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Alcohol consumption during adolescence. Medical considerations and educational counseling

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Updated by topics

SUMMARY

Alcohol is the most commonly consumed psychoactive drug among Spanish adolescents. The effects of alcohol on the human brain - specifically on neurotransmission - are broadly studied. The adolescent brain is especially vulnerable to the effects of alcohol due to the intense and active processes of synapse restructuring occurring during this period. To achieve and establish educational interventions oriented towards facilitating and eradicating harmful habits related to alcohol consumption during adolescence, it is necessary to join resources, knowledge and forces focused on a better understanding of the biological effects of alcohol and the harm produced in the emotional, social and family realms. Here, we discuss how intervention needs prior assessment and should focus on secondary education, a crucial period in human development.

Key words: Alcohol, adolescence, brain, educational counseling.

RESUMEN

El consumo de alcohol por parte de los adolescentes supera en España el consumo de otras sustancias psicoactivas. Los daños que el cerebro humano sufre a causa del etanol, especialmente en la etapa de la adolescencia, son objeto de muchos estudios y se centran principalmente en cómo se afecta la neurotransmisión. Además, la vulnerabilidad del cerebro de los adolescentes a la influencia del alcohol ofrece rasgos peculiares por cuanto se encuentra en una etapa de intensa actividad de remodelación sináptica. Es necesario unir fuerzas, conocimientos y recursos dirigidos a un mejor conocimiento, tanto de los efectos biológicos del alcohol en el individuo adolescente como de los derivados del consumo en los ámbitos emocional, social y familiar, para diseñar actuaciones educativas que faciliten la modificación o erradicación de hábitos no saludables relacionados con la ingesta de alcohol. La evaluación previa se dirige a promover la calidad de vida en la Educación Secundaria, una etapa crucial en el desarrollo global del ser humano.

Palabras clave: Alcohol, adolescencia, cerebro, asesoría educativa.

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ADOLESCENCE AND ALCOHOL CONSUMPTION

According to the World Health Organization, adolescence is the period between ages 10 and 19 years (the second decade).[1] In turn, this stage is subdivided into two age groups: 10-14 years (early adolescence) and 15-19 years (late adolescence).[2] Adolescence is a time of substantial change in a short amount of time, which affects development and the consolidation of body functions. The transformations include the appearance of puberty, the strengthening and consolidation of social relationships with peers, and the struggle to find independence from parents or teachers.[3,4] The time and form of adolescence are changing. The start of puberty tends to be earlier, while the age at which more stable social roles are found is being delayed.[2] This phase of life is characterized by a very important development of the brain that includes establishing, remodeling, and consolidation of the neuronal circuits in key areas of the prefrontal cortex and in other cortical and subcortical areas which are essential in the executive functions of the brain.[5]

Alcohol consumption is not a problem exclusive to adolescence; it affects the whole population. But consumption usually starts during this time of life. As such, if we direct attention, analysis, and action towards adolescents, premature and future damage could be avoided, at the same time

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as making a critical revision of certain adult attitudes and behaviors that stimulate and promote consumption.

In their usual environment, teenagers receive ambiguous messages.[6] On the one side, public and private bodies denounce the harmful effects of alcohol, and on the other, publicity campaigns by sellers and distributors stimulate consumption, which often includes misleading terms (*e.g.*, "responsible" and "moderate" consumption) and presents messages associated with images of freedom and fun. The effects derived from alcohol consumption are not just an individual problem, but a community one as well. Although the risk is defined as an action that could imply a loss, each subject understands it in terms of their own perceptions.[7]

Particularly notable among the pathologies associated with alcohol consumption[8] are disorders related to behavior towards alcohol (harmful consumption or abuse and alcohol dependency) and alterations related to its direct effects on the brain (acute intoxication, alcoholic abstinence, delirium, amnesiac disorder, Wernicke-Korsakow syndrome and dementia, psychotic disorders, mood disorders, anxiety disorders, sexual dysfunction, and sleep disorders). However, guided primarily by the momentary pleasure associated with drinking, forced by peer pressure, driven by their desires to communicate better with others, or as a form of evasion, humans ignore the harm associated with drinking to a great extent.

