



Research Article

Assessment and Comparison of Cognitive Function in Offspring of Patients Diagnosed with Schizophrenia and Alcohol Dependence Syndrome

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Received: 23-09-2025

Accepted: 06-10-2025

Available online: 20-10-2025

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Medical and Pharmaceutical Research

ABSTRACT

Background: Cognitive impairments are frequently observed in the offspring of individuals with psychiatric disorders, particularly schizophrenia and alcohol dependence syndrome (ADS), due to genetic and environmental factors. Early identification of these deficits is essential for timely intervention.

Aim: To assess and compare cognitive functioning in offspring of patients diagnosed with schizophrenia and ADS.

Methods: A cross-sectional study was conducted with 62 participants (31 in each group), aged 12 years and above. Cognitive functioning was assessed using the Mini- Mental State Examination (MMSE), Wechsler Intelligence Scale for Children (WISC- IV), and Wechsler Adult Intelligence Scale (WAIS- IV). Statistical analyses included Mann-Whitney U tests and Pearson's correlation using SPSS version 20.

Results: Offspring of schizophrenia patients demonstrated significantly lower scores in working memory (mean = 56.09, $p = 0.001$), perceptual reasoning (mean = 89.36, $p = 0.003$), and verbal comprehension (mean = 90.64, $p = 0.026$) compared to those of ADS patients. A near-significant difference was observed in Full-Scale IQ ($p = 0.058$). Freedom from distractibility was also significantly lower in the schizophrenia group ($p = 0.005$). No significant differences were found in MMSE scores. Duration of parental illness showed weak correlation with cognitive performance.

Conclusion: Schizophrenia-offspring exhibit broader and more severe cognitive impairments than ADS-offspring, indicating stronger heritable neurodevelopmental vulnerability. Early cognitive screening and targeted interventions are recommended for these high-risk populations.

Keywords: Cognitive function, schizophrenia, alcohol dependence, offspring, WAIS- IV, WISC-IV, working memory, verbal comprehension.

INTRODUCTION

Cognitive functioning encompasses essential mental processes such as attention, memory, language, executive function, and problem-solving, which are foundational to learning, adaptive behavior, and social integration. Typically, these abilities follow a predictable developmental trajectory; however, early disruptions—especially those linked to parental psychiatric disorders—can significantly affect this process.

Children of individuals with schizophrenia or alcohol dependence syndrome (ADS) represent high-risk populations for cognitive impairments, shaped by both genetic predisposition and environmental adversity. In schizophrenia, cognitive dysfunction is a core feature, often predating clinical symptoms. Studies have shown that 60–80% of schizophrenia risk is heritable, and cognitive deficits in offspring—particularly in working memory, executive function, and attention—are considered stable endophenotypes (Tsuang et al., 1999; Gottesman & Gould, 2003). Neurophysiological abnormalities such as reduced P300 amplitude, impaired pre-pulse inhibition (PPI), and oculomotor irregularities further support this risk (Nuechterlein et al., 2004; Jeon & Polich, 2003).

Similarly, offspring of alcohol-dependent parents also exhibit impairments in working memory, attention, and inhibitory control, often linked to both heritable neurocognitive traits and adverse exposures like prenatal alcohol, emotional neglect, and inconsistent caregiving (Hill et al., 2000; Gierski et al., 2013). Electrophysiological markers, such as reduced P300 and elevated EEG beta activity, may serve as biomarkers of risk in this group as well (Begleiter et al., 1984; Iacono & Malone, 2011).

Despite overlapping vulnerabilities, the cognitive profiles in these two groups may differ. While schizophrenia-offspring often present with global impairments across multiple domains, ADS-offspring more commonly display domain-specific deficits, especially in attention and impulse control. Understanding these differences is essential for early identification and the development of targeted interventions.

This study aims to assess and compare cognitive functioning in the offspring of individuals diagnosed with schizophrenia and ADS using standardized neuropsychological tools, providing insights into their respective cognitive risk profiles.

AIMS

To assess and compare the cognitive functions in the offspring of patients diagnosed with schizophrenia and Alcohol Dependence syndrome.

OBJECTIVES

- To assess the cognitive function in the offspring of patients diagnosed with schizophrenia.
- To assess cognitive function in the offspring of patients diagnosed with alcohol dependence syndrome.
- To compare the cognitive function of offspring of schizophrenia and alcohol dependence syndrome

MATERIAL AND METHOD

SOURCE OF DATA:

The study will be performed at BLDE (DU) Shri B.M. Patil Medical College Hospital and Research Centre, Vijayapura.

METHOD OF COLLECTION OF DATA:

INCLUSION CRITERIA

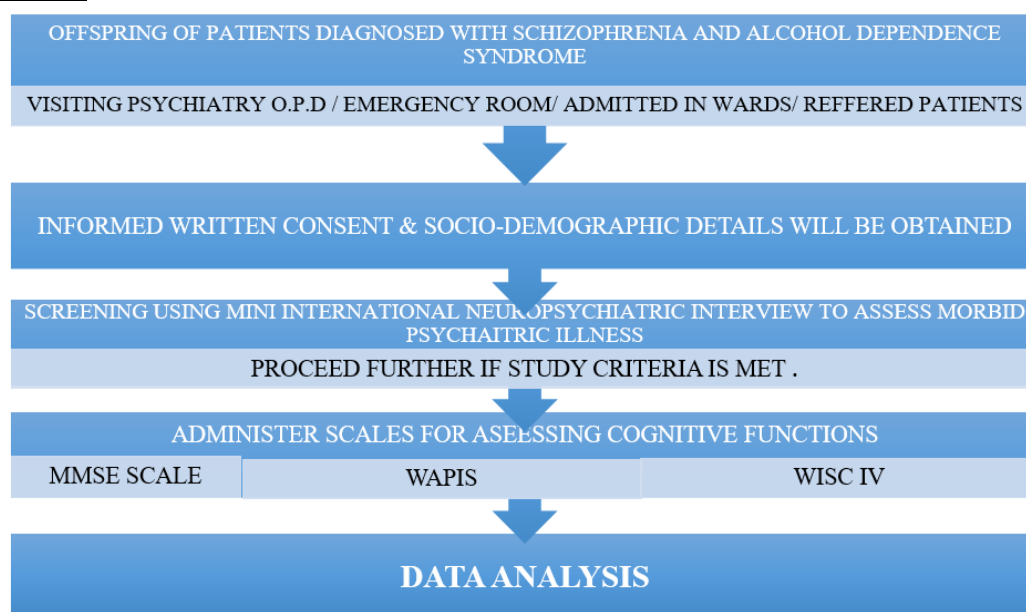
Any Offspring of patients diagnosed with either schizophrenia or alcohol dependence syndrome, aged 12 and above.

