

Reading comprehension evaluation by means of the neuropsi assessment tool in patients attending “alcoholics anonymous” due to alcohol consumption

Evaluación de la comprensión de la lectura a través de la batería neuropsi en pacientes que asisten a “alcohólicos anónimos” por consumo de alcohol

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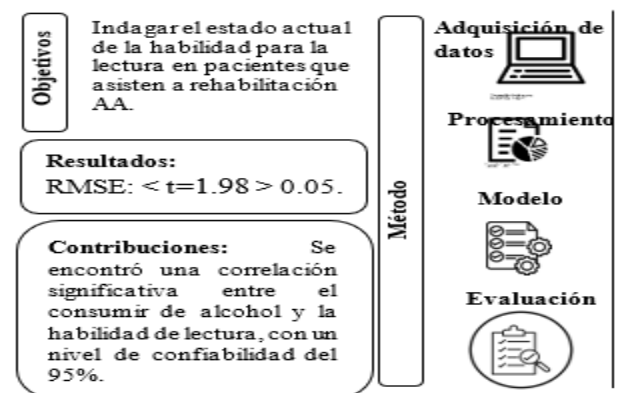
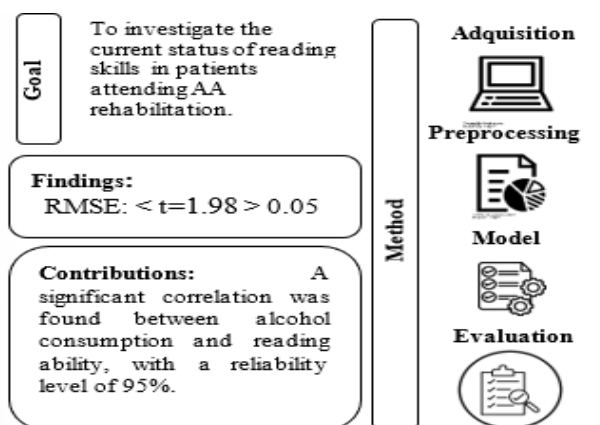
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Abstract

Alcohol drinking negatively affects the reading skill. The article addresses the prevalence of reading difficulties in alcohol rehabilitation patients by applying the neuropsychological assessment tool NEUROPSI. Methodology: non-experimental, exploratory, and observational study based on the Neuropsychological assessment tool NEUROPSI in Spanish (brief version). Findings: In a sample of 20 participants, the results indicate that only 40% fall within the normal values, whilst 60% exhibit low scores in reading comprehension, concentration, and attention. Lastly, 60% of the participants presented alterations in neurocognitive functions, with 25% indicating moderate alterations, 20% revealing severe alterations, and 15% exhibiting mild alterations.

Resumen

El alcohol afecta negativamente la habilidad de la lectura. En el presente artículo se aborda la prevalencia de dificultades en la lectura en pacientes en rehabilitación por alcoholismo utilizando la batería de evaluación neuropsicológica NEUROPSI. Metodología: investigación de tipo no experimental, exploratorio, observacional con base al instrumento de evaluación Neuropsicológica breve, en español NEUROPSI. Contribución: en una muestra integrada por 20 participantes, los resultados muestran que el 60% se ubican en un rango con una baja puntuación en la comprensión lectora, mientras que el otro 40% se encuentra dentro de los valores normales. Se observan alteraciones en las funciones neurocognitivas en el 60% de los participantes de los cuales el 25% apuntan alteraciones moderadas, el 20% revelan alteraciones graves y el 15% las alteraciones son leves.



Reading, Neuropsi, Alcoholis

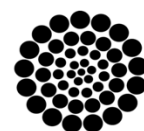
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Introduction

Reading is related to continuous learning episodes throughout life and actively contributes to human development. The acquisition of reading involves a series of complex cognitive processes that enable the interpretation of letters and the comprehension of text. These processes involve the recognition, identification and encoding of textual information (Montealegre, 2004).

