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ARTICULOS ORIGINALES

Comparación del perfil cognitivo de pacientes con alcoholismo y esquizofrenia

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Resumen:

Estudios recientes muestran que una alta prevalencia de trastornos psicóticos y por consumo de sustancias comparten mecanismos cerebrales comunes que pueden afectar el rendimiento cognitivo, la adhesión al tratamiento y, con ello, aumentar el riesgo de recaídas. Objetivo: Comparar el rendimiento cognitivo en pacientes con alcoholismo y con esquizofrenia. Material y Métodos: Estudio observacional que evaluó a 18 pacientes con esquizofrenia y 32 con trastorno mental debido a consumo de alcohol. Se utilizó la batería neuropsicológica breve NEUROPSI, validada en español. Resultados: Se encontraron diferencias significativas entre ambos grupos en áreas de función ejecutiva y memoria declarativa (a largo plazo), con mayores puntajes de deterioro en el grupo de pacientes con esquizofrenia. Conclusiones: Los resultados permiten comprender y explicar las dificultades observadas en pacientes con esquizofrenia en cuanto a funciones de regulación conductual y recuperación de información.

Palabras clave: Neuropsicología, esquizofrenia, alcoholismo, memoria, función ejecutiva.

Abstract:

Recent studies report a high prevalence of psychotic and substance use disorders sharing common brain mechanisms that may affect cognitive performance, response to treatment, the ability to commit to it and, consequently, increase the risk of relapse. Objective: To compare cognitive performance in patients with alcoholism and schizophrenia. Material and Methods: Observational study designed to evaluated 18 patients with schizophrenia and 32 with mental disorders due to alcohol consumption. The short neuropsychological battery NEUROPSI, validated in Spanish, was the main study instrument. Results: Significant differences were found between both groups in areas of executive function and long-term memory, with the sub-group of patients with schizophrenia showing greater deterioration levels. Conclusion: The results assist in explaining and understanding the difficulties that patients with schizophrenia experience in the functions of behavior regulation and information retrieval.

Keywords: Neuropsychology, schizophrenia, alcoholism, memory, executive function.

INTRODUCTION

It is well known that mood, psychotic and substance use disorders are the most prevalent mental illnesses in the southern region of Peru (1), where, in addition, mental health services are limited or inadequate for both, assessment and follow-up interventions and, particularly, those related to the neuropsychological examination of cognitive profiles. The literature related to this topic reports on the difficulties at familiar, social and professional levels, as well as compliance with treatment programs (2). In this context, the results

of neuropsychological evaluations have been associated to the level of commitment to treatment, its results and relapse risks, with a greater cognitive impairment seemingly related to better levels of recovery among patients with schizophrenia and alcohol abuse or dependence (3,4, 5, 6) .

Moreover, Chambers et al., report that, in many cases, there is a close relationship between vulnerability to addiction and schizophrenia, the former preceding the latter (7), which also seems to be related to abnormal brain development (8). In addition, neural abnormalities in schizophrenia appear to match the neural substrates that regulate addictive behaviors, e.g.,mesolimbic and mesocortical circuits (7). Many studies claim that patients with schizophrenia and alcohol dependence or abuse disorder show an active neurophysiological involvement of these circuits eventually leading to cognitive impairment (9). Against this background, the most affected cognitive skills in both types of patients would be attentional control, abstract reasoning, cognitive flexibility, strategic global planning, sequential response, and working memory (3,6,10, 11, 12). All these processes are linked to the executive function (13); but, not to be forgotten, verbal memory, verbal fluency and motor speed also seem to be affected (14).

In schizophrenia, marked cognitive deficits have been described mainly in the areas of attention and visual working memory (6,4,9); within the impaired attentional system, deterioration predominates in the areas of executive attentional network (in charge of inhibitory control) (15) and sustained attention (16). These shortcomings are more noticeable when the disease has evolved for longer periods. Within the memory problems, episodic memory shows most damage (16); the memory system is, in fact, the most demanding of all processes because it requires a temporal-space context (17).

Thus, cognitive impairment in executive function is a permanent and central feature of schizophrenia, in cases of both, remission or relapse (5). Executive function has to do with an integrated set of cognitive skills involved in the generation, monitoring and control of goal-directed behaviors (18). The alterations in executive functions have historically been considered prototypical pathology of the frontal lobe, mainly through lesions affecting prefrontal dorsolateral (19), orbitofrontal (20) and cingulate (21) regions. As a whole, this would cause a "dysexecutive syndrome" affecting the regulation of cognition and behavior. Laurenson et al., (5) found that cognitive processes related to attentional and semantic components, not only cognitive inhibition, are impaired.

