

ALCOHOLISM AND DEVELOPMENT OF PERIODONTAL DISEASE

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TITLE: ALCOHOLISM AND DEVELOPMENT OF PERIODONTAL DISEASE

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ABSTRACT:

AIM AND OBJECTIVE: The aim of this study was to investigate whether alcohol use is a determinant of infectious periodontal disease development in a longitudinal setting.

BACKGROUND: Alcohol is known to cause more than 200 diseases and injuries, and it is considered as a necessary cause for about 30 diseases (World Health Organization 2014). In addition to general health, alcohol has also been associated with oral health, and specifically periodontitis, which is one of the commonest oral diseases with a high global burden.

MATERIALS AND METHODS: A research based on a questionnaire was conducted at saveetha dental college in the month of November. The questionnaire contained questions subjecting chronic alcoholics and non alcohol consuming individuals to come to a conclusion, if the chronic alcohol consuming individuals were subjected to a higher risk of periodontal disease in comparison to the non alcohol consuming individuals. The questionnaire was distributed among the out patients at Saveetha Dental College out of which 25 were non alcoholic and 25 were alcoholics. Their pocket depths were also measured. The datas were then tabulated and compared and statistics were obtained.

REASON: The purpose of this study is to analyse the prevalence of periodontal disease in alcoholics vs non alcoholics. This may help dental practitioners to efficiently manage periodontal conditions.

KEYWORDS: Alcoholism, periodontitis, clinical attachment loss, inflammation, gingival recession.

INTRODUCTION:

Periodontitis is invariably described as having a systemic host-mediated component. Several studies have sought to identify and further understand relationships between periodontitis and potential systemic risk factors including consideration of possibilities such as genetic disorders, osteoporosis and alcohol.^[1] Increased alcohol consumption is known to have a broad range of detrimental systemic effects with the attendant potential of modifying the host-mediated response and affecting risk.^[2]

Periodontal disease is caused by three or more presumed disease-causing periodontal pathogens. The disease is categorised as mild, moderate or severe. It damages the bone and connective tissue that supports the teeth. When pockets around the tooth become 4mm deep on probing, the tooth is at risk for infection.^[3] When pockets are 6mm to 7mm or more and there is attachment loss, the tooth is at risk for falling out. The greater the number of teeth lost, the higher the extent of severe periodontal disease.^[4]

While many studies have linked alcohol consumption to other diseases, few have looked at its effects on periodontal disease.^[5] Since excessive alcohol intake can contribute to faster biofilm formation and alcohol users are more likely to have poor oral hygiene, the researchers wanted to see if alcohol consumption was associated with periodontitis.^[6] Alcohol consumption, like smoking, may be related to periodontal disease independently of oral hygiene status.^[7] Established risk factors for periodontal disease are far from explaining the total variability for disease severity. Researchers are considering other possible factors, with life-style among the proposed additional factors.^[8]

Alcohol consumption and oral health share a cause-and-effect relationship, with alcohol serving as the catalyst for the development of many diseases that affect your oral health. Dental decay, gum disease and increased chance of oral cancer are among the risks associated with excessive alcohol consumption.^[9]

Alcohol impairs neutrophil, macrophage, and T-cell functions, increasing the likelihood of infections, possibly raising the risk of periodontitis. Despite the plausible mechanisms, information relating alcohol consumption to periodontitis risk is sparse.^[10] Previous cross-sectional and case control have shown positive associations between alcohol use and periodontal disease; however, prospective data are not yet available.^[11] Furthermore, only one study has assessed the effects of different types of alcohol on the risk of periodontal disease. We therefore examined prospectively the association between alcohol consumption and periodontitis among male patients who happened to visit Saveetha Dental College, Chennai, with respective complaints regarding their oral cavity.

Alcohol, acids and sugars temporarily can weaken enamel but it quickly recovers from this damage. Saliva assists in this process by washing away sugars and preventing them from remaining on teeth.