Effective comprehension of information read requires the ability to discern, reflect and apply what has been learned (OECD, 2009). This involves processes of attention, visual perception, phonological awareness and memory, which are fundamental to storing, transforming, analysing and organising information in order to understand it (Canet-Juric, Urquijo, & Richard's, 2009).

Attention selects the essential information within the text, while the process of visual perception organises and interprets textual elements (Cuetos, 2010). Phonological awareness manages and processes speech sounds. Finally, memory temporally manages the information read (Lorenzo, 2001; Morgado, 2005; Barreyro, Burin and Duarte, 2009). All these processes are executed simultaneously during reading, creating a mental representation in which new information is integrated with previous knowledge (Molinari-Marotto, Barreyro, Cevasco and Van den Broek, 2011).

In the article published by the Centro de Investigación en Salud Poblacional del Instituto Nacional de Salud Pública, it talks about the analysis carried out based on the Encuesta Nacional de Salud y Nutrición Continua 2022 in which the habits of the Mexican adolescent population were observed and reported an alcohol intake of 20.6%, with a higher prevalence in males (22.0%) than in females (19.2%) (ENSANUT et al., 2022).

Since reading is a basic daily activity, it is important to study those habits that deteriorate this skill. Therefore, the aim of this study is to assess how the impact of alcohol consumption influences reading comprehension processes using the NEUROPSI brief neuropsychological battery (highly effective in the area of assessment and easy to apply).

To carry out this evaluation, 20 patients between 20 and 69 years of age were selected from the Alcoholics Anonymous group, without distinction of educational level. An exhaustive analysis of the scientific literature on the effects of alcohol on reading comprehension was carried out, as well as an empirical study with participants of the programme to obtain specific data and observe possible correlations.

The results of this research will provide valuable information for health professionals, therapists and leaders of Alcoholics Anonymous groups in Mexico. By better understanding the impact of alcohol on reading, they will be able to adapt and improve strategies to prevent this addiction and be able to provide more tools for rehabilitation, supporting individuals in the recovery process in a holistic way.

Rationale

Alcohol addiction is a public health problem affecting millions of people worldwide. The Global Status Report on Alcohol and Health published by the Pan American Health Organization (PAHO) in conjunction with the Regional Office for the Americas of the World Health Organization (WHO) reports that approximately 237 million men and 46 million women suffer from alcohol-related disorders. Furthermore, PAHO projects a global increase over the next 10 years (PAHO, 2018). Alarmingly, the WHO's Global Alcohol Action Plan 2022-2030 reveals that the 283 million people involved in alcoholism start from the age of 14 years onwards (WHO, 2021).

The rehabilitation programme with the largest presence in Mexico is Alcoholics Anonymous. During the sessions, it begins with a series of readings on topics selected from the list of approved literature (Alcoholics Anonymous World Services, Inc., 2019). In other words, reading becomes a primary tool for fostering therapeutic connection at both the group and individual levels. In this way, appealing to the strengthening of the cognitive processes involved in reading enriches the benefits of the rehabilitation programme. Reading, as a cognitive skill, is essential for learning, communication and personal development. However, consuming alcohol impairs brain functions such as memory, concentration and reading comprehension (Arias 2005).

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Understanding how alcohol affects reading would allow the identification of specific areas of intervention in rehabilitation programmes and improve their efficiency. It would also initiate actions through the health sector to provide access to information on this risk to the population and disseminate its prevention, as well as regularise the participation of professionals in Human Communication in recovery processes.

Problem

Prolonged alcohol consumption is a public health problem that affects millions of people around the world. Individuals suffering from this addiction experience a variety of adverse consequences in their daily lives, encompassing physical, psychological and social aspects. One of the significant effects of alcohol is a decrease in reading comprehension. In addition, individuals may experience alterations in their reading skills depending on their history of exposure to alcohol and other vulnerability factors (Arias 2005).

The ability to comprehend reading is a cognitive aspect, a crucial task that enables people to understand and extract meaning from written information. This process involves the combination of cognitive functions such as word decoding, attention, memory, inference and the ability to make connections between ideas, concepts and the meaning of letter sequences (Ferrerres and López 2009). However, prolonged drinking can have significant damage to the central nervous system, affecting brain areas related to reading comprehension (Arias 2005).

