Evaluation of neurocognitive functions in young university students who frequently consume alcohol at the UJED Durango Law School

Evaluación de las funciones neurocognitivas en jóvenes universitarios consumidores frecuentes de alcohol de la facultad de Derecho de la Universidad Juárez del Estado de Durango

Contreras-Ortega, Sonia Andrea * [a], Covarrubias-Salas, Lizeth Sarahi [b] and Herrera Vargas, Isela Vanessa [c]

[a] ROR Universidad Juarez del Estado de Durango • KIH-5218-2024 • 0000-0003-3990-4106 • 2018935
[b] ROR Universidad Juarez del Estado de Durango • KRW-3086-2024 • 0000-0002-3411-5936 • 1167256
[c] ROR Universidad Juarez del Estado de Durango • X-3314-2018 • 0000-0002-9154-6978 • 954357

Abstract

The objective of this research is to evaluate the state of the neurocognitive functions of young frequent alcohol users of the Faculty of Law and Political Science of the Juárez University of the State of Durango, for this two instruments were applied: the AUDIT test, to identify the level of alcohol consumption of the students and the BCSE brief test to evaluate the cognitive state of the participants. 100 students participated voluntarily. In the results, it can be observed that 60% of the students evaluated have medium to excessive alcohol consumption, and 40% obtained low level scores in the cognitive assessment. Decision-making, planning, self-monitoring, spatial orientation, attentional control, and cognitive flexibility are the areas most affected by alcohol consumption, in addition to making them less consistent in fulfilling their school obligations and affecting their cognitive capacity necessary to correctly acquire knowledge.

Resumen

La presente investigación tiene como objetivo evaluar el estado de las funciones neurocognitivas de los jóvenes consumidores frecuentes de alcohol de la Facultad de Derecho y Ciencias Políticas de la Universidad Juárez del Estado de Durango, para esto se aplicaron dos instrumentos: el test AUDIT, para identificar el nivel de consumo de alcohol de los alumnos y test breve BCSE para evaluar el estado cognitivo de los participantes. Participaron 100 estudiantes voluntariamente. En los resultados se puede observar que el 60% de los alumnos evaluados tienen consumo de alcohol de medio a excesivo, y el 40% obtuvo puntuaciones nivel bajo en la evaluación cognitiva. La toma de decisiones, planeación, automonitoreo, orientación espacial, control atencional y flexibilidad cognitiva son las áreas más afectadas por el consumo de alcohol, ademas de volverlos menos constantes en el cumplimiento de sus obligaciones escolares y afectando su capacidad cognitiva necesaria para adquirir correctamente el conocimiento

Evaluation of neurocognitive functions in young university students who frequently consume alcohol at the Faculty of Law of the Juárez University of the State of Durango		
Objectives	*Methodology*	*Contributions*
Evaluate student alcohol consumption	Search for tests and evaluations according to the age and educational level of the test-takers	Checking Neurocognitive Functions Affected by Alcohol
Evaluate the neurocognitive functions of the students themselves.		Identification of students' level of alcohol consumption
Compare the relationship of the results of both tests	Application of tests and evaluations to students	
	Identification and reporting of results	

Alcohol, cognitive function

Evaluación de las funciones neurocognitivas en jóvenes universitarios consumidores frecuentes de alcohol de la facultad de Derecho de la Universidad Juárez del Estado de Durango		
Objetivos	*Metodologia*	*Contribuciones*
Evaluar el consumo de alcohol de los estudiantes	Busqueda de pruebas y evaluaciones conforme a la edad y nivel educativo de los evaluados	Comprobacion de funciones neurocognitivas afectadas por el alcohol
Evaluar las funciones neurocognitivas de los mismos alumnos.	Aplicación de pruebas y evaluaciones a los alumnos	Identificacion del nivel de consumo de alcohol de los
Comparar la relacion de los resultados de ambas pruebas	Identificacion y relacion de los resultados	alumnos

Alcohol, Funciones cognitivas

RENIECYT
Registro Nacional de Instituciones y Empresas Científicas y Tecnológicas
1702902 CONAHCYT

Introduction

Alcohol is a psychoactive substance that affects the brain, behavior and cognition, acting as a central nervous system depressant (Schlesinger, 2017).