However, when an individual drinks multiple alcoholic beverage within a short period of time, damaged enamel has no time to repair. The increased exposure to sugars and acids in alcohol, in addition to bad oral hygiene practices, can lead to tooth decay and other oral health problems.^[12]

Periodontitis results from bacterial growth in the mouth. Sugars in alcohol feed these bacteria such as *Bacteroides forsythus*, *Actinobacillus*, *Actinomycetemcomitus*, *Porphyromonas gingivalis*, *Prevotella intermedia*, *Campylobacter rectus*, *Fusobacterium nucleatum*, *Eubacterium saburreum* and can cause inflammation of the gingiva—leading to bleeding, swelling and bad breath among other symptoms.^[13] As periodontitis progresses, it can lead to loosened gum tissue and tooth loss. Recent research has even suggested that alcohol and oral health may have even more far-reaching effects on your overall health, with periodontitis thought to play a major role in conditions such as premature birth and diabetes.^[14]

Alcohol dries the oral cavity and can even dehydrate your entire body. The drying effects of alcohol can result in white tongue, a condition that occurs when papillae become inflamed and bacteria and dead cells become trapped within them, causing a white film to cover the surface of the tongue. The absence of saliva also means that bacteria and food particles that settle around your teeth are not effectively washed away. Conditions such as bad breath or even black hairy tongue can occur as a result.^[15]

Established risk factors for periodontal disease are far from explaining the total variability for disease severity. Researchers are considering other possible factors, with life-style among the proposed additional factors. It is estimated that up to 90% of the U.S. population drink alcohol, 40 to 50% of men have temporary alcohol-induced problems, and 10% of men and 3 to 5% of women develop pervasive and persistent alcoholism.^[16] The economic impact of alcohol abuse and dependence was estimated to be \$150 billion in 1995.^[17] Alcohol consumption, like smoking, may be related to periodontal disease independently of oral hygiene status, contrary to other studies suggesting that periodontal disease is the result of self-neglect due to chronic alcohol consumption. Most studies have examined only the effect of extreme levels of alcohol consumption (alcoholism) on oral tissues. The information on the effect of alcohol intake that does not necessarily reach alcoholism levels is usually overlooked. The prior purpose of this study was to assess and analyse the relationship between alcohol consumption and severity of periodontal disease utilizing the assessment of gingival bleeding, clinical attachment loss.

Alcoholism has been defined by World Health Organization as “a term of long-standing use and variable meaning, generally taken to refer to chronic continual drinking or periodic consumption of alcohol which is characterized by impaired control over drinking, frequent episodes of intoxication, and preoccupation with alcohol and the use of alcohol despite adverse consequences”^[18]. The consequences faced may be physical, psychological, social or economic. An alcoholic is an individual who is obsessed with alcohol and cannot control how much he/she consumes. An alcoholic consumes alcohol for a longer amount of time which leads to development of addiction towards alcohol. The addiction can lead to development of behavioural disorders and may have detrimental effect on mental and physical health.^[19] Alcoholism can be both a habitual (psychological) and a chemical (physical) addiction. Psychological addicts drink to aid themselves to overcome routine problems; particularly sufferings of life. Psychological dependence is drinking in order to function “normally” and feel good. While physical alcoholics are those who feel metabolic conditioned desires for alcohol which drives them daily towards alcohol. Similar to addiction to drugs, alcoholics also suffer from recognizable withdrawal symptoms.^[20] Alcohol addiction can have serious impact on health of an individual. Physical effects include: Gastro-intestinal system: Nausea, vomiting, esophagitis and oesophageal cancer; can also cause gastritis, hepatitis, liver cirrhosis and pancreatitis; impact on teeth, gingivae and oral mucosa can also be seen.

- Central nervous system: Brain cells death, harm to cerebellum and peripheral nerves; problems with cognition and memory; injury to optic nerve, neuropathies etc.
- Cardiovascular system: Heavy alcohol drinkers suffer from Cardiovascular System (CVS) damage such as cardiac muscle disorders, irregular heart rhythms, hypertension and strokes.