PAHO's 2020 annual report highlights that the COVID-19 pandemic significantly increased mental health risks in Mexico, including alcohol abuse (PAHO, 2021). According to Ensanut 2020, during confinement, a worrying number of adolescents in the country (414,300 males and 208,903 females), have been consuming alcoholic beverages (Secretaría de Salud 2020). In addition, people in the process of recovery and abstinence faced relapses as a result of quarantine, necessitating the suspension of face-to-face meetings held during this period by Alcoholics Anonymous groups. This situation poses a significant problem in terms of mental health and well-being during the pandemic in Mexico (PAHO, 2021).

Talking about the problems that alcohol causes at the brain level when reading is essential to understand the effects it can have on our intellectual and cognitive capacity, which in turn can encourage a responsible attitude towards drinking alcohol and promote a healthier lifestyle.

Hypothesis

Ho: Reading ability in AA rehabilitation patients is not impaired.

Hi: Reading ability is impaired in AA rehabilitation patients.

Objectives

General objective: To investigate the current status of reading skills in patients attending AA rehabilitation.

Specific objective

- To identify the total reading ability score by NEUROPSI in patients attending AA rehabilitation.
- To identify the current status of neurocognitive functions by NEUROPSI in patients with alcohol dependence according to DSM-V classification.

Theoretical framework

Background

According to Cortéz et al. (2017) indicate that ingesting alcohol can be measured in grams of alcohol or in standard units of drinking. The definition of a standard drink according to the World Health Organisation (WHO 2001) refers to a drink containing around 10 grams of alcohol. Some examples with their respective percentages of alcohol content would be: a 330 ml can of beer with 5%, a 140 ml glass of wine with 12%, or a 40 ml glass of distillate with 40%.

When the established limit of alcohol exposure is exceeded, it can be considered excessive. However, alcoholism, as defined by Kershenobich (2010), is a chronic disease characterised by a lack of control during consumption, continuous or intermittent drinking, despite awareness of the consequences, causing disturbances in thinking. Estrada-Flores, Alejandra Pamela, Ontiveros-Vargas, Angel Adrián, Santiesteban-Contreras, María Tereza and Vázquez-Ríos, Elda Raquel. Reading comprehension evaluation by means of the neuropsi assessment tool in patients attending "alcoholics anonymous" due to alcohol consumption. ECORFAN Journal-Bolivia. 2024. 11-21: 1-10 <https://doi.org/10.35429/EJB.2024.21.11.1.10>

Vera (2015) describes that, in the past, alcoholism was seen as a symptom of social or psychological stresses, or as maladaptive behaviour that was learned.

Since 1976, the World Health Organisation has recognised 'Alcohol Dependence Syndrome (ADD)' as manifestations of various alcohol-related emotions, behaviours and thoughts, encompassing clinical indicators involving the feeling of losing control over the amount of alcohol ingested, the strong desire to drink and the organisation of life around alcoholic beverages (Barrero and Pérez, 2018).

The SDA pattern becomes inflexible, they drink daily despite how destructive this habit can be and develop tolerance, needing more alcohol to get the same effects. When the drinking habit is stopped or decreased, either intentionally or unintentionally, withdrawal symptoms may appear, consisting of: tremors, elevated blood pressure, sweating, sleep problems, anxiety, difficulty concentrating, memory problems, impaired judgement, changes in sensory perception and, in severe cases, seizures (Barrero and Perez, 2018).

Factors influencing alcoholism

The desire to drink alcohol is influenced by various factors, Ríos et al. (2012) mention how family conflicts, lack or excess of discipline and lack of responsibility can trigger the early stages of addiction. Similarly, psychological factors, such as low self-esteem, anxiety problems and depression, are of paramount importance.