EXCLUSION CRITERIA

1. Offspring already diagnosed with any psychiatric illness.
2. Offspring with a history of alcohol use.
3. Offspring diagnosed with Intellectual Disability Disorder.
4. Any major medical illness that affects cognitive function.

STUDY DURATION: 24 MONTHS (May 2023- MAY 2025)

METHODOLOGY:



SAMPLING:

With the anticipated Prevalence of both illnesses, the study would require a sample size of 62(for each group 31, assuming equal group sizes), so to achieve a power of 85% for detecting a difference in Means: Inequality, t-tests - Means: Difference between two independent means (two groups) with 5% level of significance.

Statistical Analysis:

The data obtained will be entered into a Microsoft Excel sheet, and regression analyses cognitive performance will be performed. Using a statistical package for the social sciences (SPSS) (Version 20).

Results will be presented as Mean, SD, counts, percentages, and diagrams. The two groups will be compared for normally distributed continuous variables using an independent sample t-test. For not normally distributed variables, the Mann-Whitney U test is used. For Categorical variables, the two groups will be compared using the Chi-square test/Fisher's exact test. If $p < 0.05$, it will be considered statistically significant. All statistical data will be analyzed using a two-tailed test.

4.8 SCALES USED FOR ASSESSMENT:

1. Mini-Mental Status Examination
2. Wechsler intelligent scale for children IV
3. Wechsler Adult Intelligence Scale.

RESULTS

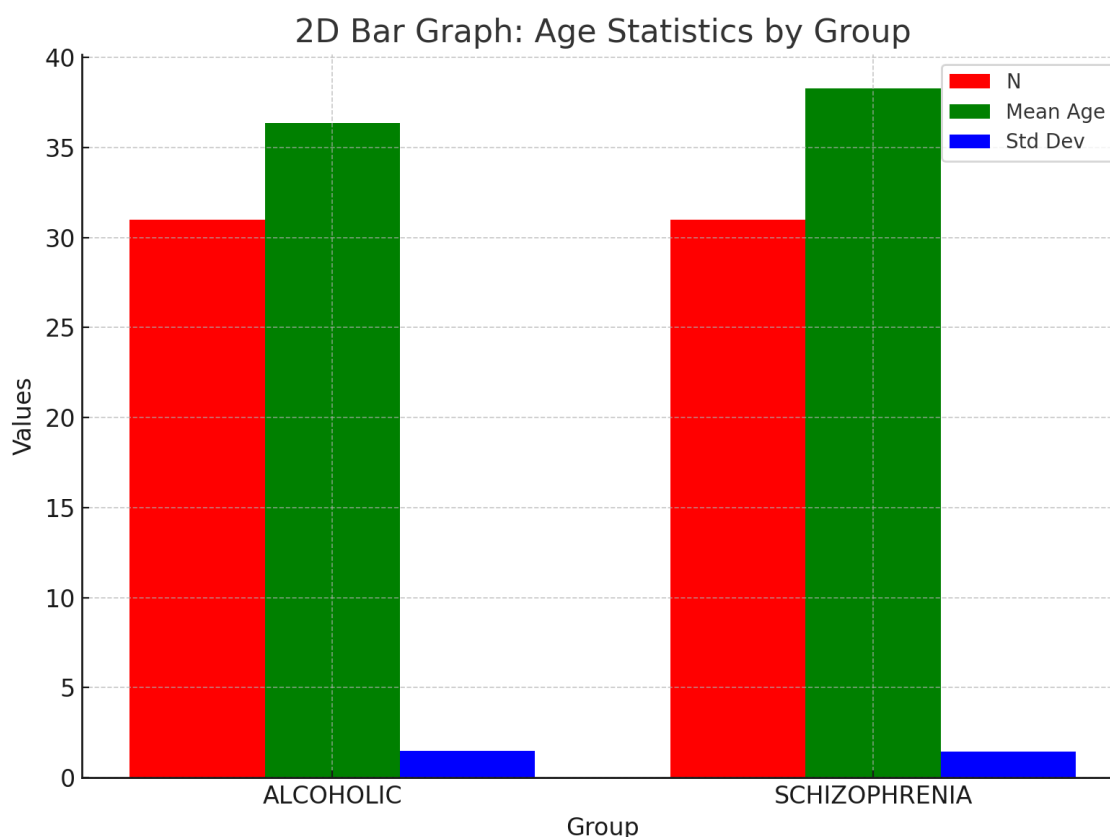
SOCIODEMOGRAPHIC PROFILE

AGE

Table 1: AGE

AGE	N	MEAN AGE	STD DEVIATION
OFFSPRINGS OF ALCOHOLIC	31	36.38	1.480
OFFSPRINGS OF SCHIZOPHRENIA	31	38.27	1.451

Graphical representation 1: AGE



Graph 1: AGE

SEX

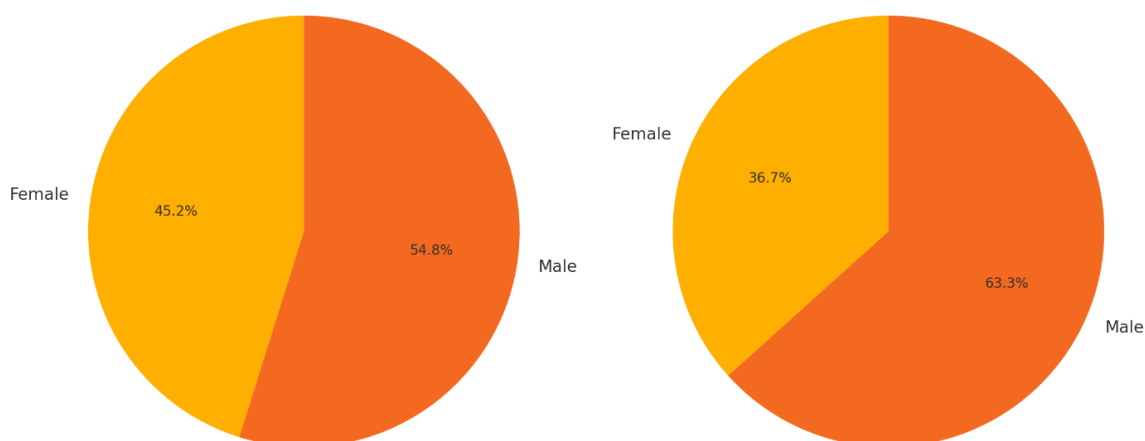
Table 2: SEX

SEX	OFFSPRINGS OF ALCOHOLICS	OFFSPRINGS OF SCHIZOPHRENIA	TOTAL
FEMALE	14	11	25
MALE	17	19	20
TOTAL	31	31	62

Graphical representation 2: SEX

Sex Distribution: Offsprings of Alcoholics

Sex Distribution: Offsprings of Schizophrenia



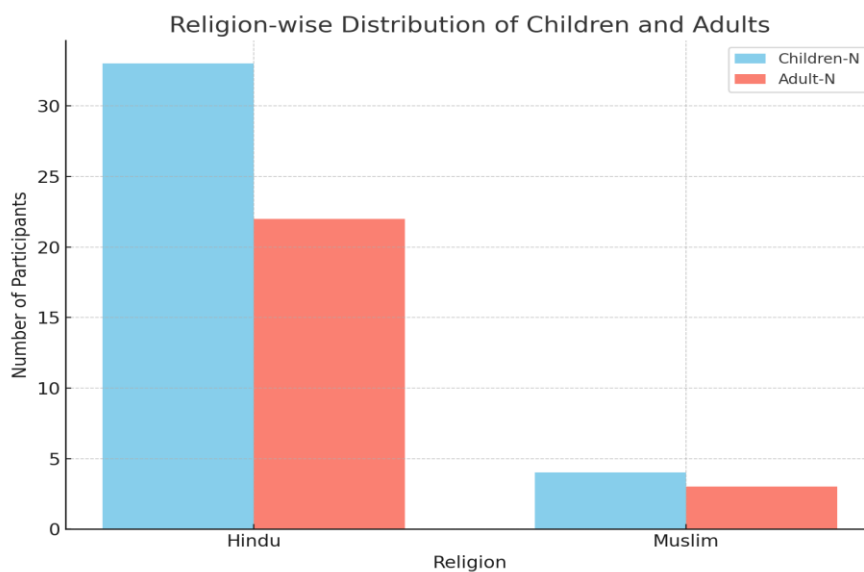
Graph 2: SEX

RELIGION

Table 3: RELIGION

RELIGION	CHILDREN-N	ADULT-N	TOTAL
HINDU	33	22	55
MUSLIM	4	3	7
TOTAL	37	25	62

Graphical representation 3: RELIGION

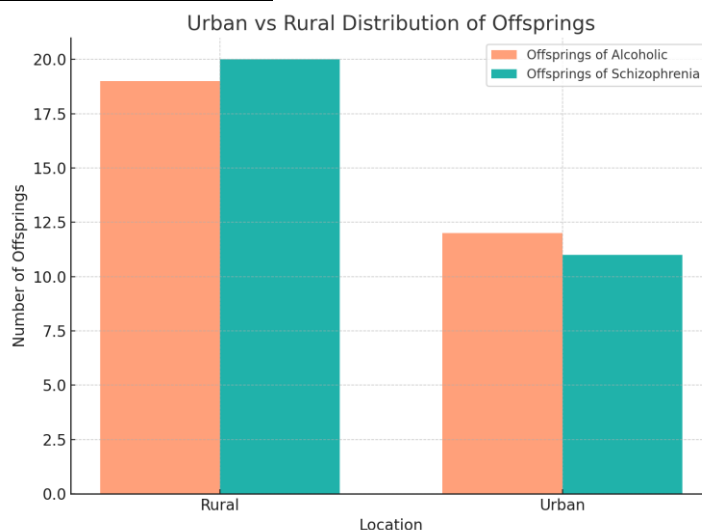


URBAN AND RURAL

Table 4: URBAN AND RURAL

	OFFSPRINGS OF ALCOHOLIC	OFFSPRINGS OF SCHIZOPHRENIA	TOTAL
RURAL	19	20	39
URBAN	12	11	23
TOTAL	31	31	62

Graphical representation 4: URBAN AND RURAL

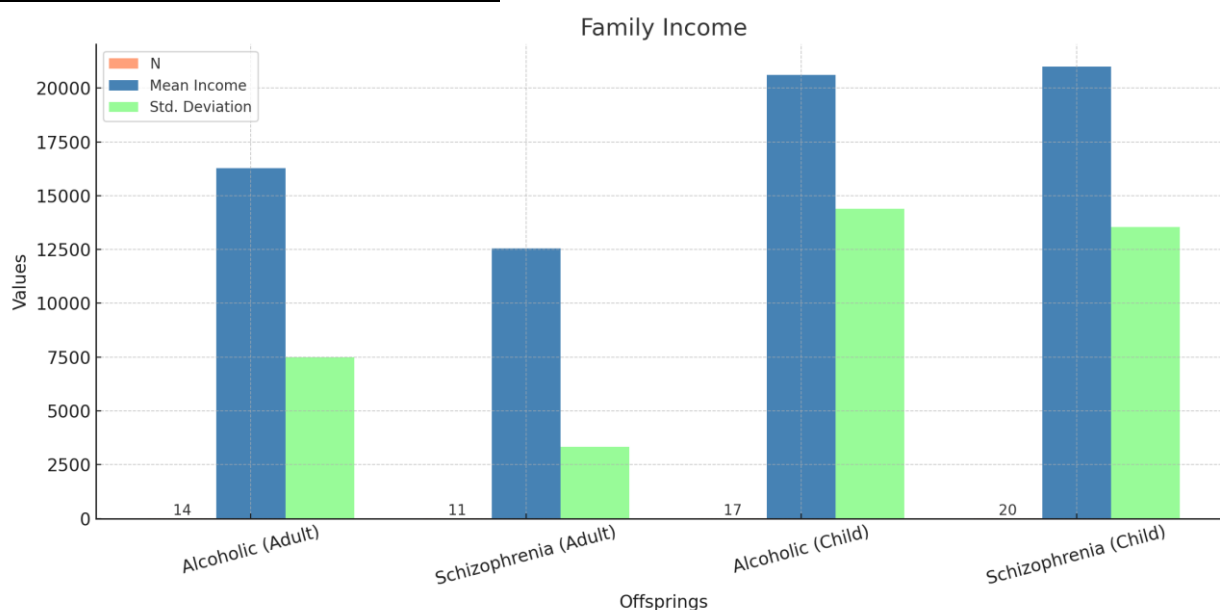


FAMILY INCOME

Table 5: FAMILY INCOME

Offsprings	N	Mean Income	Std. Deviation
Alcoholic (Adult)	14	16,285.71	7,487.72
Schizophrenia (Adult)	11	12,545.45	3,327.57
Alcoholic (Child)	17	20,617.65	14,393.50
Schizophrenia (Child)	20	21,000.00	13,549.13

