



BRIEF COMMUNICATION

Impact of alcohol consumption on salivary gland activity in Dental students

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ABSTRACT

Introduction: alcohol consumption among university students is a frequent habit that can alter salivary function and predispose individuals to relevant oral complications.

Objective: to evaluate the impact of alcohol consumption on salivary gland activity in Dental students from Ambato.

Methods: an observational, descriptive, cross-sectional study was conducted in 2024 with a non-probabilistic (intentional) sample of 40 students from the third and ninth semesters of Dentistry. The validated AUDIT questionnaire was applied, and salivary pH was measured using reactive strips, allowing the collection of data for the analyzed variables. Descriptive and inferential statistical methods were employed, respecting medical ethics.

Results: a total of 42,5 % of students reported consuming alcohol once a month or less, and 37,5 % between two and four times per month. Most participants (72,5 %) ingested one or two drinks on a normal day, while only 5 % reached between seven and nine drinks. Fifty-five percent never consumed six or more drinks in a single occasion. Regarding consequences, 77,5 % never experienced inability to stop drinking, and 67,5 % did not report impairment in their responsibilities. Ninety-five percent showed salivary pH within normal ranges, while 5 % presented low values associated with risk of xerostomia.

Conclusions: the study reveals moderate consumption patterns in most students, with low prevalence of dependence and limited effects on salivary function, although risk cases requiring preventive attention were identified.

Keywords: Alcohol Drinking; Students, Dental; Salivary Glands; Oral Health.

INTRODUCTION

The World Health Organization (WHO) has repeatedly emphasized that harmful alcohol use is a causal factor in over 200 diseases and disorders. Specifically regarding oral health, the WHO notes that excessive alcohol consumption can increase the risk of dental caries, enamel erosion, and periodontal diseases. However, the specific effects of alcohol on salivary glands and saliva production in young populations have not been extensively studied.⁽¹⁾

Salivary glands play a crucial role in maintaining oral health. They produce saliva, which not only facilitates swallowing and speech but also contains enzymes essential for initial food digestion, helps neutralize oral acids, and possesses antimicrobial properties that protect against oral infections.⁽²⁾

Xerostomia, or dry mouth, is a common condition associated with alcohol consumption and is particularly relevant in this context. Alcohol-induced reduction in saliva production can disrupt oral pH balance, creating a more acidic environment that favors enamel erosion and caries development. This may explain why chronic drinkers often experience chronic dry mouth. Furthermore, prolonged xerostomia can lead to increased bacterial plaque accumulation and heightened risk of periodontal diseases.⁽³⁾

The Pan American Health Organization (PAHO) states that alcohol consumption during adolescence can impair healthy growth, promote unhealthy behaviors, and increase the risk of alcohol-related disorders in adulthood.⁽⁴⁾ Several factors may contribute to excessive alcohol use among university students, necessitating identification of the toxic effects of this habit. Given this context, the present study aimed to evaluate the impact of alcohol consumption on salivary gland activity in dental students in Ambato.

METHODS

An observational, descriptive, cross-sectional study was conducted at the Universidad Regional Autónoma de los Andes, Ambato campus, Ecuador, between May and September 2024.

The sample consisted of 40 students (20 from the third semester and 20 from the ninth semester), selected through non-probabilistic convenience sampling. Inclusion criteria were:

- Inclusion criteria: Students enrolled in third and ninth semester, parallel "B," of the Dentistry program who voluntarily agreed to participate.
- Exclusion criteria: Students who did not complete both the questionnaire and salivary pH measurement.

Procedures and techniques

The validated AUDIT (Alcohol Use Disorders Identification Test) questionnaire—previously validated in Latin American populations—was administered. It consists of 14 multiple-choice questions assessing frequency and quantity of alcohol consumption, dependence symptoms, and associated consequences. This was complemented by salivary pH measurement: unstimulated saliva was collected in sterile containers for one minute, followed by analysis using pH reactive strips. Values were recorded on a scale of 1–14 and classified as "normal" (pH 6–7) or "low" (pH <6).

Statistical analysis

Data were analyzed using descriptive statistics, calculating frequencies and percentages. Student's t-test was applied to compare mean pH values between semester groups. Statistical significance was set at $p < 0.05$. Analysis was performed using SPSS version 25. Missing data were excluded, and bias was minimized through anonymization and standardized collection procedures.

Ethical considerations

The study was approved by the Ethics Committee of the Universidad Regional Autónoma de los Andes. All students provided informed consent prior to participation. Confidentiality was guaranteed, and the study adhered to the principles of the Declaration of Helsinki.

RESULTS

The study included 40 participants: 60 % were female (24 individuals), and 50 % (20 students) were from the third semester while the other 50 % (20 students) were from the ninth semester.