Finally, environmental and social factors also play a role, such as social norms that favour easy access to the substance, as the initial, barely perceptible symptoms involve concerns about the availability of alcohol, which strongly influences the affected person's choices of friendships and activities.

Alcoholism represents a serious global health concern, with WHO (2022) stating that up to three million people die annually due to harmful alcohol intake. Alarmingly, 13.5% of alcohol-related deaths are among young people between the ages of 20 and 39.

Moreno (2015) states that in Latin America and the Caribbean, there is a deep-rooted culture around alcohol that poses a significant challenge for public health in the region, as highlighted by the expert report, since the average alcohol intake per person per year is 8.4 litres, which is 2.2 litres higher than the global average. The importance of knowing these figures stems from the need to effectively address this problem in the region and promote greater awareness of the risks associated with alcohol.

The impact of alcohol consumption on the neurobiological processes of reading

Bravo (2016), argues that reading involves the interaction of visual stimuli. From a neurobiological perspective, as discussed by Alonso Ortiz T (1997), the development of reading involves the transmission of visual stimuli from the retina to the central nervous system.

This involves specific areas of the brain such as the primary visual area and the secondary visual area, which detect and interpret visual stimuli.

Working memory is a key function in the acquisition and development of reading comprehension skills (Gómez-Veiga I., 2013). In addition, awareness of psycholinguistic knowledge, involving phonological, lexical, syntactic and semantic analysis, is essential in the reading and writing process (Montealegre R., 2006).

Drinking alcohol has been confirmed to have harmful effects on brain tissue and affect its functioning (Horton et al., 2015).

Overall, it has a detrimental impact on neurobiological processes involved in reading including visual perception, language processing and memory (Flores et al., 2019), decreased concentration spans and reflexes, this can significantly influence the reading process and academic performance in adolescents so it is vitally important to address this problem in order to preserve cognitive function and promote effective reading.

DSM-V criteria and their relationship to alcoholism

The Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-V) is a publication of the American Psychiatric Association (APA) that provides standardised diagnostic criteria used by mental health professionals to classify and diagnose mental disorders, including alcoholism or alcohol use disorder.

Alcohol use disorder is classified into two main categories: alcohol use disorder and alcohol use disorder in remission. Criteria for diagnosis include symptoms such as loss of control, withdrawal, tolerance to alcohol.

The DSM-V stresses that the criteria are not only based on quantity, but also on the individual's ability to control. These criteria provide a diagnostic structure that allows for an accurate assessment of alcohol dependence and facilitates appropriate treatment and intervention (APA, 2014).

NEUROPSI Battery

The Brief Neuropsychological Battery, known as NEUROPSI, is an instrument used for neuropsychological screening developed and standardised in Mexico. It aims to measure cognitive functions (Ostrosky, 2015), making it the optimal assessment to identify the degree of reading impairment caused by alcohol.

This battery is applied in people with possible cognitive impairment, such as neurological, psychiatric, geriatric patients and those with chronic degenerative diseases (Ostrosky et al., 2022). This reliable tool is composed of short, easy-to-use items, taking into account the schooling and age of the respondents (Marreros et al., 2022).

NEUROPSI provides qualitative and quantitative data that allow us to obtain a profile that indicates the degree of impairment in the different dimensions evaluated, involving the areas of: attention and concentration, memory, language, visual-constructive processes, executive functions, writing, orientation, calculation and reading (Ostrosky-Solis F, 1999).

Research methodology

The present study is an exploratory, non-experimental, observational and cross-sectional study, with a descriptive statistical analysis.

Reading comprehension in alcoholics was established as a complex variable in order to verify the existence of alterations and other variables such as age, gender and schooling.

For the statistical analysis of the population studied, measures of central tendency and dispersion were used.

Procedure

Patients attending the 24-hour Alcoholics Anonymous group 'Primero de Mayo' in the city of Durango, Dgo, Mexico were evaluated. Data were collected during the month of September 2020.

