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Dental Care and Oral Disease in Alcohol Dependent Persons

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Abstract

Dental/oral health of alcoholics and substance abusers is often neglected. It is not clear that alcohol dependence has effects on oral health beyond those expected in non-alcoholic persons of similar socioeconomic status (SES). Study objectives were to examine the personal dental care habits, ability to access professional dental care and the types of services received, and examine their effect on the oral health of alcoholics and substance abusers. Forty DSM-III-R diagnosed alcoholics and a comparison group of 25 non-alcoholic subjects matched for race, age, sex and SES were recruited. Subjects were medically healthy. Each subject received a comprehensive oral/dental examination and an interview was conducted to record personal dental hygiene habits, ability to access professional dental care and types of dental services provided.

Results—No statistical differences were found between the oral care habits of the groups. Forty-four percent of all subjects had access to charity professional dental care. Tooth extraction was the main dental service they received. Seventy-five percent of subjects brushed their teeth once or more per day. In the non-alcoholic group, brushing frequency was inversely associated with plaque levels ($p < 0.05$); in the alcoholic group brushing frequency showed no statistical effect on plaque levels. Access to professional dental care was inversely associated with periodontitis in the alcoholic group ($p < 0.05$).

Conclusions—Alcohol dependence may increase plaque levels above that seen in race, sex, age and SES-matched controls, but professional dental care can limit the subsequent development of periodontal disease in these people.

Keywords

Dental care; Alcohol dependence; Drug abuse; Periodontal diseases

Introduction

Heavy alcohol drinking and illicit drug use are serious health problems affecting millions of Americans. The Substance Abuse and Mental Health Services Administration (SAMHSA) reported in the 2007 National Survey on Drug Use and Health that an estimated 22.3 million Americans aged 12 or older were classified with substance dependence or abuse in the past

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year. Of these, 3.2 million were classified with dependence on or abuse of both alcohol or illicit drugs, 3.7 million were dependent on or abused illicit drugs but not alcohol, and 15.5 million were dependent on or abused alcohol but not illicit drugs.

Others and we have previously shown that alcohol dependence and substance abuse are associated with increased risk for oral diseases such as caries and periodontitis (Hede 1996; Khocht, Janal, Schleifer, & Keller 2003; Molendijk, Ter Horst, Kasbergen, Truin, & Mulder 1996). Despite this well documented susceptibility to oral diseases, there is only limited information concerning the circumvention of oral disease in alcoholics and substance abusers. The many medical, psychiatric and social problems affecting these patients tend to overshadow their oral health. What is often not taken into consideration is that their oral health is relevant to their overall health and the management of their medical problems. HIV infections associated with needle use among drug users could be detected early with access to professional dental care (Ritter & Patton 2007; Zakrzewska & Atkin 2003). Alcoholics and drug users tend to also smoke tobacco that increases their risk for periodontitis and oral cancer (Berggren, Berglund, Fahlke, Aronsson, Eriksson, & Balldin 2007; Harris, Warnakulasuriya, Cooper, Peters, & Gelbier 2004). Periodontal infections and needle use among substance abusers compound the risk for bacteremia and heart disease (Forner, Larsen, Kilian, & Holmstrup 2006; Haynes & Stanford 2003). Improved oral health and access to professional dental care among alcoholics and substance abusers would lessen their medical problems and decrease their health care burden on society.

Personal dental care habits and access to professional dental care are important factors in reducing oral diseases. It is the objective of this report to investigate the personal dental care habits, access to professional dental care and the types of services received, and examine their effect on the oral health of alcoholics and substance abusers.