Graphical representation 5: FAMILY INCOME

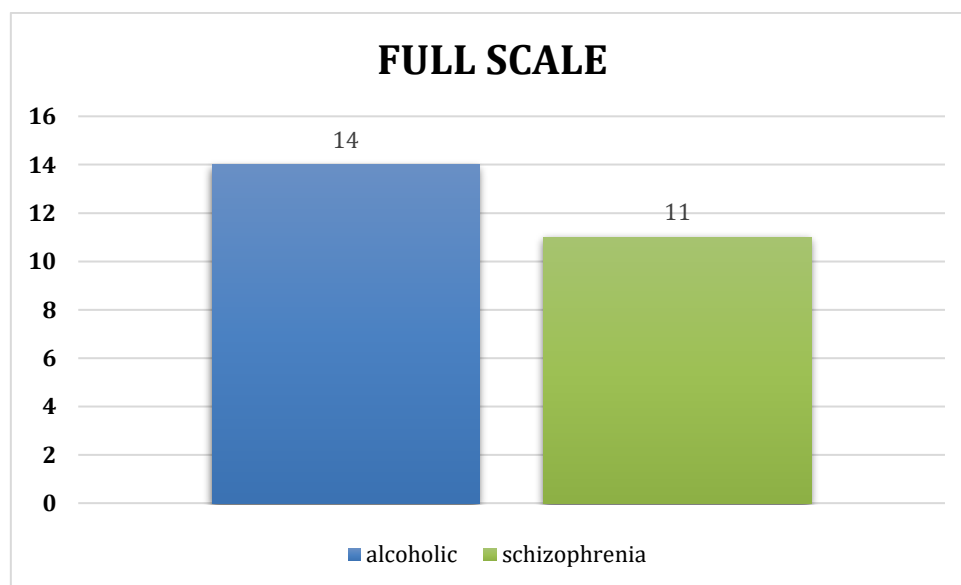


Graph 5: FAMILY INCOME

WAIS 4: Wechsler Adult Intelligence Scale 4 GROUP STATISTICS OF OFFSPRINGS OF ALCOHOLIC PARENTS VERSUS OFFSPRINGS OF SCHIZOPHRENIA(ADULT)

TABLE 6 Group Statistics

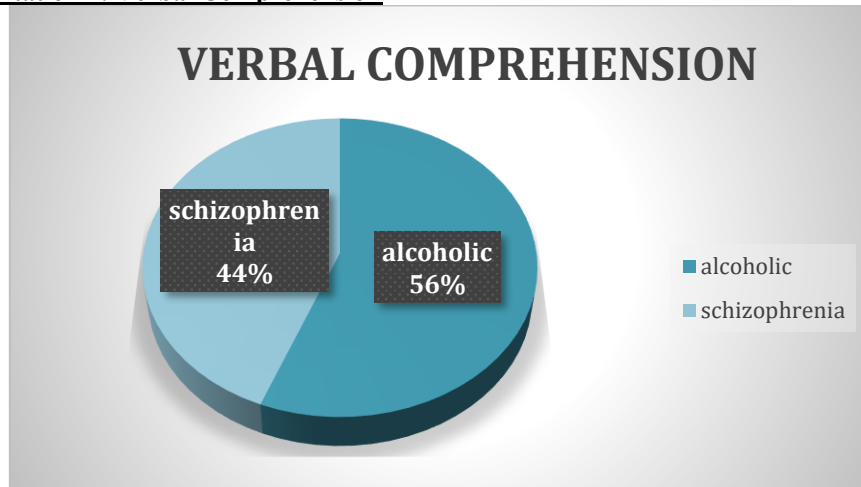
ADULT		N	MEAN	St. Deviation
FULL SCALE	OFFSPRINGS OF ALCOHOLIC	14	93.79	8.972
	OFFSPRINGS OF SCHIZOPHRENIA	11	87.27	6.857
VERBAL COMPREHENSION	OFFSPRINGS OF ALCOHOLIC	14	100.29	11.789
	OFFSPRINGS OF SCHIZOPHRENIA	11	90.64	7.379
PERCEPTUAL REASONING	OFFSPRINGS OF ALCOHOLIC	14	107.00	12.070
	OFFSPRINGS OF SCHIZOPHRENIA	11	89.36	10.984
WORKING MEMORY	OFFSPRINGS OF ALCOHOLIC	14	87.93	7.898
	OFFSPRINGS OF SCHIZOPHRENIA	11	56.09	30.517
PROCESSING SPEED	OFFSPRINGS OF ALCOHOLIC	14	101.86	11.818
	OFFSPRINGS OF SCHIZOPHRENIA	11	95.18	11.643
MMSE	OFFSPRINGS OF ALCOHOLIC	14	24.21	1.578
	OFFSPRINGS OF SCHIZOPHRENIA	11	23.82	1.328



Graph 6: Full Scale IQ

- Compares cognitive functioning; OFFSPRINGS OF ALCOHOLIC has a higher average IQ (93.79) than OFFSPRINGS OF SCHIZOPHRENIA (87.27).
- Near-significant difference ($p = 0.058$).

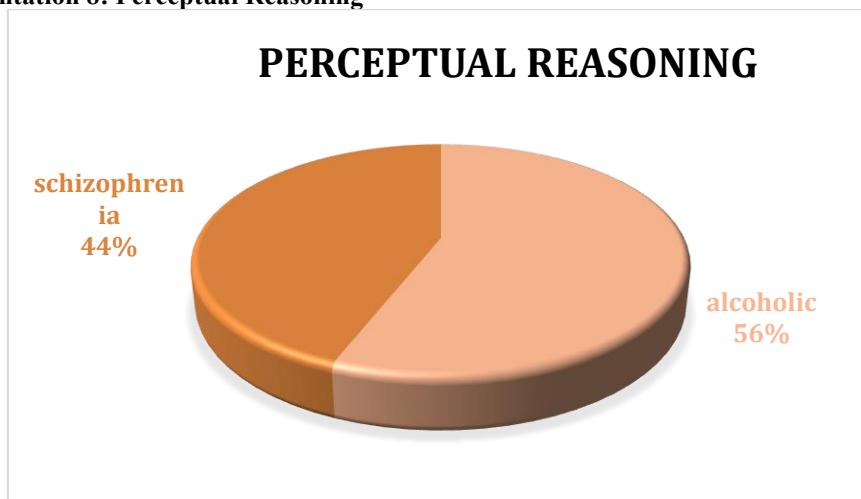
Graphical representation 7: Verbal Comprehension



Graph 7: Verbal Comprehension

- Significant difference ($p = 0.026$); OFFSPRINGS OF ALCOHOLIC performed better verbally.