People with chronic and continuous alcohol use are characterized by impaired control over drinking, frequent episodes of intoxication, obsession with alcohol, and consumption despite adverse consequences (WHO, cited in Schlesinger, 2017).

Alcohol is a chemical teratogen that produces a wide range of disorders that have a direct impact on growth and development at any stage of a person's life (Rodriguez et. al., 2018).

According to the Ministry of Health and National Commission against Addictions (2017) the frequency with which the population of young adults aged 17-34 years make use of substances such as alcohol is increasing, increasing per year approximately 7.8% of young male consumers and 3.3% in the case of women.

Alcohol consumption is associated with numerous health problems, including infectious diseases, cancer, endocrine and metabolic diseases, mental, neurological, cardiovascular, digestive, intentional and unintentional injuries, among others (Sarasa et. al. 2014).

In Mexico, it was found that adolescents perceive alcohol consumption as not very harmful and, sometimes, as a way of socializing with their peers. This could motivate their consumption, despite warnings (Méndez et. al., 2018).

Harmful alcohol consumption is the main risk factor for deaths in males aged 15-49 years, although evidence shows that females are more vulnerable to any of the harmful effects of alcohol (PAHO, 2022).

According to statistics, young heavy drinkers are those who consume four standard drinks or more in one sitting at least once a month (Scutti, 2019).

In 2021, in Mexico City, research conducted on young undergraduates' alcohol consumption in relation to their neurocognitive functions showed that participants who frequently get drunk have difficulty in tasks related to the dorsolateral prefrontal cortex, such as verbal working memory and cognitive flexibility, planning, self-monitoring, decision-making and inhibition (Mondragón et. al., 2021). This study coincides with what Mendez et. al. (2018) mentioned about the alteration in the ability to make good decisions, learn and react to stimuli when this substance is consumed.

It has been detected that there is a relationship between the abuse of this substance and the problems caused in the university population. Alcohol consumption affects academic performance, such that there is a reduction in overall grade point average as consumption increases. It has also been related to lower probability of attending classes and completing homework, lower commitment to academics, as well as lower expectations of graduating and continuing university studies. Alcohol abuse is present in more than 40% of students with low academic performance, and in 28% of university dropouts (Vera et. al. 2020).

The same author mentions that the neurotoxic effects of alcohol affect cognitive functions required in learning processes, such as sustained attention, working memory, executive function, and speed of information processing. In addition, alcohol consumption influences behavioral changes, increased impulsivity and aggressiveness, increased prevalence of mood disorders and poor decision-making (Vera et. al. 2020).

According to Planas et. al. (2017) alcohol has effects on the CNS, as it can decrease cognitive capacity, concentration, spatial organization, visual or verbal abstraction, and can also cause disorientation phenomena in time. A study conducted in 2015 by Salcedo et. al. in Bogota on young university students relating alcohol and their cognitive functions concluded that there is a relationship between alcohol consumption and representative failures in tasks involving inhibition processes. sequencing, attentional control (processing speed and divided attention), categorization, cognitive flexibility, self-monitoring.

Article

The State of Durango ranks 11th in the country in terms of young people who consume alcohol, determining that 1 in 5 drinks to excess (Canedo, 2019).

Continuing with Durango, on average, 54.8% of students have consumed an alcoholic beverage at least once in their life; 54.2% males and 55.4% females and 17.7% have consumed alcohol excessively. 16.5% of students show a pattern of problematic alcohol consumption; 17.7% of males and 15.3% of females (Comisión Nacional Contra las Adicciones, 2014).

Therefore, looking in detail at all the above statistics from various authors and following the research, it is considered that alcohol consumption can cause school dropout coupled with a significant cognitive deficit. It is for this reason that it is considered necessary, important and interesting to investigate alcohol consumption in young university students from Durango and its relationship with alterations in cognitive functions as well as the link between this and the end of their professional studies.