Materials and Methods

Subject recruitment and clinical evaluations were previously described (Khocht, Janal, Schleifer, & Keller 2003). To summarize, alcoholic subjects were recruited for a study of immune and other health factors in persons with alcoholism. Subjects were derived from a patient population presenting for evaluation and treatment at a university hospital ambulatory alcohol treatment center (ATC) in Newark, New Jersey. The majority of patients attending the ATC were indigent, from 30–60 years of age, more than 90% African American, with a 3:1 male:female gender distribution. Initial screening at ATC referred to the study only English-speaking subjects. Those showing evidence of disabling or life-threatening medical disorders were not referred, including those with known neoplastic diseases or AIDS. Patients presenting with injecting drug use or other primary non-alcohol substance abuse were also not referred. A total of 1870 patients were screened at ATC. Only 320 subjects met the inclusion/exclusion criteria and were referred to the study. Non-alcoholic subjects consisted of inner city residents recruited from community programs (including indigent persons receiving assistance from local churches and other centers) and personal referrals. All subjects read and signed an informed consent form approved by the UMDNJ-New Jersey Medical and Dental Schools Institutional Review Boards.

All subjects entered underwent psychosocial assessments by trained interviewers meeting inter-rater reliability criteria to diagnose substance dependence. The symptoms of dependence were determined according to the Diagnostic and Statistical Manual of Mental Disorders, Third Edition Revised (DSM-III-R) (American-Psychiatric-Association 1994), using the Structured Clinical Interview for DSM-III-R (SCID), designed to enable trained interviewers to make substance dependence diagnoses according to DSM-III-R. The SCID established alcohol

dependence and history of abuse of other substances. For representative recent and long-term time frames, history of type and volume of alcohol consumed was taken.

A total of 102 subjects consented to participate in the dental/periodontal evaluations. Thirty-four subjects were disqualified for not completing all study examinations and 3 subjects for being edentulous. Entered into the study were a total of forty DSM-III-R verified alcoholic dependent subjects, either exclusively ($n = 10$) or alcohol plus other drugs, primarily cocaine ($n = 30$), and a matched comparison group of 25 non-alcoholic subjects, 14 of whom were cocaine abusers. Subjects in both groups were all African Americans. Non-alcoholic subjects were comparable to alcoholic patients on variables of age and sex. Subjects averaged 41 years old, were 50% male, and about 75% smoked cigarettes (Khocht, Janal, Schleifer, & Keller 2003).

On the day of their dental examination, all subjects answered a dental health questionnaire. This was followed by a comprehensive oral/periodontal evaluation including probing measurements. All dental exams were performed by examiner AK. The examiner was calibrated and standardized in the use of the clinical evaluation measures employed in the study. The examiner recorded the Loe and Silness gingival index (GI) (Loe 1967) around all teeth present. Each tooth was scored at six sites, mesiobuccal, buccal, distobuccal, mesiolingual, lingual and distolingual. The teeth were then disclosed with D and C Red No. 28 dye and the Quigley Hein plaque index (Quigley & Hein 1962) on the same six surfaces was determined. Surfaces with large restorations and teeth with crowns were not scored.

A conventional periodontal probe with Williams markings (PQ-OW, Hu-Friedy) was used for all probing measurements. Probing depth (PD) was taken on six sites per tooth, mesiobuccal, buccal, distobuccal, mesiolingual, lingual and distolingual. The probe was inserted parallel to the long axis of the tooth on the buccal and lingual surfaces. Interproximally, the probe was placed with slight angulation, as close to the contact area as possible. At the gingival margin the reading was taken to the nearest millimeter. The position of the gingival margin (GM) to the cemento-enamel junction was recorded at the same six sites per tooth to the nearest millimeter. A (-) sign was given when the gingival margin was coronal to the cemento-enamel junction and a (+) sign when it was apical. Attachment levels were calculated according to the formula $AL = PD + GM$. Also all clinically detectable tooth decay (caries) was recorded. For all the aforementioned examinations, only fully erupted teeth were used, except third molars were not included. The examiner was blinded in regard to alcohol dependence diagnosis.

The demographic and clinical data (except for tooth decay) was previously published (Khocht, Janal, Schleifer, & Keller 2003). A summary of this data is presented in table 1. No statistical differences were present between the two groups in any of the demographic or clinical parameters. To summarize, AL averaged 3.1 mm, PI averaged 2.6, and GI averaged 1.0; the average subject presented with 19 teeth, 13% of which were decayed.

Dental interview

All subjects were interviewed regarding their living conditions, perception of oral health, practice of oral hygiene, access to professional dental care within the past 12 months, and types of dental services received by a research assistant trained to conduct such interviews.

