±1.0	**0.990**	**0.329**
	Digits total	9.0±2.0	8.8±1.2	**0.961**	**0.343**
	Associate learning	17.3±1.4	17.6±0.9	**-1.227**	**0.228**
	Visual reproduction	8.4±1.0	8.7±0.9	**-0.572**	**0.571**

Data are presented as mean ± SD

WAIS and TMT(A) have negative correlations with negative scores, positive correlations with positive scores and total scores, and negative correlations with negative scores and total scores for the WCST (number of categories completed and conceptual level answer percentage). In the BVRT, the number of correct cards correlates negatively with the total score, while the number of errors correlates positively with the general and total scores. In the MESCIT, the facilitating branch and experiential area correlate negatively with the positive score. In the WMS, the mental control, logical memory, and digits total correlate negatively with the positive scores. Table 7

Table (7): Correlation between symptoms and cognitive functions among group I III, and V

	Group I			
	PANSS-P	**PANSS-N**	**PANSS-G**	**PANSS-T**
WAIS				
R	0.089	-0.552	-0.109	-0.391
P	0.539	0.001	0.452	0.005*
TMT				
TMT A				
R	-0.087	0.716	0.067	0.452
P	0.546	0.001*	0.643	0.001*

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TMT B				
R	0.007	0.630	0.174	0.495
P	0.964	0.001*	0.228	0.001*
WCST				
no. of categories completed				
r	-0.027	-0.362	-0.125	-0.364
P	0.852	0.010*	0.389	0.009*
No. of preservative errors				
R	-0.051	0.150	-0.002	0.096
P	0.726	0.297	0.992	0.508
Conceptual Level Responses Percent				
r	0.030	-0.339	-0.083	-0.295
P	0.835	0.016*	0.566	0.038*
BVRT				
No. of correct cards				
r	-0.080	-0.269	-0.255	-0.385
P	0.581	0.059	0.074	0.006*
No. of errors				
R	0.121	0.211	0.356	0.451
P	0.401	0.140	0.011*	0.001*
MESCIT				
Perception branch				
r	0.058	-0.055	-0.048	0.019
P	0.689	0.704	0.742	0.897
Facilitating branch				
r	-0.037	-0.293	0.080	-0.187
P	0.798	0.039*	0.581	0.193
Understanding branch				
r	-0.168	-0.037	-0.189	-0.222
P	0.243	0.800	0.188	0.122
Management branch				
r	-0.069	-0.061	-0.111	-0.153
P	0.634	0.673	0.443	0.289
Experiential area				
r	0.071	-0.300	0.008	-0.138
P	0.625	0.034*	0.957	0.340
Strategic area				
r	-0.149	-0.053	-0.172	-0.221
P	0.302	0.715	0.232	0.124
MSCEIT total				
r	-0.071	-0.192	-0.119	-0.229
P	0.625	0.183	0.412	0.110
Information				
r	0.084	-0.024	-0.018	0.034
P	0.562	0.869	0.904	0.814
Mental control				
r	0.090	-0.416	0.071	-0.150
P	0.536	0.003*	0.623	0.297
Logical memory				
r	0.192	-0.504	-0.070	-0.233
P	0.182	0.001*	0.631	0.103
Digit's total				
r	0.068	-0.488	-0.227	-0.376
P	0.637	0.001*	0.113	0.007*

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Associate learning				
r	0.148	-0.466	-0.194	-0.316
P	0.304	0.001*	0.178	0.025*
Visual reproduction				
r	0.197	-0.430	0.078	-0.099
P	0.171	0.002	0.589	0.494

Group I demonstrates that WAIS positively correlates with education, TMT (A and B) negatively correlates with education, WCST positively correlates with education (number of categories completed and percent of conceptual level response), BVRT positively correlates with education (number of correct cards), negatively correlates with education (number of errors), positively correlates with education (logical memory and associate learning), and negatively correlates with education (visual reproduction). Group II demonstrates that WAIS: favourably corresponds with education, TMT-B: Education has a negative correlation, In the WCST, the percentage of conceptual level responses and the number of correct cards positively correlated with education, but the number of preservative errors adversely correlated with education. In the BVRT, the number of correct cards positively correlated with education while the number of errors negatively correlated with education. WMS: Visual reproduction and education have a positive correlation. Group III demonstrates a positive correlation between WMS: logical memory and schooling. Table 8

