

Dental and Periodontal Conditions in Alcoholics from a Brazilian Recovery Center

Las Condiciones Dentales y Periodontales en Alcohólicos de un Centro de Recuperación Brasileño

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ABSTRACT: The aim of this study was to evaluate the dental and periodontal condition of alcohol-dependents from a Brazilian Recovery Center. Sixty male individuals (30 alcoholic and 30 non-alcoholic) and aged between 32 and 72 years old were clinically evaluated. Interviews, dental and periodontal clinical examinations were obtained from all participants. The Pearson Chi-Square Test and Exact Fisher test were used to compare categorical data. The t-Student's test was adopted for non-categorical data. Multiple logistic regressions were used to evaluate the association of variables in the groups. The alcoholics were younger, consumed more tobacco, had lower frequency of tooth brushing and dental flossing, higher number of missing and decayed teeth, more residual root, and more teeth with presence of visible plaque index (OR = 0.5, 95 % CI = 4.4 to 5.5), when compared to the non-alcoholics. Alcoholics at the Recovery Center performed poor oral hygiene, had higher number of sites with periodontal disease, and worse oral hygiene than non-alcoholic individuals. As regards professional follow-up, there was similarity between the groups evaluated.

KEY WORDS: dentistry, alcoholism, dental caries, periodontal diseases.

INTRODUCTION

Alcohol abuse or dependence is an important risk factor for many diseases and incapacities that may threaten people's health. In 2012, 5.9 % of all deaths and 5.1 % of all cases of diseases in the world were correlated with the consumption of alcoholic beverages (World Health Organization, 2014). In Brazil, 48 % of the population report they do not consume alcoholic beverages. However, the consumption of alcohol is very high within those who consume, resulting in 3 % of harmful use, 9 % of dependents, and 12 % of alcohol-related illnesses (Laranjeira *et al.*, 2007a). A previous

study showed that 6.8 % of population was alcohol-dependent, and that the 20 % of adults who drank were responsible for 56 % of all the alcohol consumed by adults (Laranjeira *et al.*, 2007b).

The tissue damage stimulated by alcohol consumption is related to the toxicity of its main metabolite, acetaldehyde, and to the increase in formation of free radicals (such as hydrogen peroxide). Other complications of chronic alcohol users include nutritional deficiency (Manzo-Avalos & Saavedra-

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Molina, 2010), changes in immune response, poor oral hygiene (Saini *et al.*, 2013), and damage in salivary glands (Faustino & Stipp, 2003). The chronic use of alcohol is also harmful to the oral mucosa, and is related to a higher incidence of caries, periodontal disease, tooth wear (Dasanayake *et al.*, 2010), xerostomia (Pinto-Coelho *et al.*, 2002) and squamous cell cancer (Carrard *et al.*, 2008). Dental caries is one of the most prevalent lesions in alcoholic patients (Falcão *et al.*, 2015), and alcohol consumption can be considered an indicator of risk for periodontitis (Pitiphat *et al.*, 2003).

A previous study demonstrated that alcohol dependence increased 2.5 times the risk for tooth loss, but severe periodontal disease was not associated with alcohol dependence (Pinto-Filho *et al.*, 2018). Despite some evidence on the relationship between alcohol consumption and oral diseases, a still limited number of studies regarding this topic have been published to date. Therefore, the aim of this study was to evaluate the dental and periodontal condition of alcohol-dependent from a Brazilian Recovery center.

MATERIAL AND METHOD

This cross-sectional study was realized in accordance with the Helsinki Declaration of human studies and the Resolution 466/12 of the National Health Council after approval of the Human Research Ethics Committee, under No. 1.943.623.

The sample was performed by 60 male individuals (30 alcoholic and 30 non-alcoholic) Brazilians, all of whom were over 32 years old. Alcoholics were selected in a reference out-patient Clinic for the treatment of alcohol dependence (Alcoholic Assistance Program at the University Hospital Cassiano Antônio Moraes, Health Sciences Center, Federal University of Espírito Santo, ES, Brazil). The non-alcoholic subjects were randomly selected from the record charts of patients that attended the periodontal outpatient clinic at the University (Federal University of Espírito Santo, ES, Brazil) from July 2015 to December 2017.