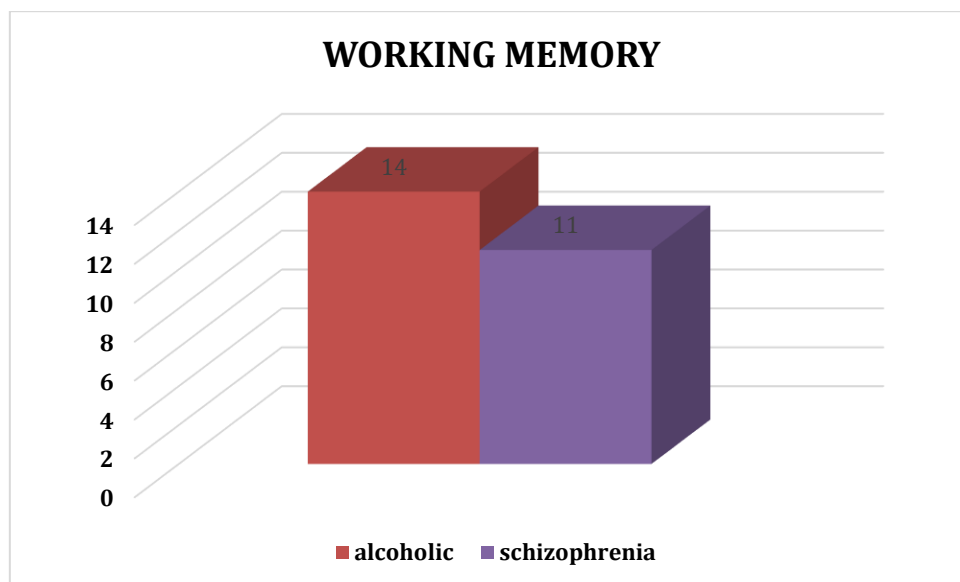
Graphical representation 8: Perceptual Reasoning



Graph 8: Perceptual Reasoning

- OFFSPRINGS OF ALCOHOLIC shows much stronger reasoning skills; highly significant ($p = 0.003$)

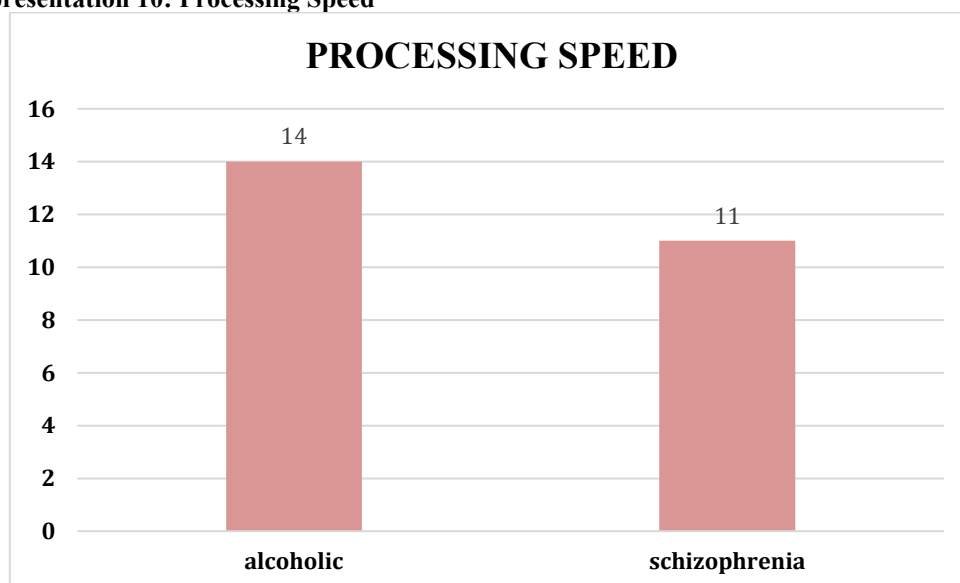
Graphical representation 9: Working Memory



Graph 9: Working Memory

Significant disparity in scores; OFFSPRINGS OF SCHIZOPHRENIA performed much worse ($p = 0.001$), indicating cognitive challenges.

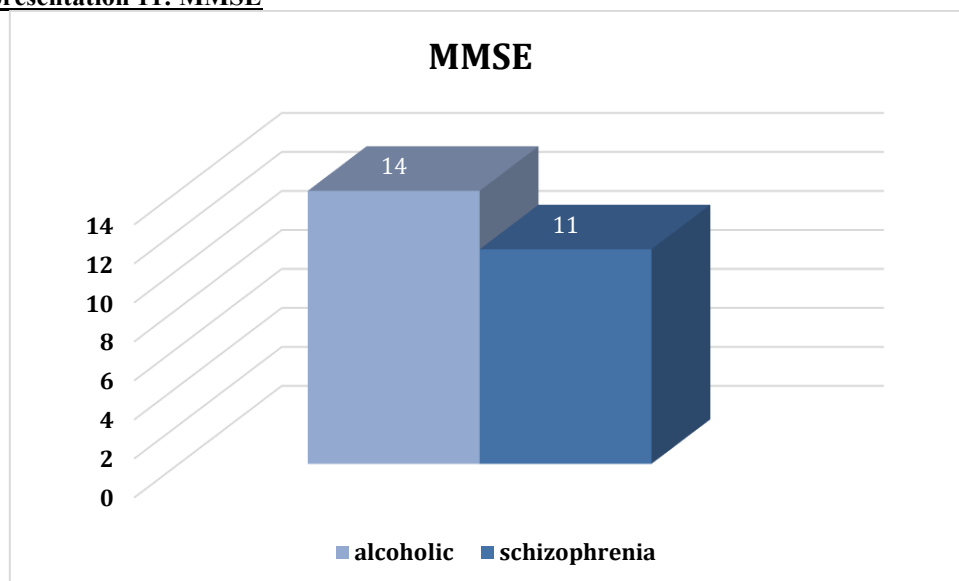
Graphical representation 10: Processing Speed



Graph 10: Processing Speed

No significant difference ($p = 0.236$), although OFFSPRINGS OF ALCOHOLIC has a slight edge.

Graphical representation 11: MMSE



Graph 11: MMSE
Alcoholics' offspring showed better results.