Methodology

This is a non-experimental, quantitative, cross-sectional and descriptive research, the data collection was obtained at the Faculty of Law and Political Science of the Universidad Juárez del Estado de Durango from 4 June to 29 July 2023.

The data collection consisted of 100 students from the 2nd, 4th, 5th, 6th, 7th and 8th semesters of the aforementioned faculty. Students from both degree courses participated. The selection of the evaluated students was non-probabilistic and by convenience.

In order to carry out the data collection in the aforementioned faculty, it was necessary to go to the directors and deliver a letter requesting authorization to evaluate the students, obtaining a favorable response. The evaluation process was carried out by going to the classrooms and inviting the students to participate; they were asked to sign an informed consent form and had the right to withdraw from the evaluation at any time if they wished to do so.

The assessments used for data collection were as follows:

-    Alcohol Use Disorders Identification Test (Audit): This was developed by the World Health Organization (WHO) as a brief and reliable instrument to identify risky or harmful drinking patterns. It consists of 10 questions designed to assess the amount and frequency of alcohol consumption, drinking-related problems, as well as dependence and risk perception (Betancurt, 2019).

Brief Cognitive Status Screening Test (BCSE): The BCSE test provides a rapid assessment of general cognitive functioning in adults and adolescents, assessing orientation, temporal estimation, mental control, incidental recall, planning and organization, inhibition and verbal production, focusing mainly on the processes of attention and executive function (Consejo General de la Psicología, 2014).

The following inclusion and exclusion criteria were considered:

Inclusion

-    Active students of the Faculty of Law and Political Science UJED of any age and semester.
-    Exclusion
-    Students from other faculties of the UJED.
-    Elimination:
-    Students who did not agree to sign the informed consent form.
-    Students who withdrew their consent at any point during the evaluation.

Results

The present research was carried out with the participation of 100 students from the Faculty of Law and Political Science of the Universidad Juárez del Estado de Durango (UJED), of whom 55 were men and 45 were women, 73% of whom belonged to the Faculty of Law and 27% to the Faculty of Political Science. The age of the students who participated was between 18 and 38 years old, with a mode of 22, mean of 22.89 and median of 22. The evaluations were carried out as follows: 27% of the students belonged to the 2nd semester, 1% to the 3rd semester, 7% to the 4th semester, 13% to the 5th semester, 13% to the 6th semester, 21% to the 6th semester, 21% to the 4th semester, 13% to the 6th semester and 21% to the 5th semester. 13% of 6th, 21% of 7th and 18% of 8th.

Journal-Health Education and Welfare

Article

Information was collected on the general average of the 100 participating students and a mode of 8, mean of 8.4 and median of 8.5 was found, the standard deviation corresponds to 0.59.

However, once the information was analyzed according to the parameters set by the AUDIT test, which allows the identification of alcohol consumption, 40% of the students evaluated obtained a low level of alcohol consumption, 40% a medium level, 9% a high level and 11% were at the addiction level (see Figure 1). (See Figure 1).
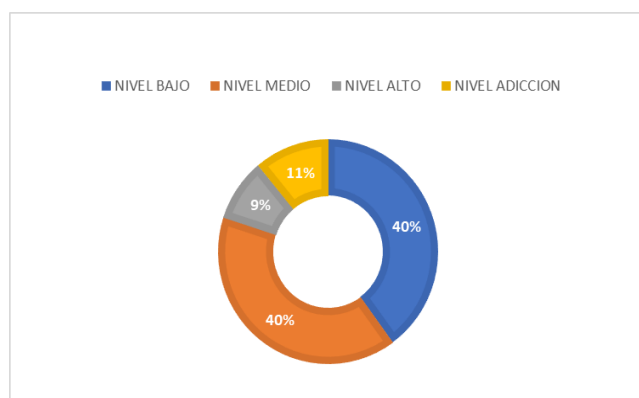
Box 1

Figure 1

Level of alcohol consumption among students according to AUDIT

According to AUDIT, the average alcohol consumption of the students assessed is 10.8 which is considered medium level. Of these 100 participants, only 14% report never drinking alcoholic beverages, 34% drink alcohol once a month or less, 32% drink alcohol 2 to 4 times a month, 16% drink alcohol 2 to 3 times a week and 4% of the students drink 4 or more times a week. (See Figure 2).