- Skin: skin lesions like pellagra, psoriasis, discoid eczema and superficial infections are more common in heavy drinkers which can result bluish colour of the face.
- Respiratory system: Alcohol abuse causes significant derangements in the lung and predisposes individuals to the development of pneumonia and acute lung injury; increased risk of tuberculosis.^[21]
- Mental disorders like depression, violence, psychosis, memory loss, and illusions.^[22]
- Alcoholics normally live 10-12 years less than non-alcoholics. Further, the death rate among alcoholics is 2.5 times higher than normal. Light to moderate drinking (up to one drink or 15 g alcohol a day for women and up to two drinks or 30 g alcohol a day for men) can result in low risk of Cardiovascular System diseases because reduced blood levels of the Inflammation markers interleukin-6 (IL-6) and C-reactive Protein (CRP) than non-drinkers and heavy drinkers. Alcohol consumption is associated with increased circulating levels of high density lipoprotein cholesterol, Apo lipoprotein A1, and adiponectin and decreased fibrinogen levels, all changes reported to be cardio protective. However moderate alcohol consumption is associated with reduced levels of α -tocopherols, ascorbic acid in moderate to heavy drinkers.^[23]

Alcohol addiction not only affects health of the entire body but also the oral health of an individual. Alcoholics are at high risk of developing dental caries, gingival diseases and may suffer from oropharyngeal cancers. The risk of oral cancer further increases when alcohol is consumed along with cigarette. Alcohol and salivary glands and dental caries (tooth decay) The salivary glands, notably parotid glands, may become swollen in long term alcohol drinkers. This condition is known as Sialadenosis and it is associated with ethanol induced peripheral neuropathy. This condition results in disturbances in the metabolism and excretion of the salivary glands. Reduced salivary secretion along with diminished buffering capacity and less attention to oral hygiene may lead to increased risk of dental caries and gingival disease.^[24] Other detrimental factors consist of consumption of sugared drinks and cariogenic food along with alcohol. Acidic nature of alcoholic beverages and consumption of carbohydrate rich food leads to production of acids upon metabolism and it leads to decrease in salivary pH below critical level. Ultimately it may lead to development of dental caries.^[25] Also, Alcohol consumption increases Blood Lead Levels (BLLs) in humans and BLLs have been correlated with caries. Alcoholics generally have a high incidence of decayed teeth which leads to either extraction of teeth (missing) or restoration (filling) of teeth. In particular, alcoholics suffer from more number of missing teeth as compared to non-alcoholics. A study showed significantly fewer teeth and more active carious lesions among alcoholics and alcoholics had more number of endodontically treated teeth as compared to non-alcoholics. These patients had a permanent tooth loss three times higher than the national average for corresponding ages. Another study, on alcoholic and non-alcoholic subjects showed positive association between alcoholism and dental caries.^[26]

The aim of this study was to investigate whether alcohol use is a determinant of infectious periodontal disease development in a longitudinal setting.

MATERIALS AND METHODS:

A research based on a questionnaire was conducted at Saveetha Dental College in the month of November 2017. The questionnaire contained questions subjecting chronic alcoholics and non-alcohol consuming individual to come to a conclusion, if the chronic alcohol consuming individuals were subjected to higher risk of periodontal disease in comparison to the non-alcoholic consuming individuals. The questionnaire was distributed among the out patients of Saveetha Dental College out of which 25 were alcoholic and 25 were non-alcoholic. The pocket depth was also measured. The data were then tabulated and compared and statistics were also obtained. The questionnaire was surveyed to estimate the severity and frequency of alcohol consumption. The selected subjects were not affected by systemic diseases such as diabetes and hypertension. The pocket depth of the subjects was assessed by a William's probe. The clinical attachment loss score was obtained by calculating the sum average of the pocket depth measured from each subject. The sum average of clinical attachment loss was obtained from the clinical attachment score of each individual subject grouped into alcoholic and non-alcoholic patients.