Were excluded of the study alcoholics individual who presented: neoplastic diseases, acute febrile diseases, some condition that would contraindicate dental treatment, and refusal to sign the

informed consent term. For the non-alcoholic group the exclusion criterion was ingestion of alcoholic beverages.

The alcoholic individuals answered a questionnaire including information of socio-demographic characteristics, frequency of alcoholic beverage consumed and period of abstinence. The diagnosis of chronic alcoholism was made in accordance with the criteria of the 10th edition of the International Classification of Diseases - ICD-10 (World Health Organization, 1994). The socio-demographic characteristics and the absence of alcohol consumption in the non-alcoholic group were obtained from the previously filled out record charts.

Dental evaluation. A standard dental exam was performed to record presence of decayed, restored, missing teeth and those indicated for extraction, in both groups. This exam is composed of a square with a picture of all the teeth, and by lines on which the examiner describes the condition of each tooth per surface (vestibular, mesial, lingual, distal and occlusal or incisal). A single examiner not involved in the alcohol treatment carried out the exams of the Alcoholic Group. For the Non-Alcoholic Group the information was collected from the patient records.

Periodontal evaluation. In the Alcoholic Group, the following periodontal measurements were obtained from six sites (mesio-buccal, buccal, disto-buccal, mesio-lingual/palatine, lingual/palatine and disto-lingual/palatine) of all teeth, except third molars and residual roots by a calibrated professional. To perform the intraexaminer calibration, before the beginning of the research, the selected professional was submitted to the Kappa test. The calibration was continued until the agreement was excellent (>0.75).

For periodontal evaluated, were recorded: (1) Probing Pocket Depth (PPD) - measured in millimeters; (2) Clinical Attachment Level (CAL) - measured in millimeters; (3) Visible Plaque Index (VPI) - dichotomous data were expressed, the presence (Score 1) or absence (Score 0) was evaluated; (4) Gingival Bleeding Index (GBI) – dichotomous data were expressed, the presence (Score 1) or absence (Score 0) was evaluated; (5) Bleeding on Probing (BOP) - dichotomous data. All measurements were performed for each implant using a periodontal probe (PCPNU 15 Hu-Friedy Inc., Chicago, IL, USA). For the Non-Alcoholic Group periodontal measurements were obtained from previously patient recorded.

Statistical analysis. Data were reported as frequency, percentage and mean. The Pearson Chi-Square Test and Exact Fisher test were used to compare categorical data. The Student's-t test was used for comparisons between alcoholics and non-alcoholics non-categorical data. Multiple logistic regression was used to evaluate the association of VPI, GBI, PPD, CAL, and BOP in the groups. The level of significance established for the tests was 5 %, which established a 95 % confidence interval for the presented results, and the power of a statistical test was 80 %. Statistical analyses were performed in IBM SPSS Statistics version 24.

Table I. Characterization and association of socio-demographic data and other factors between the Groups.

		Alcoholic		p-Value
		N	%	
Time of abstinence	0 to 7 days	17	56.67	0.003 ^c
	7 to 30 days	2	6.67	
	Longer than	11	36.67	
Years of consumption	0 to 10 years	3	10.00	0.001 ^c
	11 to 20	8	26.67	
	21 years or	19	63.33	
Types of beverages consumed	Sugarcane	28	65.12	< 0.001
	Beer	13	30.23	
	Wine	1	2.33	
	Others	1	2.33	
		Mean	Standard Deviation	
Consumption of beverages		374.50	260.63	

RESULTS

The results are shown in six tables. The sociodemographic data of the study are shown in Table I. The behaviors for the Alcoholic Group are shown in Table II. Self-report and self-perceive dental history of alcoholic and non-alcoholic patients are shown in Table III. The frequency of dental

problems according to the frequency of daily tooth brushing as shown in Table IV. For missing teeth, alcoholics and non-alcoholics who did not use dental floss were most affected by tooth losses as shown in Table V. The periodontal parameters are shown in Table VI.

Table II. Characterization of alcoholic beverage consumption by Alcoholic Group.