Table (8): Correlation between age and education years with cognitive functions of the patients and the first degree relatives

	Group I		**Group II**		**Group III**	
	Age	**Education**	**Age**	**Education**	**Age**	**Education**
WAIS						
r	-0.081	0.373	-0.097	0.601	-0.021	0.147
P	0.575	0.008*	0.504	0.001*	0.887	0.307
TMT A						
r	0.213	-0.524	0.128	-0.526	-0.059	-0.150
P	0.138	0.001*	0.376	0.000	0.686	0.299
TMT B						
r	0.157	-0.486	0.080	-0.645	-0.043	-0.028
P	0.275	0.001*	0.579	0.001*	0.765	0.848
no. of categories completed						
r	-0.110	0.352	-0.106	0.577	0.114	0.218
P	0.447	0.012*	0.465	0.001*	0.431	0.128

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No0. of preservative errors						
r	-0.043	-0.134	-0.077	-0.430	0.190	0.199
P	0.766	0.355	0.594	0.002*	0.186	0.165
Conceptual Level Responses Percent						
r	-0.035	0.366	-0.148	0.612	0.007	0.209
P	0.809	0.009*	0.305	0.001*	0.959	0.145
No0. of correct cards						
r	-0.041	0.347	-0.213	0.497	0.101	0.077
P	0.778	0.014*	0.137	0.000	0.486	0.597
No0. of errors						
r	0.033	-0.404	0.020	-0.418	-0.145	-0.141
P	0.819	0.004*	0.892	0.003**	0.313	0.329
MESCIT						
Perception branch						
r	0.200	-0.007	-0.010	-0.053	0.052	0.139
P	0.164	0.960	0.945	0.714	0.718	0.337
Facilitating branch						
r	0.031	0.145	0.014	0.009	-0.091	0.070
P	0.829	0.316	0.925	0.952	0.529	0.628
Understanding branch						
r	0.179	0.131	-0.042	-0.012	-0.249	0.106
P	0.213	0.364	0.773	0.936	0.081	0.463
Management branch						
r	0.238	0.191	-0.124	-0.046	-0.148	0.147
P	0.096	0.183	0.392	0.752	0.305	0.308
Experiential area						
r	0.107	0.098	-0.053	0.010	-0.070	0.111
P	0.459	0.496	0.713	0.946	0.634	0.446
Strategic area						
r	0.244	0.180	-0.104	-0.033	-0.183	0.198
P	0.088	0.210	0.470	0.820	0.209	0.173
MSCEIT total						
r	0.246	0.187	-0.120	0.070	-0.188	0.157
P	0.086	0.193	0.406	0.630	0.192	0.277
Information						
r	-0.145	-0.133	-0.064	0.112	0.059	-0.031
P	0.315	0.358	0.660	0.438	0.686	0.829
Mental control						
r	-0.077	0.417	-0.149	-0.323	0.061	0.174
P	0.597	0.003	0.303	0.022	0.674	0.227
Logical memory						
r	-0.133	0.425	-0.367	-0.031	-0.001	0.293
P	0.359	0.002*	0.009	0.832	0.996	0.039*
Digit's total						
r	-0.086	0.382	0.125	-0.125	0.040	0.018
P	0.554	0.006*	0.386	0.387	0.785	0.904
Associate learning						
r	-0.110	0.429	-0.030	-0.226	0.042	0.152
P	0.446	0.002*	0.835	0.114	0.773	0.293
Visual reproduction						
r	-0.405	0.074	-0.268	0.290	-0.145	-0.018
P	0.003*	0.608	0.060	0.041*	0.314	0.904

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Discussion

The first episode patients' BVRT, WMS, and MESCIT test results revealed statistically significant differences in general IQ, attention, executive function, memory, and social cognition between patients and controls.According to a study by Yuan et al. [15], people with first-episode schizophrenia and drug-naive schizophrenia suffer from severe cognitive impairment.