Statistical analysis

t-test or chi-square analysis was used to compare the differences in dental care habits of alcoholics versus non-alcoholics. Analysis of covariance (ANCOVA) was used to examine the effect of brushing frequency on plaque levels and the effect of dental care habits on dental disease.

Results

Even though all subjects were living in shelters, they all had access to a bath with sink and running water. Subjects in both groups were sharing the same bath with multiple other individuals. Eighty-nine percent of the subjects shared a bath with up to 10 individuals; 11% shared a bath with 16 to 60 individuals. The number of subjects sharing a bath was statistically similar between the two groups. All subjects reported owning a toothbrush and 80% of the subjects reported using toothpaste when they brushed their teeth. The remaining 20% brushed their teeth with a wet brush without paste. None of the subjects reported sharing a toothbrush with others.

Dental care variables for the alcohol abusing and comparison group subjects are shown in Table 2. Forty-four percent of subjects reported access to professional dental care. Dental services included fillings, extractions and tooth cleaning. No specialized dental services, such as root canal treatment, crown and bridge, or surgical periodontal therapy were reported. The main reason for dental visits was dental pain, and tooth extraction ranked as the top service received, followed by filling and tooth cleaning. No statistical differences were evident between groups for brushing frequency, toothbrush change, mouth rinsing and access to professional dental care (table 2). Alcoholics were more likely to report using a hard toothbrush than non-alcoholics ($p = 0.039$). None of the subjects flossed. Mouth rinsing reported was mainly with water. In both groups, the number of individuals sharing a bath was inversely related to tooth brushing frequency ($r = -0.4$, $p = 0.001$).

ANCOVA was used to examine the effect of brushing frequency on plaque levels and tooth decay in each group. Analysis showed an interaction between group and brushing frequency on plaque levels ($F(1, 55) = 3.95$, $p = 0.052$), and on tooth decay ($F(1, 55) = 7.44$, $p = 0.008$). Post-hoc analysis (Tukey HSD) showed that among non-alcoholics, those who brushed once or more per day harbored less plaque and showed less decay than those who brushed less than once per day ($ps < 0.05$). On the other hand, brushing frequency had no effect on either plaque levels or tooth decay in the alcoholic group.

ANCOVA (accounting for risk factors associated with periodontitis: age, sex, plaque, cigarette smoking) also showed an interaction between group and the influence of professional dental care on clinical periodontal attachment levels (AL) ($F(1, 38) = 4.19$, $p = 0.047$). Post-hoc analysis (Tukey HSD) showed that whereas access to professional care was unrelated to AL in non-alcoholics, alcoholics with access to professional dental care had less loss of AL than alcoholics with no access to dental care ($p < 0.05$).

Discussion

The patient group investigated in this study represents a unique population that is at greater risk for oral/dental disease yet is often less able to receive appropriate dental care. They exemplify the inadequacies and inequities of our oral health care system. They all come from poor and minority groups with minimal education and limited work skills. Their psychiatric illness, alcohol dependence and drug addiction further hamper their ability to take better care of themselves.

Despite the adverse and difficult living conditions, all subjects owned a toothbrush and most made the effort to brush their teeth. This desire to own a toothbrush and use it certainly indicates interest in oral health among this group. Alcoholics preferred using a hard toothbrush. This choice may be related to a faulty perception that a hard toothbrush would be more effective in eliminating the alcoholic odor after alcohol consumption.

Alcoholics, despite reporting similar brushing frequency, brushed less effectively than the non-alcoholics. Also, tooth brushing in the alcoholic group did not benefit their oral health (as measured by periodontal clinical attachment levels and percentage of decayed teeth). These findings suggest that alcoholics are unable to practice basic dental hygiene adequately. It may be explained by impaired motor activity associated with prolonged and excessive alcohol use. It also may be related to their use of hard toothbrush. The stiffer bristles of a hard toothbrush may be less effective in reaching between the teeth to remove plaque.