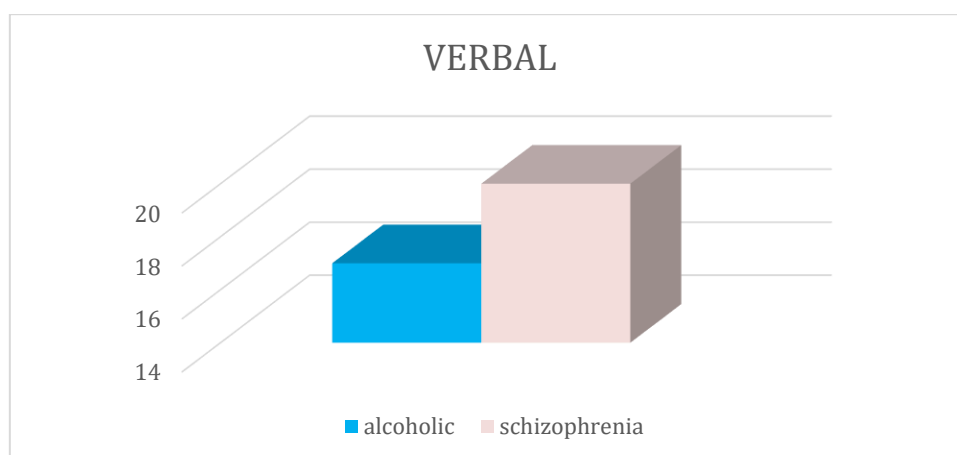
WISC-Wechsler Intelligence Scale for Children(Children)

Group Statistics: OFFSPRINGS OF ALCOHOLIC VERSUS OFFSPRINGS OF SCHIZOPHRENIA(Children)

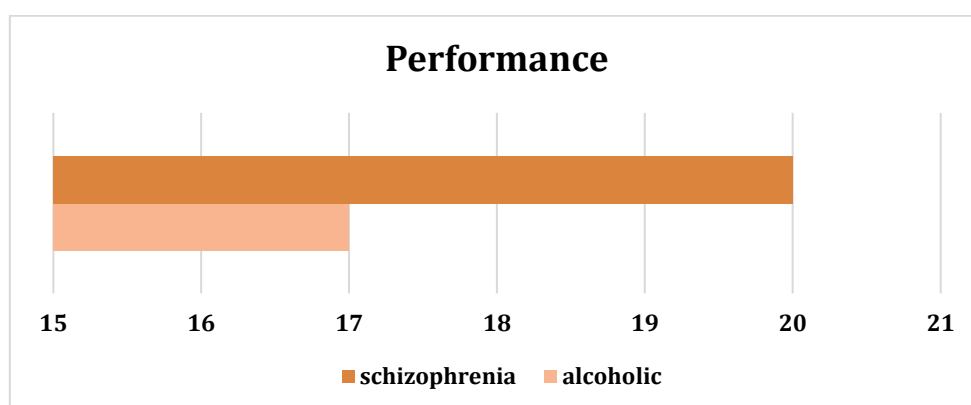
Table 7: group statistics

CHILDREN		N	Mean	Std. Deviation
VERBAL	OFFSPRINGS OF ALCOHOLIC	17	91.59	8.704
	OFFSPRINGS OF SCHIZOPHRENIA	20	85.95	9.976
PERFORMANCE	OFFSPRINGS OF ALCOHOLIC	17	93.94	7.941
	OFFSPRINGS OF SCHIZOPHRENIA	20	96.45	8.959
FULL SCALE	OFFSPRINGS OF ALCOHOLIC	17	91.94	7.949
	OFFSPRINGS OF SCHIZOPHRENIA	20	89.55	8.420
VERBAL COMPREHENSION	OFFSPRINGS OF ALCOHOLIC	17	84.12	6.244
	OFFSPRINGS OF SCHIZOPHRENIA	20	79.65	16.620
PERCEPTUAL ORGANISATION	OFFSPRINGS OF ALCOHOLIC	17	75.88	5.085
	OFFSPRINGS OF SCHIZOPHRENIA	20	77.05	4.685
FREEDOM FOR DISTRACTION	OFFSPRINGS OF ALCOHOLIC	17	84.29	8.387
	OFFSPRINGS OF SCHIZOPHRENIA	20	75.35	8.543
PROCESSING SPEED	OFFSPRINGS OF ALCOHOLIC	17	84.06	4.322
	OFFSPRINGS OF SCHIZOPHRENIA	20	84.40	5.082
MMSE	OFFSPRINGS OF ALCOHOLIC	17	23.88	3.180
	OFFSPRINGS OF SCHIZOPHRENIA	20	25.05	2.089

Graphical Representation 12: Verbal



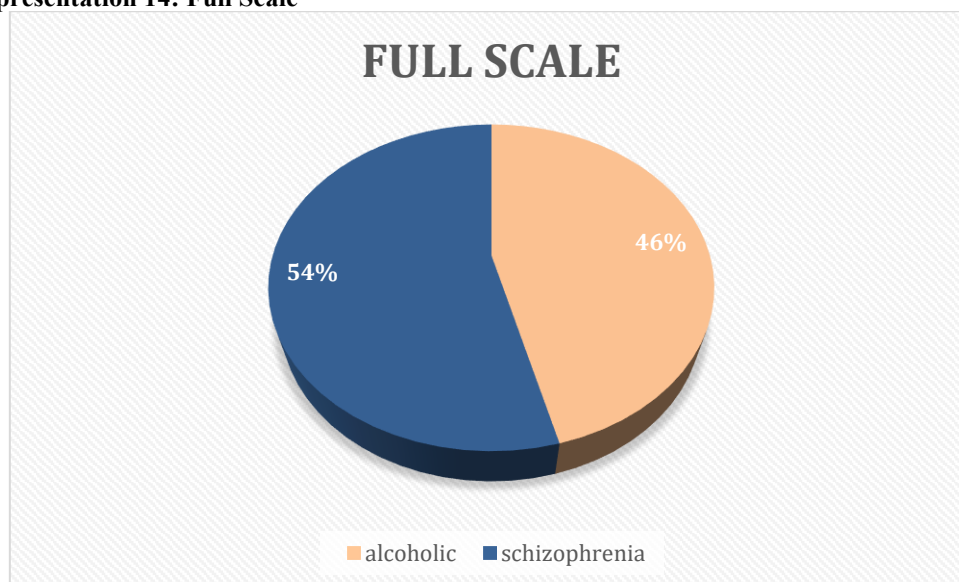
Graphical Representation 13: Performances



13. Graph: Performances

OFFSPRINGS OF ALCOHOLIC outperforms OFFSPRINGS OF SCHIZOPHRENIA ($p = 0.053$, near significance)