In the alcoholism camp, Corral-Varela & Cadaveira (2) report that not all alcoholics manifest cognitive impairments. That is, changes observed in executive functions and memory are interpreted as increased impulsivity and specific vulnerability of the frontal lobes to the toxic effects of alcohol (12, 22, 23). Besides, in substance abuse patients, there would be a further deterioration at both attentional level and in the processing of emotions, in addition to impairment in executive functions. However, Bates et al., (22) and Cabe et al., (3), indicate that the strength of the different cognitive impairments present in alcoholic patients is varied and very heterogeneous.

In a review of brain and cognitive impairment in alcohol-dependent subjects, Bernardin et al., showed a "striking" level of brain atrophy in the frontal lobes, the limbic system and the cerebellum (24). These were related to alterations in executive function, memory systems and motor coordination. The authors concluded that it is important to analyze the cognitive processes in these patients in order to better tailor the treatment and alleviate the difficulties of daily life.

In short, there are patterns of deterioration in memory and executive function, seemingly associated to deficiencies in prefrontal and temporal-medial structures in both disorders. However, the level of deterioration brought about by these pathologies vis- à-vis the brain circuits, remains uncertain, considering especially the close linking between addiction and schizophrenia during the CNS developmental process (7).

Given this reality it is necessary to have a better understanding of the cognitive profile of the two disorders, as it could help to improve the treatment, achieve its goals more effectively, and strengthen the patients' cognitive processes. This could even be an important predictor of remission and patient's functionality (3, 5). Such is the objective of our study: to compare the cognitive performance of both patients

with schizophrenia and alcohol-dependent patients by means of a short test battery of neuropsychological evaluation (NEUROPSI). This analysis will allow us to identify the levels of cognitive involvement and use it as a foundation to a better sequence of treatment and follow-up of these patients.

MATERIAL AND METHODS

This is an observational/comparative study on patients with pre-existing clinical diagnoses. Fifty patients were tested, 18 with the clinical diagnosis of mental disorders due to alcohol (F10), and 32 diagnosed with schizophrenia (F20), at the NationalHospital ES SALUD "Carlos Seguin Escobedo" in the city of Arequipa, Perú. The probands' ages ranged between 17 and 70 years, with an average of 50. 70% of the sample was male(n = 35), and 30%, female (n = 15). From a clinical view, there was a high variability in duration of illness and number of hospitalizations (table 1).

Table 1. Clinical and sociodemographic features of the sample

		Minimum	Maximum	Mean	SD
Age		17	70	45.92	11.515
Years of education		1	17	11.73	3.019
N° of Hospitalizations		0	10	1.92	2.029
Time of illness		0	576	201.00	148.176
			Frecuency	Percentage	
Sex	Male		35	70	
	Female		15	30	
Diagnostic	Alcoholism (F10)		18	36	
	Schizophrenia (F20)		32	64	

Table 1.

We used the Mexican version of the brief neuropsychological test battery (in Spanish) NEUROPSI, developed by Ostrosky, Ardila and Rosselli in 1994. This battery has not been used in previous psychometric studies in Peru. It assesses cognitive functions such as orientation, attention and concentration, language, memory, executive functions, reading, writing and arithmetic. It takes approximately 25 to 30 minutes to be individually performed, by probands aged 16 or more, and can be applied to illiterate and poorly educated people.

Assessment sessions, approximately 50 minutes long, were conducted in hospital settings. After the assessment and rating of the test battery, raw scores were converted to z scores to better appreciate the eventual contrasts between the two groups. Nonparametric contrast statistic tests were used.

RESULTS

The results show significant differences in executive function ($U = 154$, $p < .05$), memory ($U = 162.5$, $p < 0.05$), and the overall score ($U = 164$, $p < 0.05$) between the two groups (table 2).

Table 2. Comparison of means in NEUROPSI scores between clinical entities

	Alchoholic patients		Patients with Squizophrenia			
	Mean	SD	Mean	SD	Mann Whitney U	p value
Orientation	5.78	.548	5.41	.946	232.5	.155
Attention	16.56	5.008	13.84	3.819	214.0	.132
Concentration	21.72	30.835	24.31	34.880	256.5	.521
Language	21.78	1.734	20.56	2.435	211.0	.115
Reading	2.28	.826	2.19	1.030	285.0	.947
Writing	1.94	.236	1.94	.354	281.5	.699
Executive F.	14.44	2.307	11.78	3.471	154.0	.006**
Memory	20.00	5.678	15.38	6.499	162.5	.011*
General score	99.12	13.720	84.77	15.970	164.0	.032*

*p<.05; **p<.01

Table 2.

An analysis of covariance was subsequently conducted to analyze the effect of demographic and clinical variables of the sample. It is noted that the level of education (F = 16,327, p <.05), diagnosis (F= 9.154, p <0.05) and number of hospitalizations (F= 7.537, p <.05) have a significant effect on the total scores on the NEUROPSI (table 3).