Forty-four percent of the subjects of this study had access to professional dental care. This figure is comparable to reported figures for dental care access among US workers that ranged from 35 to 57% (Caban-Martinez, Lee, Fleming, Arheart, Leblanc, Chung-Bridges, Christ, & Pitman 2007). This relatively high access to dental care in the population we examined may be atypical of the alcohol dependent population in general and may be influenced by the fact that the subjects in this study are care-seeking subjects who were recruited from an alcohol treatment center.

The relatively high percentage of alcoholics and substance abusers in this population having access to professional dental care suggest that local communities are active in helping this group of underserved patients. Still, more than half of the subjects (56%) did not have access to dental care. Also, treatment provided under charity care programs, unlike regular dental programs, are limited to the very basic of dental services. As indicated by the questionnaire, tooth extraction, caries control and tooth cleaning were the main therapies provided. Due to the economic limitations of such programs, no advanced or continued therapy could be provided. The main focus is emergency care with tooth extraction as the main option to relieve oral/dental discomfort and pain. Despite the limitations of these charity programs, limited service appears far preferable to no service at all.

Alcoholics benefited the most from ability to access professional dental care. Being able to visit a dental clinic was inversely correlated with loss of periodontal attachment among alcoholics (data not shown). Since periodontal therapy was not specifically provided, the most likely explanation to this favorable outcome is that alcoholics with advanced periodontal problems opted to have the affected teeth extracted. If true, this "favorable" outcome may not reflect a true improvement in periodontal health.

A recent report (Turner, Laine, Cohen, & Hauck 2002) examined the effect of medical, drug abuse, and mental health care on receipt of dental care by drug users. They reported that HIV-positive drug abusers without AIDS are more likely to seek dental care than HIV-negative drug users. However, drug users with AIDS are less likely to receive dental care probably due to disability and other significant health issues. Our study focused on medically healthy alcohol and drug users, a group less studied in previous reports. All the subjects in our study expressed a desire to see a dentist and seek dental care. Those subjects who were not able to visit a dentist within a twelve-month period prior to the date of their enrollment in the study indicated that the main reason was economic.

In conclusion, the results of this study show that oral/dental health is important to alcohol and drug abusers. The practice of basic oral hygiene and access to limited professional dental care were helpful in reducing oral disease in this population. Access to professional dental care compensated for the inadequate personal hygiene of alcoholics. Health care providers involved in the treatment of alcohol and drug abusers should promote oral care.

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Table 1

Summary of demographic and clinical data previously published (except for tooth decay) (Khocht, Janal, Schleifer, & Keller 2003). Data presented as mean (SEM).

Variable	Alcoholics N = 40	Non-Alcoholics N = 25	p level
Demographic:			
Age	41.0 (9.0)	41.6 (12.6)	NS
Sex (male)	22 (55%)	11 (44%)	NS
Smoker (yes)	32 (80%)	16 (66.7%)	NS
Clinical:			
AL (mm)	3.2 (1.0)	3.1 (0.8)	NS
Plaque Index	2.7 (0.6)	2.5 (0.8)	NS
N teeth	17.6 (8.8)	20.4 (8.7)	NS
Tooth decay (%)	13.96 (3.73)	12.51 (2.87)	NS

NS = > 0.20

Table 2

Dental care variables. Data presented as Mean (SD) or percentage (%). P-level indicated the probability that the two groups differ in either a t-test or chi-square test for means or proportions respectively.

Variable	Non-alcoholics N = 25	Alcoholics N = 40	p-level*
Tooth brushing (TB)			
Never	0	5.13%	
1/week	0	2.56%	
>1/wek	13.64%	23.08%	
1/day	27.27%	35.90%	
>1/day	59.09%	33.33%	NS
Brush Type			
Soft	42.11%	20.59%	
Meduim	57.89%	55.88%	
Hard	0	23.53%	0.039
Brush Change			
Number of changes per year, mean (SD)	2.59 (1.18)	2.72 (1.14)	NS
Floss	.	.	.
Mouth Rinsing	84%	82.50%	NS
Professional Dental Care (PDC)	54.55%	37.84%	NS

* NS entries indicate that $p > 0.20$.