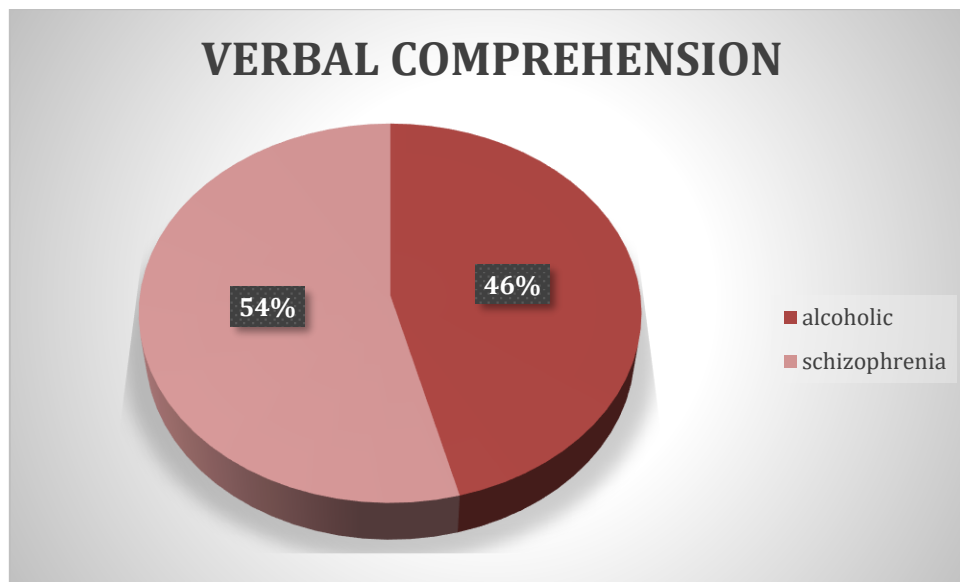
Graphical Representation 14: Full Scale



Graph 14: Full Scale IQ

Minimal difference; not statistically significant.

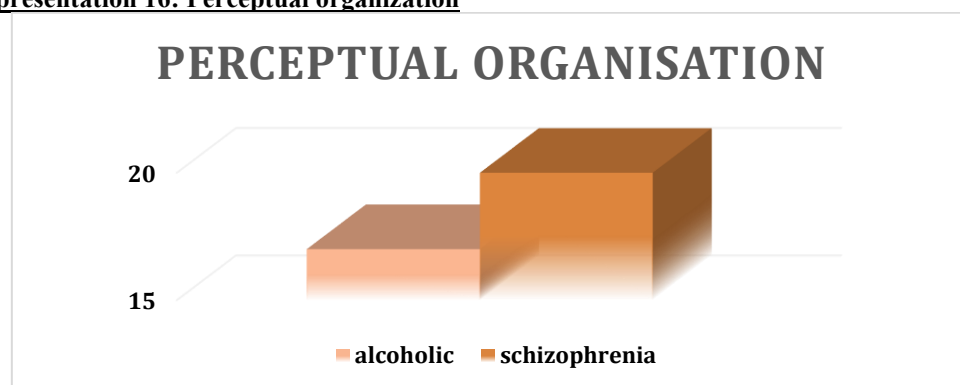
Graphical Representation 15: Verbal Comprehension



Graph 15: Verbal Comprehension

- OFFSPRINGS OF ALCOHOLIC has slightly higher scores, which are not significant.

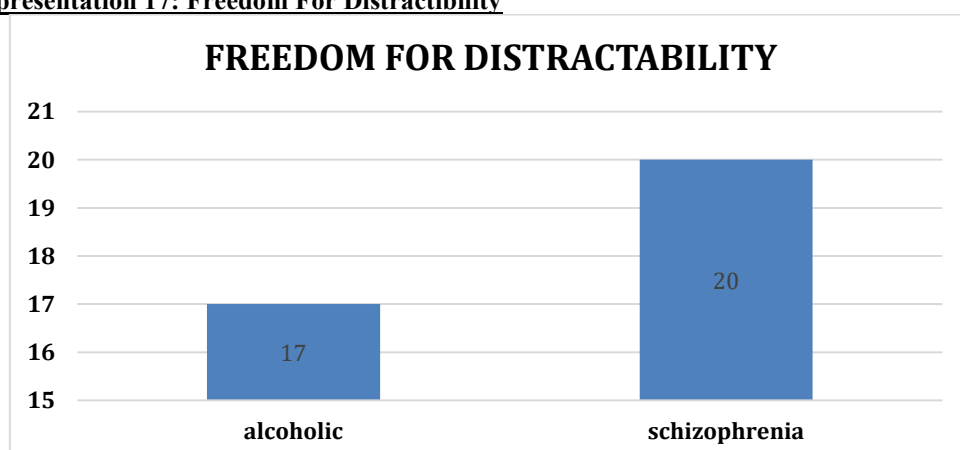
Graphical Representation 16: Perceptual organization



Graph 16: Perceptual Organisation

- Close values; not significantly different.

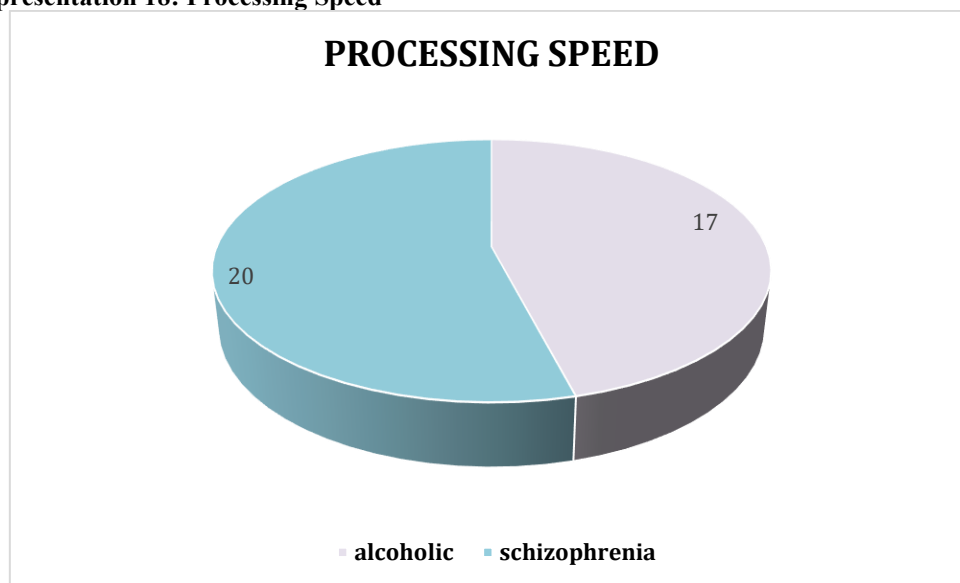
Graphical Representation 17: Freedom For Distractibility



Graph 17: Freedom from Distractibility

- Significant ($p = 0.005$); OFFSPRINGS OF ALCOHOLIC performs better, indicating better attention regulation.