		Alcoholic		Non-Alcoholic		p-Value
		N	%	N	%	
Skin Color ¹	White	9	30.00	9	32.14	0.843 ^a
	Dark	14	46.67	11	39.29	
	Black	7	23.33	8	28.57	
Schooling ¹	Illiterate	1	3.33	1	3.70	0.056 ^b
	1 to 8 years	19	63.33	9	33.33	
	9 to 10 years	6	20.00	9	33.33	
Systemic Diseases	11 years or older	4	13.33	8	29.63	0.999 ^a
	No	15	50.00	14	46.67	
	Yes	15	50.00	16	53.33	
Smoking	No	15	50.00	28	93.33	< 0.001 ^a
	Yes	15	50.00	2	6.67	
Use of other drugs	No	26	86.67	30	100.00	0.112 ^b
	Yes	4	13.33	0	0.00	
Use of medication	No	12	40.00	15	50.00	0.604 ^a
	Yes	18	60.00	15	50.00	
		Mean	Standard Deviation	Mean	Standard Deviation	p-Value
Age (years)		48.57	11.16	54.27	10.12	0.043 ^d

(^a) The Pearson Chi Square test; (^b) Exact Fisher Test; (^d) Student's-t test for independent samples.

(¹) Exclusion of individuals from Non-alcoholic Group due to lack of information.

Table III. Self-report and self-perceive of dental profile for both groups.

		Alcoholic		Non-Alcoholic		p-Value
		N	%	N	%	
Dental Follow-up	No	29	96.67	24	80.00	0.103 ^b
	Yes	1	3.33	6	20.00	
	Less than 1 year ago	6	20.00	8	26.67	
Last visit to dentist ¹	1 to 5 years	14	46.67	6	20.00	0.339 ^b
	6 to 10 years	2	6.67	2	6.67	
	11 to 20 years	6	20.00	2	6.67	
	over 21 years	2	6.67	0	0.00	
Gingival bleeding ¹	No	22	75.86	16	53.33	0.013 ^a
	Yes	7	24.14	14	46.67	
Tooth mobility	No	19	63.33	15	50.00	0.435 ^a
	Yes	11	36.67	15	50.00	
	None	1	3.33	0	0.00	
Daily Tooth Brushing frequency	Once	7	23.33	1	3.33	0.006 ^b
	Twice	13	43.33	8	26.67	
	Three	9	30.00	17	56.67	
	Four	0	0.00	4	13.33	
Use of dental floss	No	19	63.33	8	26.67	0.009 ^a
	Yes	11	36.67	22	73.33	

(^a) The Pearson Chi Square test; (^b) Exact Fisher Test.

(¹) Exclusion of individuals from Non-alcoholic Group due to lack of information.

Table IV. Characterization and association of frequency of daily tooth brushing with dental problems between the groups.

Status	Daily Tooth Brushing frequency	Alcoholic		Non-Alcoholic		p-Value
		N	%	N	%	
Carious	None	3	4.11	0	0.00	< 0.001 ^a
	Once	12	16.44	5	5.75	
	Twice	37	50.68	14	16.09	
	Three	21	28.77	50	57.47	
	Four	0	0.00	18	20.69	
Total:		73	100	87	100	
Healthy	None	4	0.98	0	0.00	< 0.001 ^a
	Once	91	22.25	7	2.16	
	Twice	196	47.92	89	27.47	
	Three	118	28.85	199	61.42	
	Four	0	0.00	29	8.95	
Total:		409	100	324	100	
Lost	None	25	7.60	0	0.00	< 0.001 ^a
	Once	106	32.22	9	2.81	
	Twice	106	32.22	94	29.38	
	Three	92	27.96	155	48.44	
Total:		329	100	320	100	
Residual roots	One	10	21.74	0	0.00	< 0.001 ^b
	Two	34	73.91	0	0.00	
	Three	2	4.35	5	100.00	
Total:		46	100	5	100	
Restored	One	6	5.45	11	4.42	< 0.001 ^a
	Two	45	40.91	63	25.30	
	Three	59	53.64	150	60.24	
	Four	0	0.00	25	10.04	
Total:		110	100	249	100	

(^a) The Pearson Chi Square test; (^b) Exact Fisher Test

Table V. Characterization and association of frequency of weekly use of dental floss with dental problems between the groups.