Box 2
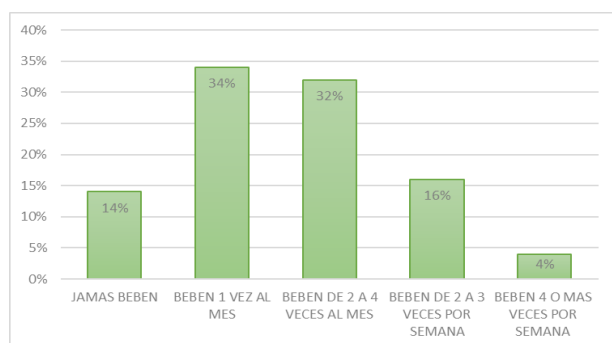
Figure 2

Frequency of alcohol consumption

Regarding the amounts of alcohol consumed by students (see Figure 3), 22% drink 1 or 2 drinks per occasion, 26% have 3 or 4 drinks, another 26% have 5 or 6 drinks, 18% have 7 to 9 drinks and 8% have 10 or more drinks.

Box 3
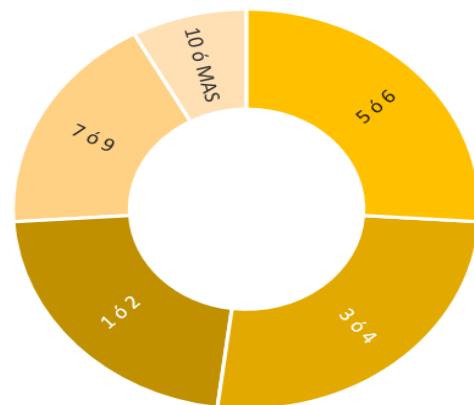
Figure 3

Number of drinks drunk by students per occasion.

In relation to alcohol consumption and homework (see Figure 4), the data collected showed that 13 of the 100 students fail to do their homework at least once a month because of alcohol consumption, 12 do so monthly, 1 does so weekly and 74 report never giving up their school duties because of drinking.

Box 4
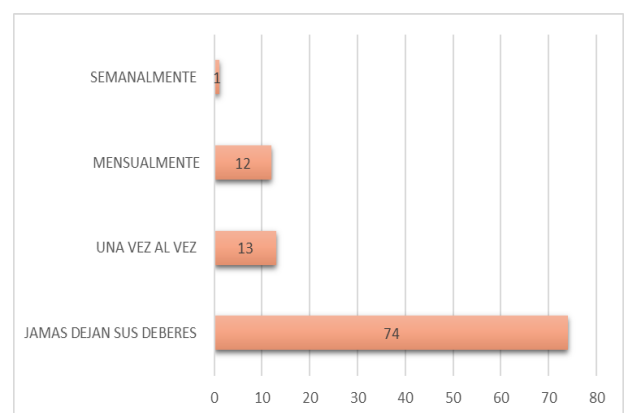
Figure 4

Relationship between students' alcohol consumption and neglecting schoolwork

It was also found that 70% of the young consumers or some of their drinking companions had been injured on at least one occasion because of alcohol consumption, leaving only 30% free of any risky experience with alcohol.

Contreras-Ortega, Sonia Andrea, Covarrubias-Salas, Lizeth Sarahi and Herrera Vargas, Isela Vanessa. Evaluation of neurocognitive functions in young university students who frequently consume alcohol at the UJED Durango Law School. Journal Health Education and Welfare. 2024. 8-14:1-8.
https://doi.org/10.35429/JHEW.2024.14.8.1.8

On the other hand, in terms of cognitive performance as assessed by the BCSE test, it was found that the overall average is 47.37, giving the students a low overall level in terms of mental function performance. The mode was 50 points and is considered borderline level according to the BCSE averages.