Our results are remarkably similar to those of Man et al., [16] who discovered that our results were the same as theirs (RBANS). All five RBANS subscales—immediate memory, visuospatial/constructional memory, language, attention, and delayed memory—were considerably worse for patients. It was discovered that there is a strong negative link between the PANSS negative subscale score and the immediate memory and language index.

Our findings are consistent with those of Li et al., [17]. In tests examining processing speed, focus and alertness, short- and long-term memory, reasoning/problem-solving, social cognition, and a composite score, it was found that FES patients performed cognitively worse than healthy controls.

In a series of cognitive tests, it was discovered that patients with first-episode drug-nave (FEDN) performed less well than healthy controls. Our findings (words, colours, and interference) were consistent with those of Wenhuan et al. [18]. According to the study, PANSS unpleasant sensations were associated with lower VFT actions subscale and Stroop word scores in patients.

According to Aydn and colleagues [19], the results were equal in 28 healthy males from multiplex families, 30 healthy males from simplex families, and a control group of 30 men with no family history of schizophrenia. Only one sibling was included in each study sample in order to reduce the overrepresentation of alleged familial genetic loading and the requirement for statistical correction (such as variance component analysis).

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On all four assessments, the study groups performed noticeably worse than the control group. The B time, A error, and B error results from the Trail Making Test demonstrate a statistically significant difference between the two research groups.

In every WCST category, the control group outscored both family groups. No statistically significant differences between the two groups with and without familial genetic loading were discovered in any of the tests

There was evidence of a statistically significant difference between TMT subgroups with low family genetic loading and those with high family genetic loading. Both family genetic loading 1 and family genetic loading 2 are used. In comparison to the group of simplex families, the multiplex families had a shorter B duration, a lower A error, and a lower B error rate

There were no statistically significant differences between the two groups in the Ling et al. [20] study in terms of gender, age, or education.

According to Chan [21], 60 healthy volunteers of the same age and intellectual aptitude participated in tests aimed to investigate specific components of executive function, compared to 78 first-time medication-naive schizophrenia patients

Neurocognitive abilities of first-onset schizophrenia patients were shown to be significantly impaired when compared to healthy controls. But when several executive functions were taken into account, this clinical group only revealed a specific deficit in the sustained component, as well as a deteriorated performance in attention allocation and planning. However, those with long-term health issues experienced a continuous decline in a number of metrics.

In terms of attention, executive dysfunction, and memory performance, we discovered a statistically significant difference between first-degree relatives and the control group (TMT A and B, WCST number of categories completed and number of preservative errors,

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MESCIT perception branch and experiential area, WMS mental control, logical memory, total number of digits, associate learning, visual reproduction). Except for the sensory and experience regions (social cognition), there were no statistically significant differences in overall IQ, WCST (% of conceptual level response), BVRT, or MESCIT

Hou et al. (2016) found that first-degree relatives of individuals with schizophrenia who were also at high risk for psychosis (UHR) had cognitive functioning that was comparable to that of individuals with first-onset schizophrenia, first-degree relatives of individuals who did not meet UHR criteria (FDR), and healthy control subjects (HC). When compared to the HC, FDR, and UHR groups, they discovered a decline in processing speed, attention, psychomotor skills, and verbal memory in the FE groups.

According to a study by Faraone [22], the probands and relatives of patients from both simplex and multiplex families showed deficits in the WCST performance of the two previous family investigations that determined whether patients were simplex or multiplex. It was challenging to draw conclusions from Birkett and colleagues' [23] investigation since there were only 30–50 participants in each kind of family and few controls used to standardise the z score. (40 and 100, respectively, vs. 440 in this study) This needs to be mentioned

The perseverative response and perseverative mistakes among the nine WCST scores examined were found to have the biggest effects on family aggregation. Parents and siblings in multiplex families exhibit greater impairments on these tests when compared to individuals without schizophrenia, and these deficiencies persist even after the patient has left the family. Consistent heritability estimates across two types of families also lend credence to the idea. The categories obtained, the other traditional indicator used in this study, did not show any strong familial ties

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According to Sosa et al. [24], the Social Cognitive Scale and an ad hoc questionnaire were used to assess emotional processing, social perception, and attributional style in a Spanish population.