In Spain, various studies have been carried out to know the extent to which drugs are taken by adolescents. Among them is the state survey on drug use in secondary school students (ESTUDES), which covers all Spanish territory and is centered on late adolescence. The most recent data can be found in ESTUDES 2010[9] (sample of 31 967 students between 14 and 18 years of age). It indicates that the psychoactive substance with the most generalized consumption among the respondents is alcohol. Some 73.6% have taken alcoholic beverages in the last 12 months. Some 63% had drunk in the 30 days prior to the study, and 36.7% of the sample had *binge drunk* in the 30 days prior to the survey. Binge drinking is drinking 50g of alcohol in a short period of time (2-3 hours), at least once in a week. ESTUDES establishes that the mean age for starting to consume alcohol is 13.7 years. The prevalence of alcohol consumption in the indicated population has been practically constant since 1994.

The most paradigmatic expression of binge drinking can be found in the so-called "botellon" and "macrobotellon"[10,11] phenomena; large gatherings of mostly teenagers and young people, generally on the weekends and in the open air. This behavior can also be seen in adults (generally in other settings). Intensive and repeated consumption is a stimulus for the brain that includes a rapid increase in blood alcohol concentration that is absent during times of abstinence. Spain belongs to the European Union (EU), a region where more than a fifth of the population over 15 years old consumes alcohol in an episodic and intense manner (*binge drinking*).[12]

ALCOHOL AND NEUROTRANSMISSION

Ethyl alcohol is an exogenous substance that the body metabolizes and transforms into assimilable or disposable compounds. Its chemical structure and properties allow it to reach all organs and tissues once absorbed. The ethanol passes through cell membranes and interacts with all elements that comprise them. The specific effect of ethanol on receptor proteins and ion conductors has been described.[13] Examples include, NMDY (N-Methyl_D-Aspartate) for glutamate, glycine receptors, nicotinic acetylcholine receptors, 5HT3 serotonin receptors, calcium conductors (type L), and some potassium conductors.[14] The action of ethanol on these proteins is detectable at concentrations from 1mM (46 mg/L). Ethanol's interference with neurotransmission systems is the basis of the damage caused to the brain by alcohol in both the short and long term. Ethanol's interactions with the proteins mentioned are dose-dependent and responsible for acute effects such as disinhibition, sedation, or sleep. The effects of ethanol diversify to disturb other neurotransmission systems, such as the opioid, dopamine, and endocannabinoid systems, which are related to mechanisms of positive reinforcement and reward and serve as a starting point for alcohol dependence. Once dependence has been consolidated, other neurotransmission systems intervene (the corticotropin-releasing hormone, or CRH, and neuropeptide Y, NPY), which are closely related to the pathological activation of circuits that control stress and states of emergency.[15]

Studies of density maps of grey matter indicate that not all structures in the brain mature at the same rate and time.[16] Differences in cerebral maturity can partly explain differences in sensitivity to the effects of ethanol in different stages of life. In adolescence, for example, the pleasurable effects of alcohol appear at very low doses, while the unpleasant effects linked to intoxication emerge at much higher doses. This phenomenon, related with an individual's sensitivity to the effects of ethanol, stimulates and reinforces drinking behavior in adolescents.[17]

A clear correlation has been demonstrated between the age at which alcohol consumption begins, and the risk of being alcoholic in adult age. The earlier drinking begins, the higher the risk.[18] Primary or secondary prevention programs which help teenagers to be aware of the damaging effects of the drug and to develop self-control and decision-making skills are a relevant focus.

Due to legal and ethical restrictions, it is not feasible to carry out certain studies around the effects of alcohol on human adolescents. Because of this, trials have been conducted using animal models; mostly rodents[19-22] or *in vitro* models.[23] The basic investigation in these models seeks to explain the cellular and molecular mechanisms that underlie the etiology and which are responsible for the consequences of alcohol consumption.[4]

Prevention policies

Prevention policies include rules and laws that establish competent authorities, as well as educational programs in various contexts and education within the family environment. According to the 2009 World Health Organization report on interventions aimed at the reduction of harm caused by alcohol,[12] information and education policies alone have little impact on the drinking behavior of individuals in general. However, they make sense in terms of maintaining and enriching a social and individual awareness about the consumption of alcohol and its consequences. They are urgent multidisciplinary actions that include policies related to price, prohibition of consumption, and sale in certain places (and to minors), as well as training and comprehensive development in the different spheres of the community in which the subject develops their activity.