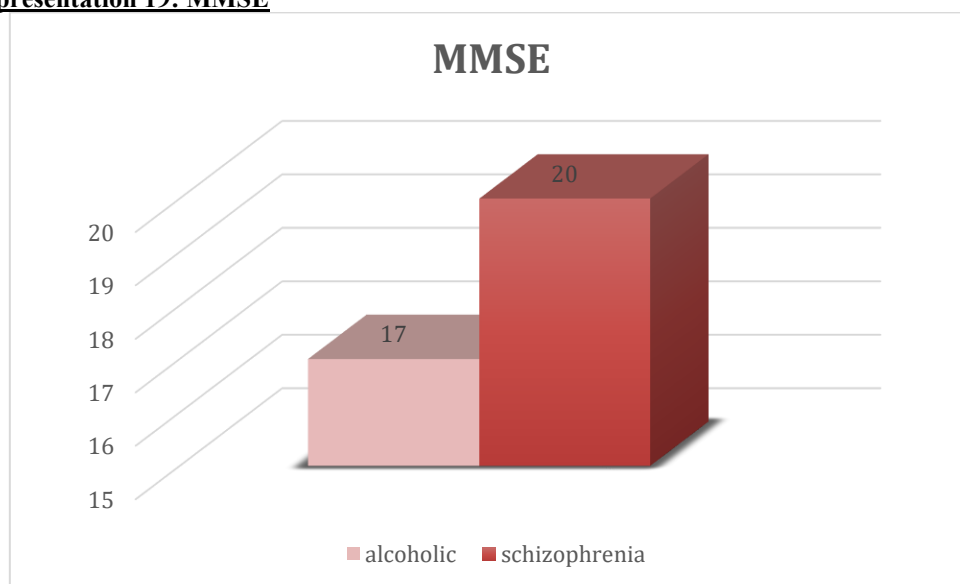
Graphical Representation 18: Processing Speed



Graph 18: Processing Speed

- Nearly identical scores in both groups.

Graphical Representation 19: MMSE



Graph 19: MMSE

- Slightly higher in Group OFFSPRINGS OF SCHIZOPHRENIA; not significant.
- Mann-Whitney Test: Independent sub-scale between offspring of alcoholics vs. offspring of schizophrenia (Adult)

Table 8: Sub-test comparison between offspring (ADULT)

Test Statistics: Offsprings of Alcoholics vs. Offsprings of Schizophrenia

Variable	P Value
Full Scale IQ	0.058
Verbal Comprehension	0.026

Perceptual Reasoning	0.003
Working Memory	0.001
Processing Speed	0.236
MMSE	0.508

Correlations

CORRELATIONS: DURATION OF ILLNESS IN THE PARENT VERSUS FULL-SCALE IQ(ADULTS)

TABLE 9: DURATION OF ILLNESS IN PARENTS VERSUS FULL-SCALE IQ(ADULT)

Variable	N	r (Correlation Coefficient)	P-VALUE
Duration of illness in the parent	25	0.360	0.077

CORRELATIONS: DURATION OF ILLNESS IN THE PARENT VERSUS FULL-SCALE IQ(CHILDREN)

TABLE 10: DURATION OF ILLNESS VERSUS FULL-SCALE IQ(CHILDREN)

Variable	N	Correlation Coefficient (r)	P Value
Full-Scale IQ (Children)	37	0.035	0.839

CORRELATION: FULL-SCALE IQ OF OFFSPRING OF ALCOHOLIC VERSUS OFFSPRING OF SCHIZOPHRENIA (BOTH)

TABLE 11

FULL SCALE	N	FULL-SCALE MEAN	SDT DEVIATION	P VALUE
ALCOHOLIC	31	92.77	8.334	
SCHIZOPHRENIA	31	88.74	7.861	
				0.43

MMSE Comparison Between Groups

TABLE 12

Group	N	Mean	Standard Deviation	P VALUE
ALCOHOLIC	31	92.77	8.334	
SCHIZOPHRENIA	31	88.74	7.861	
			0.43	

Offspring of schizophrenia patients showed significantly lower performance in working memory ($M = 56.09$, $p = 0.001$), perceptual reasoning ($M = 89.36$, $p = 0.003$), and verbal comprehension ($M = 90.64$, $p = 0.026$) compared to the ADS group. The full-scale IQ was also lower in the schizophrenia group ($M = 87.27$ vs. 93.79 , $p = 0.058$). MMSE scores did not significantly differ between groups. Among children, similar patterns were observed with lower freedom from distractibility in the schizophrenia group ($M = 75.35$ vs. 84.29 , $p = 0.005$). Correlation analysis indicated a weak association between parental illness duration and cognitive scores ($r = 0.035$, $p = 0.839$).

DISCUSSION

This study examined and compared cognitive functioning in the offspring of individuals with schizophrenia and alcohol dependence syndrome (ADS). The findings highlight significantly greater and more widespread cognitive impairments in the schizophrenia-offspring group, particularly in working memory, perceptual reasoning, and verbal comprehension. These results are consistent with prior research demonstrating that schizophrenia carries a stronger heritable neurodevelopmental burden, with cognitive deficits often presenting as stable endophenotypes even before clinical onset. In contrast, offspring of alcohol-dependent individuals showed milder, more domain-specific impairments—particularly in attention and working memory—likely arising from a combination of genetic risk, environmental adversity, and in some cases, prenatal alcohol exposure. Despite preserved verbal comprehension and processing speed in the ADS group, their cognitive performance still reflected notable deficits associated with familial risk.

The difference in Full-Scale IQ between groups approached significance, reinforcing the notion that schizophrenia is associated with a broader disruption of intellectual functioning. Neurobiological studies support this interpretation, linking schizophrenia-related cognitive deficits to abnormalities in prefrontal and temporal brain regions and disrupted

functional connectivity. Additionally, distractibility was significantly higher in the schizophrenia group, possibly reflecting inherited attentional control vulnerabilities.

Interestingly, MMSE scores showed minimal group differences, underscoring the tool's limitations in detecting subtle or domain-specific impairments. Prior studies suggest that alternatives like the MoCA may offer better sensitivity in high-risk populations.

Overall, these findings underscore the need for early cognitive screening in at-risk youth, particularly those with a familial history of schizophrenia. Tailored cognitive interventions could mitigate the long-term academic and functional consequences of these neurodevelopmental vulnerabilities.

Conclusion

This study demonstrates that offspring of individuals with schizophrenia exhibit significantly more severe and widespread cognitive impairments compared to those of alcohol-dependent parents. The most affected domains in the schizophrenia group were working memory, verbal comprehension, and perceptual reasoning, suggesting a strong heritable neurodevelopmental vulnerability. In contrast, the alcohol-offspring group showed milder, more domain-specific deficits, primarily influenced by environmental factors.

The findings underscore the need for early, domain-specific cognitive assessments in at-risk populations, particularly among children of schizophrenia patients. Standard tools like the MMSE may not adequately capture these deficits, reinforcing the value of comprehensive neuropsychological evaluation. Early identification can enable tailored interventions to improve academic and functional outcomes and mitigate long-term risks. Ultimately, this research highlights the importance of incorporating cognitive screening into routine clinical care for youth with a familial history of severe psychiatric illness.

Conflicts of interests: The authors declare no conflicts of interest.

Author contribution: All authors have contributed in the manuscript.

Author funding: Nill

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