The overall social cognition scores of the three groups varied, and this revealed that patients and relatives fared worse than controls and each other, respectively. However, no discernible correlations were found between the connections and their controls.

When it comes to processing speed, attention, working memory, and language learning skills, the sick group and the control group in the current study differed significantly from one other. Only the speed processing and attentiveness parts of the MCCB revealed statistically significant variations in mean scores between patients and their parents.

In a study, the parents of patients were contrasted with the control group. There was only one area where the parents of patients and the control group were different in the MCCB's verbal learning.

An further study in the Arab region was conducted in Casablanca, Morocco, by El Hamaoui et al. [25] at the Centre of Psychiatry at Ibn Rochd University.

In total, 90 participants from three groups of 30 each—a group of schizophrenia patients, a group of their siblings, and a control group—participated in this study. The Global Functioning Scale (GFS) and the Positive and Negative Syndrome Scale (PANSS) were applied. A copy of the WCST was sent to each of the three study teams

In the study by El Hamaoui et al., people with schizophrenia and their siblings performed noticeably lower on the WCST than control subjects. According to [25], the sick group performed significantly worse on the WCST than the other two groups. In terms of test results, siblings performed no better than the control group.

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The results of this study revealed that a variety of factors, including age, gender, educational level, disease duration, and length of therapy, significantly influenced how well participants performed on the WCST exam.

Their findings suggest that WCST performance in siblings of schizophrenia patients can be viewed as a schizophrenia vulnerability marker in siblings of schizophrenia patients because both patients with schizophrenia and their non-mentally ill siblings experience impaired executive function

The WAIS, TMT, and WCST tests of executive function were used to gauge intelligence. All of these measurements were higher in patients with the first episode than in patients with repeated episodes (social cognition), with the exception of WMS (memory function), BVRT (visual memory), and MESCIT (social cognition).

While BPRS scores were significantly lower than FES, both social cognitive (emotional intelligence exam) and neurocognitive (trail-making A test) abilities were far beyond those of FES. Our findings are in disagreement with this study's conclusions. Cognitive function was demonstrated to rapidly deteriorate in the first episode of FES in patients with first episode schizophrenia.

In earlier investigations by Bozikas and Andreou [26], it was demonstrated that fluency, trail marking A, digital sequencing, verbal learning, maze, and emotional intelligence were all much worse in CSS than FES. The results of this study, however, do not agree with those of the preceding study

The MATRICS Consensus Cognitive Battery was utilised to assess each group, according to Yang et al.'s [27] findings. The positive and negative syndrome scale was used to gauge how severe the patient's schizophrenic symptoms were.

Even after correcting for gender, age, and educational level, schizophrenia patients still performed worse than controls on a variety of cognitive assessment tasks. In addition to

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having lower processing speed, visual learning and memory, reasoning and problem-solving scores, first and chronic patients had lower comp MCCB total scores than the controls. There was no statistically significant difference between individuals who had previously visited a clinic and those who had never done so. This study suggests that we were mistaken about that.

Additionally, FSCZ and CSCZ patients demonstrated statistically significant cognitive deficits. On any cognitive test, there were no statistically significant differences between HRF and controls. Most assessments of the severity of cognitive deficits in schizophrenia patients did not significantly differ between FSCZ and CSCZ.Patients with CHR, FE-Sz, and CH-Sz performed much worse on cognition tests than healthy people, according to Zhang et al., [28].

Their findings indicate that the cognitive impairment levels in FESz and CSz are comparable. When FESz and CSz are contrasted with NP, we clearly see a reduction in all MCCB domains.The MCCB performance profiles for FESz and CSz were found to be nearly identical, with a few minor exceptions.The MCCB Overall Composite scores for the two patient groups, FESz and CSz, did not substantially differ from one another. The undamaged range was highly underrepresented in both patient categories, although moderate and severe impairment were overrepresented.

In this group of FESz patients, 59% were classified as having moderate to severe cognitive impairment. The NP performed below average on the MCCB Overall Composite score as a whole. Only 17% of the patients with FESz in our sample were found to be performing at or above the typical level for their illness.