Table 1 shows that most dental students exhibit moderate alcohol consumption patterns: 42,5 % consume alcohol once a month or less, and 37,5 % consume it two to four times per month, while only a small group reports higher intake. On a typical drinking day, 72,5 % consume one or two drinks, and only 5 % consume seven to nine drinks—confirming low frequency of excessive consumption. Additionally, 55 % have never consumed six or more drinks in a single occasion, and over 77 % have never been unable to stop drinking once started—indicating minimal dependence. Regarding consequences, 67,5 % reported no impairment in academic or personal responsibilities, and 77,5 % never needed to drink in the morning to recover from heavy drinking—further supporting controlled consumption. Although isolated risk cases were identified—such as episodes of guilt (50 % at least once) or memory loss (92,5 % less than once per month)—overall results show a predominantly moderate consumption profile with low dependence prevalence and limited impact on daily life.

Table 1. Distribution of the sample according to alcohol consumption patterns.

Question	No.	%	
How often do you consume alcoholic beverages?	Never	8	20
	Once a month or less	17	42,5
	2-4 times/month	15	37,5
	2-3 times/week	0	0
	≥4 times/week	0	0
How many drinks do you usually have on a typical drinking day?	1-2	29	72,5
	3-4	3	7,5
	5-6	6	15
	7-9	2	5
	≥10	0	0
How often do you drink 6+ drinks on one occasion?	Never	22	55
	<1/month	11	27,5
	Monthly	6	15

	Weekly	1	2,5
	Daily/near daily	0	0
How often in the past year were you unable to stop drinking once started?	Never	31	77,5
	<1/month	7	17,5
	Monthly	1	2,5
	Weekly	0	0
	Daily/near daily	1	2,5
How often in the past year did drinking prevent you from fulfilling responsibilities?	Never	27	67,5
	<1/month	12	30
	Monthly	1	2,5
	Weekly	0	0
	Daily/near daily	0	0
How often in the past year did you need a morning drink to recover?	Never	31	77,5
	<1/month	7	17,5
	Monthly	2	5
	Weekly	0	0
	Daily/near daily	0	0
How often in the past year did you feel guilt or remorse after drinking?	Never	20	50
	<1/month	18	45
	Monthly	2	5
	Weekly	0	0
	Daily/near daily	0	0
How often in the past year could you not remember what happened the night before due to drinking?	Never	0	0
	<1/month	37	92,5
	Monthly	1	2,5
	Weekly	0	0
	Daily/near daily	2	5
Have you or someone else been injured because of your drinking?	No	38	95
	Yes, but not in the past year	0	0
	Yes, in the past year	2	5
Has anyone expressed concern about your drinking or suggested you quit?	No	38	95
	Yes, but not in the past year	2	5
	Yes, in the past year	0	0

Although most dental students exhibit moderate alcohol consumption—with occasional intake and low quantities (72,5 % consume only one or two drinks on a typical day, and 55 % have never consumed six or more drinks at once)—this pattern correlates with preserved salivary function: 95 % maintain pH within normal ranges (6–7), protecting against xerostomia and oral complications. Only 5 % of participants showed low pH, associated with dry mouth risk—consistent with the few cases reporting elevated consumption or negative consequences such as memory loss or guilt.

DISCUSSION

Prolonged and excessive alcohol intake poses significant risks to health and bodily integrity, causing physiological and morphological alterations across multiple systems. Ethanol—the primary component of alcoholic beverages—is recognized as a causal agent in various stomatological and systemic pathologies, including periodontitis, hepatitis, and hepatic cirrhosis, with oral and liver cancer representing the most severe manifestations affecting patients' quality of life. These alterations can occur in both adults and adolescents, though harmful effects tend to be more evident and severe in younger populations due to developmental vulnerability and early exposure to detrimental habits.^(5,6,7)

Findings indicate that prolonged ethanol exposure significantly disrupts cellular homeostasis, increasing oxidative stress and inflammation in soft and hard tissues. In the oral cavity, alcoholism is linked to heightened susceptibility to periodontitis, xerostomia, and mucosal lesions, while systemic impacts affect the liver and brain.⁽⁸⁾ These results reinforce the need for preventive strategies targeting young, vulnerable populations.⁽⁹⁾

Salivary flow is an essential parameter for oral health maintenance, as its reduction promotes dental caries and other complications—as seen in xerostomic patients. This condition can arise from multiple factors, including alcohol consumption, drug use, radiotherapy, and diseases affecting salivary gland function. Reduced salivary flow disrupts oral pH balance and diminishes saliva's buffering capacity, facilitating bacterial plaque proliferation and creating an acidic environment conducive to enamel demineralization. Thus, xerostomia becomes a significant risk factor for oral health, increasing susceptibility to caries and periodontal diseases.⁽¹⁰⁾