Inclusion criteria were limited to all patients in the group who agreed to be part of the sample and signed the informed consent form corresponding to the official Mexican standards (NOM-004-SSA3-2012 for the clinical record and NOM-040-SSA2-2004 on information) prior to their participation in the evaluation. Patients who declined the study invitation and those who were still actively drinking alcohol comprised the exclusion criteria. Thus, 20 valid cases were confirmed and three eliminated.

In order to create a profile for each patient in the sample, a clinical survey was applied to obtain the following variables: gender, age, school average, and frequency of alcohol consumption.

The six cognitive functions were then assessed using the NEUROPSI Brief neuropsychological instrument. For the purposes of this study, data on reading comprehension were collected.

These results were classified according to the ranges established by the instrument in its corresponding section, as well as in relation to the age and level of schooling of each participant. Finally, statistical analysis was carried out using Microsoft Excel software.

Results

The sample consisted of 20 people attending the 24-hour Alcoholics Anonymous group 'Primero de Mayo', of whom three (15%) were women and 17 (85%) were men (see Graph 1). The average age of the participants was 33 years, with a minimum range of 20 years and a maximum of 69 years. In terms of educational level, four people had completed primary school, eight had completed secondary school, six had completed high school and one person had a university education (see Figure 2).

Box 1

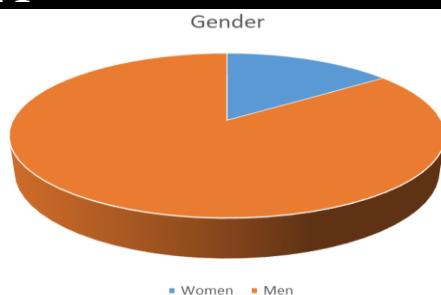


Figure 1

Gender of the sample

Box 2

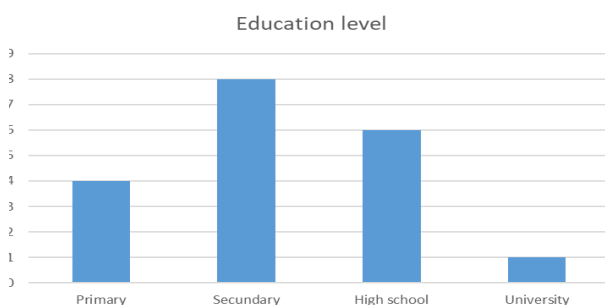


Figure 2

Education level of the sample

The clinical survey applied to determine the frequency with which the patient usually consumed alcohol revealed that their alcohol intake is relatively low. Only four participants admitted to having consumed alcohol occasionally, once or twice a month.

The results of the Neuropsychological NEUROPSI assessment revealed that 40% of those tested scored within the normal range, while 60% showed impairments in neurocognitive functions. Of the latter group, 15% showed mild disturbances, 25% showed moderate disturbances and 20% obtained results indicative of severe disturbances. These findings highlight the significant presence of difficulties in neurocognitive functions in the population assessed (table 1).

Box 3

Table 1

Results of the NEUROPSI test

	Persons	Percentage
Normal	8	40 %
Slight	3	15 %
Moderate	5	25 %
Severe	4	20 %

Next, in terms of the specific objectives, the total score for the reading ability was obtained with 50% (10 participants) answering correctly, however, only one participant (2%) with one error, four participants (8%) with two errors and five participants (10%) with a null response (graph 3).

Box 4

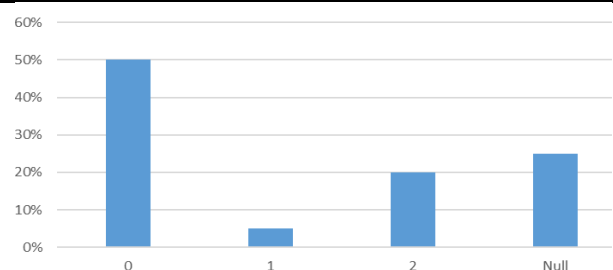


Figure 3

Participants' results obtained in the reading section of the NEUROPSI test

A significant correlation was found between alcohol consumption and reading ability, with a reliability level of 95% and a value of $t=1.98$. These results indicate the relationship between the data collected; therefore, the research hypothesis is approved: alcohol consumption is associated with reading ability in AA rehabilitation patients.