RESULTS:

The test subjects of 25 patients who happen to be alcoholics have a higher mean clinical attachment loss score of 2.56 and the control subject comprising of 25 non-alcoholic patients have a score of 1.6 in relevance to mean clinical attachment loss (CAL). This result significantly shows that patients who were alcoholics had poor periodontal health when compared to the non-alcoholic patients. Whereas the non-alcoholic test subjects reported gingival bleeding with a result of 63%. This shows that alcoholism could potentially aggravate periodontal conditions. It was concluded that 76% reports were positive on incidence of bleeding of gums. Alcohol has an effect of gingiva which increases the risk of gingivitis. In chronic drinkers the pocket depth measured in molars especially were deep pockets and gingival recession was significantly assessed in such chronic alcohol consumers.

In the other hand, the non-alcoholic subject group reported with a positive response of 32% which signifies not only alcohol consumption but also oral hygiene maintenance plays a crucial role in achieving a healthy periodontal structure.

Questionnaire analysis**Questionnaire subjected to alcoholic patients:**

Questionnaire	A	b	c	D
1. For how many years the patient has been consuming alcohol? a. 0-5 years b. 6-10 years c. 11-15 years d. More than 15 years	16%	60%	16%	8%
2. how often does the patient consume alcohol? a. Once a week b. 3 times a week c. More than 3 times a week	52%	36%	12%	**
3. Does the patient report of any bleeding gums? a. Yes b. No	76%	24%	**	**
4. Does the patient report of any exposed root surface? a. Yes b. No	28%	72%	**	**
5. Does the patient report of any mobility in teeth? a. Yes b. No	8%	92%	**	**
6. Does the patient have intention of stopping alcohol consumption? a. Yes b. No	92%	8%	**	**

Questionnaire subjected to non-alcoholic patients:

Questions	Yes %	No%	
1. Does the patient report of any exposed root surface? a. Yes b. No	4%	96%	
2. Does the patient report of any mobility in teeth? a. Yes b. No	4%	96%	
3. Does the patient report of any bleeding gums? a. Yes b. No	32%	68%	

Mean clinical attachment loss score:

1. Mean Clinical attachment loss(CAL)-alcoholics	2.56
2. Mean clinical attachment loss (CAL)-non-alcoholics	1.6

Statistical analysis:

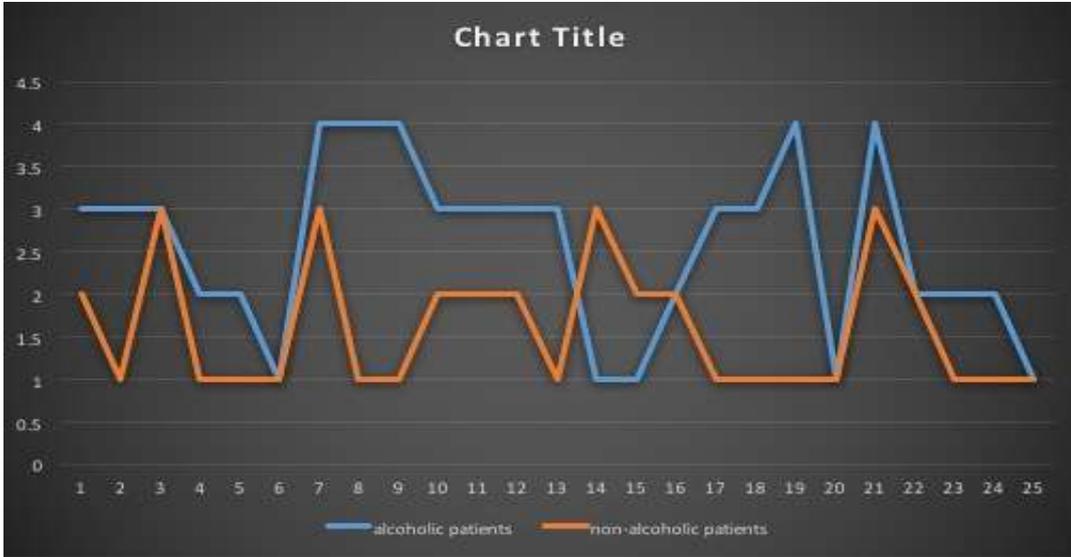


Fig 1.1:
X-Axis: number of test subjects
Y-Axis: Clinical attachment loss (CAL) score



Fig 1.2:
X-Axis: questionnaire surveyed values of each provided options
Y-Axis: number of questions