The agendas and health programs of different bodies should focus on adolescence in order to carry out policies of improving health during this stage and in future life.[2] It is not about looking at adolescence in a paternalistic or condescending fashion, or with contempt. Adolescence is a time of growth, possibilities, and adjustments, which demands attention to all aspects of the individual's development and the promotion of their health.

Educational orientations

It is important to set out educational solutions and orientations that help teenagers and which are extended to family members, educators, and the community in general. Turning to psychoactive substances is not the answer.[24]

From psychopedagogy, orientation can be understood as a continuous process that should help the full development of the individual and give them the skills they need for self-orientation and active, critical, and transformational participation in the society in which they live.[25] When approaching alcohol consumption on the part of adolescents, we consider it important to carry out preventative and intervention programs with a holistic vision that bear in mind all of the agents involved and which train teenagers to be aware of the responsibility they have for their own development.

In order for educational proposals to be adjusted to the population they are aimed at, it is important to carry out an adequate analysis and determine the demands and necessities of the audience. On occasion, the need is there but the awareness is not, and as such, the demand has not been formed; it is because of this that the agents involved need to be made aware. Not adjusting to this first requirement could endanger the improvement of the program or reduce its effectiveness. The program recipients should perceive the need for it and make the demand their own, so that the program is something that is requested and desired, rather than something imposed from outside.

Recipients of the programs. Typology

It should be noted that not all individuals have the same level of approach to alcohol. Pantoja and Añanos[26] differentiate between four groups:

a) *Normal group*, comprised of minors who do not drink, or whose consumption is sporadic.
b) *At-risk group*, minors who have begun consuming and have an increased risk of becoming drug-dependent.
c) *Critical-dependent group*, similar to the above group but with habitual consumption; approaching exclusion.
d) *Excluded group*, minors immersed in the world of the drug, located squarely in the world of exclusion ("street kids").

On the other hand, Arbex[24] distinguishes five groups:

a) Minors who are abstinent or whose consumption is moderate.
b) Minors who are abusive consumers of alcohol on weekends.
c) Minors who are abusive consumers of alcohol on the weekends, including consumption of hashish.
d) Minors who are consumers of alcohol and hashish, and sporadic consumption of other substances.
e) Minors with advanced drug consumption.

In terms of the classification we establish, we will choose the most suitable program.

TYPES OF PROGRAM

One of the objectives of education is to develop prevention from childhood through to adulthood, and in terms of alcohol consumption, with a special emphasis on secondary education (14-18 years).

The following types of prevention can be distinguished:[27]

1. Primary prevention: offered before the problem starts.
2. Secondary prevention: acts when the problem appears.
3. Tertiary prevention: acts by offering treatment and rehabilitation when the problem is widely developed.

Table 1 joins the type of prevention with the mode of the program adapted to the recipients' situation, taking as a reference the classifications made by Pantoja and Añanos[26] and Árbex.[24]

It is possible and suitable to carry out prevention within the school framework, as indicated by Pérez.[28] But it is not only about acting within formal centers of education. Social-type initiatives could also be rolled out, from associations, parishes, city halls, health centers, entertainment or social education movements, etc.

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Table 1. Type of prevention and programs according to recipients

Type of prevention	Mode	Recipients
Primary	Universal prevention	Normal group. Minors who are abstinent or sporadic consumers.
Secondary	Selective prevention	At-risk group. Critical-dependent group. Minors who are abusive consumers of alcohol on the weekends and consumers of alcohol + hashish /+ other substances.
Tertiary	Indicated prevention	Excluded group. Minors with advanced drug consumption.

Risk factors and protection factors

There are risk factors associated with personal and social situations that predispose the consumption and abuse of alcohol and other drugs (Table 2 highlights some of these). On the other hand, protection factors soften or reduce the influence of the risk factors (Table 3).