For a better understanding of the cognitive performance of the students, each of the areas of the BCSE cognitive test was analyses, considering the 100 participants, which are shown in the following table (see table 1):

Box 5

Table 1

Results obtained by cognitive function

Cognitive function	Maximum score (BCSE reference)	Media	Medium	Fashion	Desv. Est.
Orientation	8	5.69	5	8	2.57
Time estimation	4	3.33	4	4	0.95
Mental control	12	9.42	11	12	2.87
Clock drawing	4	3.11	4	4	1.19
Incidental recall	8	6.76	8	8	1.9
Inhibition	16	13.63	14.50	16	2.78
Verbal production	8	5.38	6	6	1.22
Maximum assessment score	57	47.37	50	50	7.86

From the above it can be seen that the cognitive function with the greatest discrepancy to the maximum expected score is verbal production with a difference of 2.62 points to the expected range. The second subsection with the lowest score in relation to the maximum score is mental control with a difference of 2.58 points.

Another of the subsections with the largest discrepancy is inhibition, with 2.37 points difference to the expected.

Discussion

Analyzing both tests of the 100 participants, it can be observed that 40 students have a low level in the cognitive test and of these, 85% (34 subjects) obtained a medium to addiction level in alcohol consumption. Most of this part of the population studied consumes alcoholic beverages 2 to 4 times a month and 7 to 9 drinks per occasion.

According to Scutti (2019), heavy drinkers are those who drink 4 or more drinks per occasion at least once a month, so this figure indicates a warning sign in the student population. For this reason and according to the data collection we can observe that the alcohol intake of the percentage of students mentioned is excessive.

Continuing with this identified group of students, we can observe that they have an average of 8.17. According to Vera et. al. (2020) alcohol consumption affects academic performance, there is a reduction in the general average of grades as consumption increases.

And continuing with this same group evaluated, three areas were found with lower success in the cognitive assessment (table 2), the first was orientation, with an average of 4.09 being the maximum score 8. According to Planas et. al. (2017) any substance that has effects on the CNS decreases cognitive ability and increases the phenomena of spatial and time disorientation.

Mondragon (2021) and Mendez (2018) mention that excessive alcohol consumption leads to poor executive functioning in domains such as cognitive flexibility, planning, self-monitoring, working memory, decision-making and inhibition when performing any activity that requires higher mental processes.

Box 6

Table 2

Average of the areas with the lowest cognitive test performance of the group of students with the highest percentage of alcohol consumption

Area	Average obtained by students	Maximum average in BCSE
Orientation	4.09	8
Mind control	7.32	12
Clock drawing	2.47	4

In contrast, another 40 students scored between 50 and 57 points on the BCSE, which is a borderline to normal classification. All of them with a low level of alcohol consumption. Therefore, we can confirm what Mendez et. al. (2018) mention 'alcohol consumption directly affects the ability to make decisions, learn and react to the stimuli presented to them', since we see the relationship in the scores obtained in the cognitive test with alcohol intake.

In relation to gender, 55 men were evaluated, 23.63% of the men consumed alcohol at a medium and addiction level, in the cognitive test, 18.17% of this small group of young university students obtained a low level, 3.63% were at the borderline and 1.81% at normal-low.

On the other hand, 45 women were evaluated, 26.66% of them consumed alcohol at medium and addiction levels, and it was found that of this group, only 2.22% achieved a borderline level in the cognitive test, the other 24.43% obtained a low cognitive level. Compared to the consumption figures for men, and following PAHO (2022), it can be observed that women are more vulnerable to the consequences of excessive alcohol consumption. According to the answers obtained in the consumption test, 14% of the university students evaluated who drink alcohol at least once a month have a school average of 8.43 and fail to do their homework and university assignments as a result of this consumption. Of this percentage of the university population in terms of their cognitive evaluation, 8 of these 14 participants obtained a low level, 3 were positioned in the borderline and 3 in normal-low, continuing with Vera's theory (2020) alcohol consumption has also been related to lower probability of attending classes and completing homework, lower commitment to academia, as well as lower expectation of graduating and continuing university studies.