Table 3. Analysis of covariance taking the total NEUROPSI score as dependent variable

Origin	Type III sum of squares	gl	Quadratic mean	F	Sig.	Partial eta squared
Corrected model	4448,834a	7	635.548	6.426	.000	.577
Intersection	9217.172	1	9217.172	93.190	.000	.738
Age	231.400	1	231.400	2.340	.136	.066
Hospitalizations	745.483	1	745.483	7.537	**.010**	.186
Time of illness months	9.070	1	9.070	.092	.764	.003
Years of instruction	1614.909	1	1614.909	16.327	.000	.331
Diagnostic	905.382	1	905.382	9.154	.005	.217
Background	1.133	1	1.133	.011	.915	.000
Diagnostic * background	326.152	1	326.152	3.298	.078	.091
Error	3263.947	33	98907			
Total	355289.000	41				
Total corrected	7712.780	40				

to. R Squared = 577 (R square = the set, 487)

Table 3.

DISCUSSION

The main finding of this study was that patients with the diagnosis of alcoholism performed cognitively better than those with schizophrenia in memory and executive function. These results were similar to those of other investigations (25, 26, 27, 28) also reporting on several factors that could mediate the degree of cognitive impairment in both groups. However, it has also been mentioned that in addition to memory and executive functions, other processes such as attention are severely affected in both groups of patients. This would be associated with the alteration level of the circuits that underly these processes (20).

It is known that the brain involvement of a patient with schizophrenia includes the prefrontal and medial temporal cortices (21), whereas in the case of alcoholics, the medial temporal involvement is greater (29). Thus, the profile of alterations observed in executive functions and memory, correspond to these areas; which

may even be associated with alterations in executive memory components, including encoding and retrieval of information. In the case of alcoholic patients, the main impact would be on consolidation (30).

In the same context, Landa, et al., (27), and Barrera (25) maintain that deficiencies in both alcoholic and patients with schizophrenia, focus on working memory which, in turn, affects declarative episodic long-term memory. Yet, Landa et al., also assert that semantic memory seems to remain preserved in alcoholic patients (27), but not so in patients with schizophrenia who, rather, show severe impairment of verbal and spatial declarative memory. It is important to note that, as stated by Bustamante-Quiroz (31) and Barrera (25), these alterations are associated with chronicity and other aspects of the clinical course in schizophrenia. This would explain the impact of the number of hospitalizations in the patient's cognitive performance. Conversely, as seen above, in patients with schizophrenia the disorder in declarative memory has been attributed to a dysfunction of the medial temporal lobe (26), while in alcoholic patients, it may be due to a deficiency in the memory circuit that includes structures vulnerable to thiamine deficit reaching, on occasions, clinical levels of Wernicke - Korsakoff encephalopathy (32).

On the other hand, the executive functions are clearly affected in both conditions. Neuropsychological explanations can be found in underactive frontal lobes, measured by functional neuroimaging techniques (33). For schizophrenia, the most significant dysfunction occurs in the dorsolateral prefrontal cortex (DLPFC), which would be associated with deficits in working memory (34). An abnormality in the functional connectivity between frontal and temporal lobe has also been pointed out, implying a hyperconnectivity between these regions although at a random and very inefficient activation level (35). In addition, dysfunctions have been observed in subcortical regions, with failures in the thalamus-cortical integration (32). These studies conclude that schizophrenia would be a pathology linked to a progressive disengagement of the brain.

We have observed that the pattern of cognitive impairment is strongly influenced by the education level of patients. This has been corroborated in other studies, conducted in contexts like ours (36). As it is known, exposure to formal schooling changes the brain circuits making them more efficient, and preparing them for increasingly complex and/or abstract tasks (37). This has frequently been observed in studies with healthy samples of varying schooling levels (38), and even in clinical samples (39). Therefore, it is necessary to measure the pattern and degree of involvement considering this factor and assessing its actual weight when facing the implementation of intervention strategies.

To conclude, these initial data show an interesting cognitive pattern that should be extended to a wider battery of neuropsychological assessments, including follow-up studies. In addition, it would be relevant to deepen the neurophysiological foundations of these pathologies, especially to clarify the link between memory tasks and executive function, as well as to analyze patterns of disconnection between different brain structures. In this respect, assessments that evaluate the degree of participation of the different processes have been developed, considering that brain connectivity is more relevant than an individual process assessment, especially for outset strategies (40). Likewise, assessments must be expanded to all cognitive processes, attempting to deep in the connections between the two conditions in order to clarify the presence of dual pathology or comorbidity. Finally, it is relevant to develop intervention strategies that target the rehabilitation of cognitive processes, particularly in the area of executive functions, which seem to show very interesting prospects in the patients' functional and social reintegration processes (41, 42).

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