Therefore, there were no statistically significant differences in cognitive deficits between the two patient groups according to our study. What we found stands in sharp contrast to this.Our results showed that pharmacologically stabilised outpatients with schizophrenia at different

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disease stages were unable to perform in working memory (WM) activities as well as healthy controls. Their delayed information processing is thus consistent with the idea that patients are having trouble encoding information.[29].

There were no statistically significant differences in WM characteristics or severity subscales between chronic schizophrenia patients and first-episode schizophrenia patients when patient groups were compared.In neither group were there statistically significant correlations between demographic factors and WM performance. This conservative view ignores the little but substantial variations between these two versions. For individuals with chronic schizophrenia, hospitalisations, the length of the illness, and the accuracy variables (omissions, false-alarms, accuracy index) and their impact sizes all showed significant associations, indicating a likely progression of the condition over time.

According to Addington and Addington [30], the Calgary Early Psychosis Treatment and Prevention Programme recruited 111 FE patients, of whom it was discovered that the majority had schizophrenia.

The performance of FE patients occasionally seems to be marginally better than that of ME patients, although it is still within the impaired range. In contrast, schizophrenia patients are known to have cognitive impairments. It appears that the WCST is an exception. Early in the course of the disease, those with more severe deficiencies seem to gain from this activity.

Conclusions:

This study compared the cognitive function of first episode schizophrenic patients with that of multiple schizophrenic patients, as well as examined cognitive function in patients with first episode schizophrenia and the impact of treatment on first degree. In terms of overall IQ, attention, executive function, memory function, and social cognition, patients with the first episode outperformed patients with several episodes.

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References:

1. Seidman LJ, Shapiro DI, Stone WS, Woodberry KA, Ronzio A, Cornblatt BA, et al. Association of neurocognition with transition to psychosis: baseline functioning in the second phase of the North American Prodrome Longitudinal Study. JAMA psychiatry. 2016;73:1239-48.

2. Gur RE, Calkins ME, Gur RC, Horan WP, Nuechterlein KH, Seidman LJ, et al. The Consortium on the Genetics of Schizophrenia: neurocognitive endophenotypes. Schizophr Bull. 2007;33:49-68.

3. Fioravanti M, Carlone O, Vitale B, Cinti ME, Clare L. A meta-analysis of cognitive deficits in adults with a diagnosis of schizophrenia. Neuropsychol Rev. 2005;15:73-95.

4. Bilder RM, Volavka J, Czobor P, Malhotra AK, Kennedy JL, Ni X, et al. Neurocognitive correlates of the COMT Val(158)Met polymorphism in chronic schizophrenia. Biol Psychiatry. 2002;52:701-7.

5. Heaton RK, Gladsjo JA, Palmer BW, Kuck J, Marcotte TD, Jeste DV. Stability and course of neuropsychological deficits in schizophrenia. Arch Gen Psychiatry. 2001;58:24-32.

6. Zaytseva Y, Korsakova N, Agius M, Gurovich I. Neurocognitive functioning in schizophrenia and during the early phases of psychosis: targeting cognitive remediation interventions. Biomed Res Int. 2013;2013:819587.

7. First MB, Williams JB, Karg RS, Spitzer RL. SCID-5-CV: Structured clinical interview for DSM-5 disorders: Clinician version. 2016.

8. Melika L. Wechsler adult intelligence scale—Arabic version. El-Nahda Arabic Library. 1996.

9. Kay SR, Fiszbein A, Opler LA. The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophrenia bull. 1987;13:261-76.

UNDER PEER REVIEW

10. Mueller ST, Piper BJ. The psychology experiment building language (PEBL) and PEBL test battery. J Neurosci Methods. 2014;222:250-9.

11. Wechsler D. Wechsler memory scale-revised. Psychological Corporation. 1987.

12. Robinson-Whelen S. Benton Visual Retention Test performance among normal and demented older adults. Neuropsychology. 1992;6:261.

13. Reitan RM. Validity of the Trail Making Test as an indicator of organic brain damage. Perceptual and motor skills. 1958;8:271-6.