Furthermore, alcohol's effects directly impact periodontal health and other body systems, manifesting as neurological, cardiovascular, digestive, and sexual disorders, in addition to oral cavity alterations. Chronic alcohol consumption causes oral mucosal atrophy, increasing the solubility of toxic substances and promoting enamel destruction. These structural and functional changes compromise oral tissue integrity and heighten the risk of infections and clinically challenging lesions.⁽⁹⁾

Excessive alcohol consumption also exerts significant toxic effects on vital organs like the liver and brain. In the liver, it is associated with chronic inflammation, fibrosis, and eventual cirrhosis; in the brain, it links to cognitive decline, memory impairment, and reduced intellectual capacity. These consequences are especially concerning among university students, as they affect essential functions for learning, academic performance, and personal development. Alcohol's impact during these life stages may establish risk trajectories and limit individuals' potential for holistic growth.⁽¹¹⁾

CONCLUSIONS

This study on dental students demonstrates that, although most exhibit moderate alcohol consumption patterns, even low levels can generate relevant oral health repercussions. Alcohol affects salivary gland function and may induce xerostomia—a condition that diminishes saliva's protective action and increases the risk of caries and periodontal diseases. It also shifts oral pH toward an acidic environment, favoring enamel demineralization and pathogenic bacterial growth. These findings underscore the need for continuous education and preventive strategies, as cumulative effects compromise oral integrity and must be considered both in professional training and future patient counseling.

BIBLIOGRAPHIC REFERENCES

1. World Health Organization. Alcohol [Internet]. Geneva: WHO; 2024 [citado 29/07/2024]. Disponible en: <https://www.who.int/news-room/fact-sheets/detail/alcohol>
2. Llena Puy C. La saliva en el mantenimiento de la salud oral y como ayuda en el diagnóstico de algunas patologías. Med Oral Patol Oral Cir Bucal [Internet]. 2006 [citado 29/07/2024]; 11(5): 449–55. Disponible en: https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1698-69462006000500015
3. Inenaga K, Ono K, Hitomi S, Kuroki A, Ujihara I. Thirst sensation and oral dryness following alcohol intake. Jpn Dent Sci Rev [Internet]. 2017 [citado 29/07/2024]; 53(3): 78–85. Disponible en: <https://doi.org/10.1016/j.jdsr.2016.12.001>
4. Pan American Health Organization. Serie Alcohol – El alcohol en la adolescencia [Internet]. Washington, DC: PAHO; 2018 Jul 18 [citado 29/07/2024]. Disponible en: <https://www.paho.org/es/documentos/serie-alcohol-alcohol-adolescencia>
5. Ruiz Candina H, Herrera Batista A, Puldón Seguí G. Enfermedades médicas y estomatológicas provocadas por el alcoholismo en adultos y adolescentes. Modelos animales. Rev Cuba Investig Bioméd [Internet]. 2012 [citado 29/07/2024]; 31(1): 26–36. Disponible en: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-03002012000100003
6. Morcilio M, Reibel YG, Theis-Mahon N, Thelen RM, Arnett MC. Oral and General Health Implications of Alcoholism: A review of the literature. J Dent Hyg [Internet]. 2025 Feb [citado 29/07/2024]; 99(1): 41-54. Disponible en: <https://pubmed.ncbi.nlm.nih.gov/39929522/>
7. Kusu Y, Furuta M, Kageyama S, Yamashita Y, Takeshita T. Mediating factors associated with alcohol intake and periodontal condition. Front Oral Health [Internet]. 2025 Apr 24 [citado 29/07/2024]; 6: 1524772. Disponible en: <https://doi.org/10.3389/froh.2025.1524772>
8. González-López LL, Morales-González Á, Sosa-Gómez A, Madrigal-Santillán EO, Anguiano-Robledo L, Madrigal-Bujaidar E, et al. Damage to Oral Mucosae Induced by Weekend Alcohol Consumption: The Role of Gender and Alcohol Concentration. Applied Sciences [Internet]. 2022 [citado 29/07/2024]; 12(7): 3464. Disponible en: <https://doi.org/10.3390/app12073464>
9. Matos-Sousa JM, Melo WWP, Dos Santos VRN, Pereira CDS, Mendes PFS, Lemos FLM, et al. High-intensity ethanol binge drinking pattern in adolescence induces long-lasting impairment in the salivary glands and saliva quality of rats. Naunyn Schmiedebergs Arch Pharmacol [Internet]. 2026 [citado 29/07/2024]; 399: 2353–2371. Disponible en: <https://doi.org/10.1007/s00210-025-04491-3>
10. Astoviza M, Socarrás Suárez MM. El alcoholismo, consecuencias y prevención [Internet]. Rev Cuba Investig Bioméd [Internet]. 2003 [citado 29/07/2024]; 22(1): 25-31. Disponible en: <http://scielo.sld.cu/pdf/ibi/v22n1/ibi04103.pdf>