Status	Brushing and weekly use of dental floss	Alcoholic		Non-Alcoholic		p-Value
		N	%	N	%	
Carious	None	51	69.86	38	64.41	0.709 ^b
	Three	18	24.66	16	27.12	
	Seven	4	5.48	5	8.47	
Total:		73	100	59	100	
Healthy	None	247	60.39	69	35.20	< 0.001 ^a
	Three	99	24.21	84	42.86	
	Seven	63	15.40	43	21.94	
Total:		409	100	196	100	
Lost	None	242	73.56	112	55.72	< 0.001 ^a
	Three	68	20.67	75	37.31	
	Seven	19	5.78	14	6.97	
Total:		329	100	201	100	
Residual roots	None	15	32.61	1	33.33	0.005 ^b
	Three	29	63.04	0	0.00	
	Seven	2	4.35	2	66.67	
Total:		46	100	3	100	
Restored	None	59	53.64	42	25.77	< 0.001 ^a
	Three	42	38.18	87	53.37	
	Seven	9	8.18	34	20.86	
Total		110	100	163	100	

(^a) The Pearson Chi Square test; (^b) Exact Fisher Test

Table VI. Characterization and association of Periodontal Indexes (VPI, GBI, PD, CAL and BOP) between Groups.

		Alcoholic		Non-Alcoholic		p* Value	OR:	Interval of 95 % for OR	
		N	%	N	%			Lower limit	Upper limit
VPI	Absence	586	18.16	1784	50.84	-	1	-	-
	Presence	2640	81.84	1724	49.13	< 0.001	4,953	4,410	5,563
GBI (%)	Absence	2483	76.97	2906	82.82	-	1	-	-
	Presence	743	23.03	603	17.18	0.120	1.111	0.973	1.269
PD	Up to 3 mm	2570	79.67	2711	77.26	-	1	-	-
	4 or more mm	656	20.33	798	22.74	0.054	1.177	0.997	1.390
CAL	Up to 3 mm	2109	65.38	2013	57.37	-	1	-	-
	4 or more mm	1117	34.62	1496	42.63	< 0.001	0.503	0.437	0.578
BOP	Absence	1303	40.39	1652	47.09	-	1	-	-
	Presence	1922	59.58	1855	52.88	0.083	1.104	0.987	1.235

DISCUSSION

In this study, an investigation was made into the oral conditions of alcohol-dependent patients in a sample of adults. Only alcoholic individuals of the male were considered, because there are significant

differences in alcohol metabolism between male and female. With less time of use and lower quantity of alcohol ingested female present with fewer chronic lesions than men (Ceylan-Isik *et al.*, 2010). Even in

studies in which both sexes performed the sample, the majority of them were composed of male (Khocht *et al.*, 2009; Dasanayake *et al.*, 2010; Costa *et al.*, 2011; Falcão *et al.*, 2015). This was expected, because men show higher prevalence of alcoholism than female, 8.6 % and 4.9 %, respectively (Magnusson *et al.*, 2012).

There were statistically significant differences in the ages of the groups evaluated in this study, in which the alcoholics were younger than the non-alcoholics. Chemical substance users are predominantly youngsters (Ribeiro *et al.*, 2002) and the increase in prevalence of periodontal disease is directly related to increase in age (Brunetti *et al.*, 2007).

Alcoholics have worse oral hygiene habits than non-alcoholics. Alcohol-dependent persons have dry mouth during the night, are negligent about personal and professional health care, have a cariogenic diet, so that these are the probable explanations for the higher level of caries experience observed among them (Dasanayake *et al.*, 2010). In the present study alcoholics presented more dental caries and residual roots than the non-alcoholics, corroborating with the study of Seemüller *et al.* (2015). Differently from our findings, Khocht *et al.* (2009) and Rooban *et al.* (2009) found no significant differences between the oral hygiene habits for alcoholic individuals. However, the non-alcoholic group in both studies had users of other chemical substances and who combined the use of alcohol with other drugs in their samples; this was the probable reason for the similarity in the oral hygiene between the groups evaluated.