Preventative measures

In the context of adolescence, a key role is played by the development of emotional autonomy that includes capacities and competencies of self-development such as self-esteem, responsibility, critical analysis, autonomy to seek help and resources, resilience, etc.[29] Educational interventions can establish strategies directed to the acquisition of emotional autonomy that will strengthen the individual's capacity to face situations that could harm their short- or medium-term health. The family is vitally important in people's development. When positive communication models[30] are used in the family environment, may of the problems that affect adolescence can be alleviated and satisfactorily resolved, without the need to turn to specialized programs. However, very often, families need orientation to improve relations between their members, to increase their knowledge of the dangerous effects of alcohol, and for self-analysis about drinking behaviors. With high-risk groups in particular, it is easy to find family members who also present problems of alcoholism, frequent drug use, high levels of illiteracy, etc.[31]

In order to carry out effective actions, it is necessary to detect the type of prevention that is required, and establish the levels of the program. Generally, what is required is a coordinated intervention with adolescents and their families.[24] The high involvement (knowledge, dedication, and commitment) and networking of the whole of society to maximize the protection factors and work to secure a better quality of life is required.[32] Interventions are necessary in the long term in dynamic contexts of mutual interaction and incorporated into educational actions, which help to alleviate the derivative effects of alcohol abuse and promote integrated health endeavors.

Hand in hand, neuroscience and education have to maintain a fluid dialog that allows for a better understanding of the biological bases for addiction[33] and the design of effective educational strategies[34] within the framework of a consolidated nexus between education and neuroscience.

Table 2. Risk factors

Personal	Family	School	Relationships (peer group)	Social-community
• Individualism • Imprudence • Skepticism • Inmediatism • Unclear values system • Absence of rules and boundaries • Hedonism • Irresponsibility • Avoidance attitude • Difficulty valuing effort • Choosing risk behaviors for self-affirmation and to challenge authority • Low level of self-esteem • Low level of emotional self-control	• Absence of affectivity and communication • Pessimistic and/or disinterested attitude • Lack of family cohesion • Loss of authority figures • Overprotection • Educational incoherence • Absence of shared family leisure time • Lack of recognition and acceptance of child • Emotional isolation of family members	• Problems with adaptation • Demotivation • Low academic achievement • Low educational self-concept • Absence of role models among teachers • Little or no integration into class group • Problems integrating rules • Low level of expectations • Low acceptance of the student	• Excessive dependence on group • Inclusion in transgressive groups with a positive attitude towards drugs • Difficulty relating to other non-consuming groups • Low development of social skills • Exposure to consumption patterns • Creation of opportunities for consumption	• Precarious socio-economic situation • Problems with social inclusion (immigrant collectives, ethnic minorities) • Social deconstruction • Absence of social support • Accessibility of substances • Consumption patterns • Cultural models of "lack of control and getting high" • Scarcity of alternative leisure options

Source: Extract from Árbex.[24]

Table 3. Protection factors

Personal	Family	School	Relationships (peer group)	Social-community
• Altruism • Prudence • Projection and planning for the future • Clarification on value scale • Responsability • Attitude of solidarity and commitment • Valuing effort • Establishment and compliance with boundaries and rules • Adequate level of self-esteem • Positive self-concept • Emotional and behavioral self-control • Social skills	• Affective family environment and positive communication • Attitude against drug consumption • Clear rules and boundaries • Family cohesion • Adequate supervision and control • Adjusted roles and authority figures • Age-appropriate requirements • Educational coherence • Enjoyment of shared family leisure time • Recognition and acceptance of the child • Emotional communication of family members	• Integration into the school dynamic • Motivation • Study habits • Adequate achievement • Positive educational self-concept • Positive role models among teachers • IIntegration into the class group • Classroom rules • Interest in schooling • Acceptance of the student in the group • Experience of positive reinforcement for effort • Student assessment • Emotional education • Teaching of social skills	• Critical capacity and development of own criteria • Inclusion in groups with absence of maladapted behaviors • Making personal decisions • Patterns of friends who don't consume or who moderately consume • Adequate development of social skills • Participation in groups of a positive • Participation in groups of a positive nature (associations and clubs, sports, parish groups, voluntary)	• Adequate social organization • Social cohesion in the neighborhood • Positive relationships with neighbors • Social support and protection of minors • Difficulties accessing substances • Culturally valued models • Sufficient community resources for minors • Wide enjoyment of leisure on offer • Social integration and inclusion

Source: Extract from Árbex.[24]

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