It is important to note that the results obtained in this population cannot be extrapolated because it is a small sample from a single site. Comparisons with other institutes would be necessary to assess the state of cognitive functions more broadly and accurately.

Conclusion

Drinking alcohol is one of the causes of damage to the organism. This damage is critical when it occurs during adolescence, as research shows that early initiation of drinking can lead to neuronal damage, alterations in behaviour, memory and affect learning processes (Zinn, Stein and Swartzwelder, 2004). All of the above are the main ones involved in reading comprehension.

The effects of heavy drinking are detrimental to brain and cognitive functions and are not limited to single episodes of intoxication. A single binge or a few days of heavy drinking can cause significant damage to the brain and the cognitive ability required for reading (Obernier, White, Swartzwelder and Crews, 2002).

The neurodegeneration that occurs as a result of heavy alcohol consumption involves the death and deterioration of brain cells. In conjunction, brain circuits that control cognitive functions such as memory, attention, reasoning and information processing are compromised for reading (Duque 2005).

One in six of the world's population is in adolescence, amounting to approximately 1.2 billion people between the ages of 10 and 19.

The fact that a significant number of young people are in good health is not a sufficient condition to reduce their vulnerability to early access to alcoholic beverages, with detrimental impacts on their current and future well-being (WHO 2018).

Their educational background depends on how complex cognitive processes can be operated to extract information from a text during reading. Therefore, in order to ensure meaningful learning that leads to successful completion of a given academic grade, it is key that conditions strengthen an alcohol-free space.

After analysing the data collected, it is clear that alcohol has a measurable effect on neurocognitive skills. Furthermore, the general and specific objectives set out in the research were achieved, and the hypothesis that recurrent drinking is related to greater impairments in reading ability is confirmed.

The results revealed that 40 % of the population assessed obtained a result within the normal range, while 15 % presented a mild result, 25 % showed a moderate result and 20 % registered a severe result. In relation to the assessment, this specific area obtained a lower percentage of correct answers, with an average of 53.3 %.

In the case of the limitations of this research, it is recommended to extend the sample to include a larger number of participants from different rehabilitation centres.

Additionally, it is suggested to increase the participation of professionals in human communication therapy during the rehabilitation steps of this addiction.

In this way, alongside the behavioural work, a therapeutic plan that focuses on neurocognitive processes in adults can be evaluated and structured.

Finally, it is proposed to foster collaboration with other health institutions, education and community organisations in order to develop comprehensive approaches to implement conscious prevention campaigns on issues related to alcohol consumption. It is essential that this information is accessible to the general and target audiences.

Declarations

Conflict of interest

We declare that we have no conflicts of interest, either competitive or financial. In addition, we have no interest in personal relationships that could have influenced the article.

Authors' Contribution

The contribution of each researcher in each of the points developed in this research, was defined based on:

Estrada-Flores, Alejandra Pamela: Contributed to the project idea, research method and technique. He supported the design of the field instrument. He carried out the data analysis and systematisation of results, as well as writing the article.

Ontiveros-Vargas, Angel Adrián: Carried out the systematisation of the background for the state of the art. She supported the design of the field instrument. She also contributed to the writing of the article.

Santiesteban-Contreras, María Tereza: contributed to the research design, the type of research, the approach, the method and the writing of the article.

Vázquez-Ríos, Elda Raquel: He supported the design of the field instrument.

Article

Availability of data and materials

The data obtained were previously authorized by the rehabilitation center as well as from the participants in this research by means of informed consent. The database is available at the “AA” rehabilitation center.

Funding

The research did not receive any funding.

Abbreviations

AA	Alcoholics Anonymous
APA	American Psychiatric Association
DSM-V	Diagnostic and statistical manual of mental disorders
NOM	Mexican Official Standards
NEUROPSI	Neuropsychological Assessment
OMS	World Health Organization
SDA	Alcohol Dependence Syndrome

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