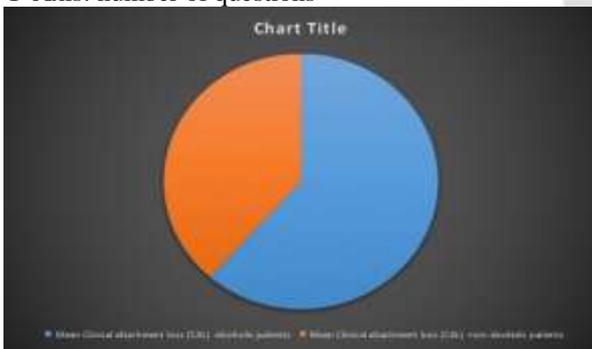


Fig 1.3: Mean clinical attachment loss (CAL) score

DISCUSSION:

In this large prospective study, we found a positive association between alcohol intake and periodontitis. Men who drank alcohol had an 18-27% higher risk of disease than did non-drinkers.^[27] These results were similar to other conventional prospective studies. Few studies have examined the possible relation between alcohol intake and periodontitis. Early studies observed increased prevalence and severity of periodontal disease among patients with cirrhosis, and attributed this to poor oral hygiene^[28]. Other studies reported worse periodontal conditions in alcoholic patients with and without cirrhosis than in healthy subjects and in non-alcoholic patients with cirrhosis.^[29] There was a significant association between alcohol consumption and periodontal disease among Japanese factory workers, but only in the bivariate analysis^[30]. In a small study among dental patients, periodontal disease was positively associated with indicators of alcoholism among males only, but there were only 25 female participants^[31]

Subjects were asked about the usual number of drinks per week they consume. The frequency of repeated alcohol intake plays an influential role in its effect on the periodontal ligament. The questions include information about both the frequency and the volume, which allowed the calculation of the total amount of alcohol consumption per week. Subjects were categorized into 2 groups: alcohol consuming patients and non-alcoholic consuming patients. Each group were allotted with 25 test subjects. The test subjects were all male of age between 25 to 60. This variation in age helped in assessing the periodontal condition with increase in age exposed to the harmful effects of alcohol. The chronic intake of alcohol aggravates the damage to the periodontium with aging. 60% of the test subjects were consuming alcohol for 6-10 years.

This helps in concluding the severity of the diseases aggravates with time and age. Older patients under the alcohol consuming criteria had a very poor oral hygiene with gingival recession and mobility of molars and premolars. The periodontal status of older patients under the non-alcohol consuming criteria were much more of a better hygiene and gingival recession and mobility of teeth were seen in much lower scale than that of the contradicting criteria.

Periodontal examination included assessing the clinical attachment loss(CAL) for the entire tooth structure of the oral cavity. A William's probe was utilized in assessing the pocket depths and attachment loss. Most of the plausible effects described above were studied in alcoholics. We do not know, however, whether these changes also occur with lower levels of alcohol consumption. We also do not know whether there is a dose-response relationship between alcohol and its effects, or whether there is a threshold point to begin seeing these negative effects. In our study, the unadjusted relationship between alcohol consumption and CAL seems to have a directly proportional relationship with each other,

CONCLUSION:

The purpose of this study was to assess the relationship between alcohol consumption and severity of periodontal disease using periodontal pocket, clinical attachment loss, controlling for principal confounding variables. The most effective method for maintaining good oral hygiene is to brush at least twice each day, flossing in regular and visiting a dentist every six month.

Alcohol intake may be a risk indicator for periodontal disease. Further studies to confirm this relationship and to test possible underlying mechanisms are needed.

Many factors influence the progression of periodontitis, including individual characteristics, social and behavioural factors, genetics, tooth factors and bacterial composition of the biofilm around the tooth.^[32] Children of parents who have periodontitis have been found to be 12 times more likely to have the bacteria that cause plaque and periodontal disease.^[33] The results suggest that alcohol consumption is associated with moderately increased severity of periodontal disease. Longitudinal studies are needed to determine whether alcohol is a true risk factor for periodontal disease.

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