14. Mayer JD, Salovey P, Caruso DR. Mayer-Salovey-Caruso emotional intelligence test (MSCEIT) users manual. Psychiatry res. 2002.

15. Yuan X, Wang Y, Li X, Jiang J, Kang Y, Pang L, et al. Gut microbial biomarkers for the treatment response in first-episode, drug-naïve schizophrenia: a 24-week follow-up study. Transl Psychiatry. 2021;11:422.

16. Man L, Lv X, Du X-D, Yin G, Zhu X, Zhang Y, et al. Cognitive impairments and low BDNF serum levels in first-episode drug-naive patients with schizophrenia. Psychiatry res. 2018;263:1-6.

17. Li M, Liu J, Bi Y, Chen J, Zhao L. Potential Medications or Compounds Acting on Toll-like Receptors in Cerebral Ischemia. Curr Neuropharmacol. 2018;16:160-75.

18. Huang W, Hall SJ. Optimized high-throughput methods for quantifying iron biogeochemical dynamics in soil. Geoderma. 2017;306:67-72.

19. Aydın O, Lysaker PH, Balıkçı K, Ünal-Aydın P, Esen-Danacı A. Associations of oxytocin and vasopressin plasma levels with neurocognitive, social cognitive and meta cognitive function in schizophrenia. Psychiatry Res. 2018;270:1010-6.

20. Ling T, Guo H, Zou X. Effect of peroral endoscopic myotomy in achalasia patients with failure of prior pneumatic dilation: a prospective case–control study. J Gastroenterol Hepatol. 2014;29:1609-13.

UNDER PEER REVIEW

21. Chan RC, Chen EY, Law CW. Specific executive dysfunction in patients with first-episode medication-naïve schizophrenia. Schizophr Res. 2006;82:51-64.

22. Faraone SV, Seidman LJ, Kremen WS, Toomey R, Pepple JR, Tsuang MT. Neuropsychologic functioning among the nonpsychotic relatives of schizophrenic patients: the effect of genetic loading. Biol Psychiatry. 2000;48:120-6.

23. Birkett P, Sigmundsson T, Sharma T, Toulopoulou T, Griffiths TD, Reveley A, et al. Reaction time and sustained attention in schizophrenia and its genetic predisposition. Schizophr Res. 2007;95:76-85.

24. Sosa JTR, Santiago HG, Cubas AT, Navarro MW, Pérez PL, Cazorla LMG, et al. Social cognition in patients with schizophrenia, their unaffected first degree relatives and healthy controls. Comparison between groups and analysis of associated clinical and sociodemographic variables. Revista de Psiquiatría y Salud Mental (English Edition). 2013;6:160-7.

25. El Hamaoui Y, Yaalaoui S, Chihabeddine K, Boukind E, Moussaoui D. Depression in mothers of burned children. Arch Womens Ment Health 2006;9:117-9.

26. Bozikas VP, Kosmidis MH, Kafantari A, Gamvrula K, Vasiliadou E, Petrikis P, et al. Community dysfunction in schizophrenia: rate-limiting factors. Prog Neuropsychopharmacol Biol Psychiatry. 2006;30:463-70.

27. Yang Y, Liu Y, Wang G, Hei G, Wang X, Li R, et al. Brain-derived neurotrophic factor is associated with cognitive impairments in first-episode and chronic schizophrenia. Psychiatry Res. 2019;273:528-36.

28. Zhang Z, Zheng H, Liang K, Wang H, Kong S, Hu J, et al. Functional degeneration in dorsal and ventral attention systems in amnestic mild cognitive impairment and Alzheimer's disease: an fMRI study. Neurosci Lett. 2015;585:160-5.

UNDER PEER REVIEW

29. Hartman M, Steketee MC, Silva S, Lanning K, Andersson C. Wisconsin Card Sorting Test performance in schizophrenia: the role of working memory. Schizophrenia res. 2003;63:201-17.

30. Addington J, Addington D. Neurocognitive and social functioning in schizophrenia: a 2.5 year follow-up study. Schizophr Res. 2000;44:47-56.

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