Turning to the results of the level of consumption of the 100 participants from the Faculty of Law of the Universidad Juárez del Estado de Durango, 40% of the students rated themselves as low consumers, another 40% consumed at a medium level, 9% at a high level and 11% at an addiction level.

In the State of Durango and according to the National Commission against Addictions (2014) 17.7% of young people have consumed alcohol excessively and 16.5% of students present a pattern of problematic alcohol consumption.

The results of the tests in the UJED Law School student sample reveal how alarming this issue is becoming as 20% of students reported high and excessive alcohol consumption, a figure that is above the percentage reported in university students in 2014 in the state of Durango.

Analyzing these figures a little, it can be seen that the sample from a single university institution in the state equates to a large extent with the sample collected in the whole state according to the statistics mentioned above.

According to the records of the Universidad Juárez del Estado de Durango in 2020 in the Faculty of Law and Political Science of the Ujed of the State of Durango in semester B, out of 123 students only 94 passed, therefore, 29 of them were left out due to failure. As for semester A, out of 134 students, 108 passed their subjects, leaving out 26 more. Observing the consumption percentages of the 100 students evaluated from the same faculty, we can continue to affirm Vera's theory (2020) on alcohol consumption and the reduction of academic commitment as well as the low expectation of graduating and continuing with their studies.

Therefore, observing in detail all the previous statistics of various authors and following the research carried out on the students of the UJED Law School, it is considered that alcohol consumption can be a limiting factor for students to adequately complete their university studies or a factor that can lead them to a significant cognitive deficit that does not allow them to acquire knowledge in an adequate manner.

Conclusions

Alcoholism is becoming a latent problem in the student community in the state of Durango, which has caused serious problems of various kinds in students.

Young students are consuming alcohol more and more frequently, and this has repercussions in various areas of their lives, one of them, and a very important one, is academic matters. Their academic performance is dropping and it is very possible that one of the causes is the intake of this substance, as from the tests applied in this research it can be observed that alcohol affects conscious and responsible decision making. Students are inhibited by alcohol consumption, as we saw through the data from the same tests mentioned above, those students with high and/or frequent ingestion score lower than the expected parameters for their age and level of studies.

The figures show that the problem is increasing as students consume more and more alcohol and in shorter and shorter periods of time. When comparing the results of the tests with other existing studies and research on the same topic, the complexity and gradual increase of the consequences of alcohol consumption can be observed, among which the decreasing cognitive level of the students can be observed.

Decision-making, planning, self-monitoring, spatial orientation, attentional control and cognitive flexibility are decreasing more and more in students, impacting on academic performance and consequently not allowing young people the cognitive agility to cope in situations of constant pressure that higher academic studies require, directly affecting the learning required to develop in the professional world of work.

In addition, and according to the consumption test that was carried out on the students, alcohol consumption has led them on several occasions not to carry out their school responsibilities, which could be leading them to fail subjects and the constant drop in their grades, which could lead them to abandon their university studies as an alternative.

In view of the results obtained, it cannot be denied that being a regular student consumer of alcohol has become a constant situation in the Faculty of Law and Political Science of the UJED, and that the academic performance of these students is considerably reduced, as he or she shows signs of inhibition as well as a lack of responsibility and decision-making capacity.

All these data obtained throughout this investigation give rise to a general investigation of the university population. The increase in the percentage of students who regularly consume alcoholic beverages, as well as those who do so excessively, is alarming, as the figures shown above reflect that young people are coming into contact with these drinks at an earlier age and with greater frequency, which could lead to more problems related to this addiction.