In this investigation, similarly to the study of Costa *et al.* (2011) the longer the time of chemical dependence was, the more affected by dental and periodontal problems were the individuals. Vieira *et al.* (2014) showed that oral hygiene was closely related to the periodontal condition. Irrespective of the individual belonging to the chemical-dependent group or not, the worse the hygiene, the more severe was the periodontal condition. In the present study, those who used dental floss every day presented better periodontal conditions. As regards daily tooth brushing, the possible explanation for the result found in relation to CAL was that the data analyzed came from the information provided by the patient, which may have been influenced by the professional's presence, so the patient answered what he knew was correct, and did not report his real tooth brushing habit. Moreover, the tooth brushing technique may also have had an influence on this analysis.

Among the various factors related to the etiology of periodontal disease, tobacco is a factor of considerable relevance, because the components of cigarettes are inducers of disease by direct local damage to the periodontal tissues, or by action on the immunological response, harming the neutralization of infections and leading to destruction of the periodontium (Brunetti *et al.*, 2007; Nascimento *et al.*, 2018). It was observed a higher number of sites with periodontal disease in smokers. Coretti *et al.* (2017) also found a worse periodontal health condition in smokers. In smokers, periodontal disease is more severe, and it is important for the professionals to make patients aware of the risk to their oral health resulting from smoking (Medeiros & Dias, 2018).

The consumption of both legal and illegal drugs is a risk factor for oral health, and the use of these substances is related to certain types of oral pathologies (Marques *et al.*, 2016). Dentistry professionals are frequently the first one to attend chemically dependent patients, thus they require special attention and knowledge about the subject (Fernandes *et al.*, 2008), in order to recognize the dental needs of these patients, institute the correct treatment, and refer them to other health professionals with a view to obtaining multidisciplinary treatment (Lopes *et al.*, 2018; Medeiros & Dias, 2018).

Among the limitations of the present study were: the reduced sample size; lack of information about other important factors for the occurrence of tooth and periodontal disease, such as exposure to fluoride, diet of the participating individuals (for analysis of the quantity of fermentable carbohydrates consumed) and analysis of the microorganisms present in the oral cavity. As this was a cross-sectional study, the absence of follow-up of the alcoholic group made it impossible to establish a relationship of cause and effect between alcohol consumption and the occurrence of dental and periodontal problems. Therefore, studies with larger samples and longitudinal follow-up are necessary to establish the influence alcohol has on oral health.

CONCLUSION

It can be concluded from this study that: Alcoholic individuals presented higher prevalence of caries, residual roots, proportionally to the number of teeth evaluated. Alcoholics also had worse oral hygiene than non-alcoholic individuals. According to periodontal disease, alcoholics had more sites with presence of

dental plaque and a lower number of sites with CAL greater than or equal to 4 mm. The quantity of alcohol consumed had no influence on the occurrence of dental problems. A longer time of alcohol use was positively related to the occurrence of dental and periodontal problems.

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RESUMEN: El objetivo de este estudio fue evaluar las condiciones dentales y periodontales de los alcohólicos de un Centro de Recuperación de Brasil. Sesenta hombres (30 alcohólicos y 30 no alcohólicos) y con edades comprendidas entre 32 y 72 años fueron evaluados clínicamente. Se obtuvieron entrevistas, exámenes clínicos dentales y periodontales de todos los participantes. La prueba de Chi-cuadrado de Pearson y la prueba exacta de Fisher se utilizaron para comparar datos categóricos. La prueba de t-Student se adoptó para datos no categóricos. Se utilizaron regresiones logísticas múltiples para evaluar la asociación de variables en los grupos. Los alcohólicos eran más jóvenes, consumían más tabaco, tenían menor frecuencia de cepillado dental y uso de hilo dental, mayor número de dientes perdidos y cariados, más raíz residual y más dientes con presencia de índice de placa visible (OR = 0,5, 95 % CI = 4,4 a 5,5), en comparación con los no alcohólicos. Los alcohólicos en el Centro de Recuperación realizan una mala higiene bucal, tenían un mayor número de sitios con enfermedad periodontal y una peor higiene bucal que los no alcohólicos. En cuanto al seguimiento profesional, hubo similitud entre los grupos evaluados.

PALABRAS CLAVE: odontología, alcoholismo, caries dental, enfermedades periodontales.

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