Statements

Conflict of interest

Both authors and co-authors declare that they have no conflict of interest in this article.

Author contribution

Contreras-Ortega, Sonia: contributed with the idea for the research, application of tests and evaluations to the students, comparison of the results obtained in both tests, structure of the article and corrections of the same.

Covarrubias-Salas, Lizeth: contributed to the orientation of the process to the author, application of tests and evaluations and constant revision of the progress of the article.

Herrera-Vargas, Isela: contributed to the final revision of the article.

Availability of data and materials

The data were obtained by administering the tests and evaluations directly to the students within the Faculty of Law and Political Science of the UJED.

The only materials required were the tests (AUDIT) and assessments (BCSE).

Funding

Acknowledgements

Abbreviations

(1) AUDIT: Alcohol Use Disorders Identification Test.
(2) BCSE - Brief Cognitive Status Exam
(3) WHO: World Health Organization
(4) PAHO: Pan American Health Organization
(5) CNS: Central Nervous System
(6) UJED: Juarez University of the State of Durango

Journal-Health Education and Welfare

Article

References

Background

Mendez, M., Ortiz G., Eligio, I., Yañez, B., Villegas, M., (2018) Risk perception and alcohol consumption in high school adolescents, Aquichan 18 (4) 441-447.

Mondragón A., Flores Y., López G., López S., Paz F., (2021) Executive functions in university students with a pattern of excessive alcohol consumption, Universidad Nacional Autónoma de México Instituto Nacional de Psiquiatría, 31(2) 4-5

Planas Ballvé, Anna, Grau López, Laia, Morillas, Rosa Maria, Planas, Ramon. (2017) Neurological manifestations of alcoholism. University of Neurosciences, Barcelona, Spain. 40 (10) 709-717.

Salcedo, D., Ramírez Y., y Acosta, M.,(2015) Executive function and behavior in undergraduate alcohol consumers. Colombian Journal of Psychiatry 44 (1) 3-12

Basic

Schlesinger, A., Pescador, B., Roa, A. (2017), Alcoholic neurotoxicity, JOURNAL 25(1) 87-90.

Rodríguez, A., Pérez, C. Martínez, M. Borges, K., Martínez, I., (2018) Main consequences of alcohol on health. Pinareña Medical University

Vera, L., Niño, J., Porras, A. M., Durán , J., Delgado, P., Caballero, M., y Navarro , J. (2020). Mental health and dropout in a university population with low academic performance. Universidad Católica del Norte Virtual Journal, (60) 137-158.

Supports

Comisión Nacional Contra las Adicciones (2017) Encuesta Nacional de Consumo de Drogas, Alcohol y Tabaco, ENCODAT 20162017 REPORTE DE ALCOHOL. 53-68

Comisión Nacional Contra las Adicciones, Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Secretaría de Salud, Secretaría de Educación Pública (2014) Encuesta Nacional de Consumo de Drogas en Estudiantes 2014 19-61

Consejo General de la Psicologia (2014) Evaluacion del cuestionario BCSE. Madrid, España. 5-10

Higgies, J., Babor, T. (2018) Una revisión de la Prueba de Identificación de Trastornos por Consumo de Alcohol (AUDIT), AUDIT-C y USAUDIT para la detección en los Estados Unidos: problemas pasados y direcciones futuras. Revista americana de abuso de alcohol y drogas. 44(6) 578-586

Organización Panamericana de la Salud (2022). Jornada Nacional de Información sobre Alcoholismo.

Discussions

Sarasa A., Sordo L., Molist G., Hoyos J., Guitart A., Barrio G., (2014) Main health and social harms related to alcohol consumption Revista Española de Salud Pública 88 (4)

Scutti, S., (2019) A study reveals that more and more people are consuming alcohol and in higher doses. Expansión online magazine.

Canedo, F., (2019) Alcohol immoderate consumption alert in Coahuila and Durango. El Siglo de Torreón Alcohol immoderate consumption alert in Coahuila and Durango | El Siglo de Torreón periódico en línea.