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Research Article

CORRELATION BETWEEN BODY MASS INDEX AND DENTAL CARIES IN ADULTS- SINGLE INSTITUTIONAL STUDY

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A B S T R A C T

Dental caries is a complex and dynamic process where a multitude of factors initiate and influence the progression of disease. Although effective methods are known for prevention and management of dental caries, it is a major health problem with manifestations persisting throughout life despite treatment.

Aim: Obesity increases the risk of chronic disease and poor mental health outcomes and dental caries impacts significantly on the quality of life. The purpose of this study is to assess the prevalence of dental caries and its relationship to BMI.

Materials and Methods: The present study was carried out in 200 students of our dental college and who were willing to participate. The Prevalence of dental caries was obtained using WHO standard criteria for dental caries diagnosis namely decayed, missing, and filled teeth (DMFT) index. Weight and Height were measured and BMI was calculated.

Results: ANOVA test was used for correlation between weight and DMFT and it was found to be highly significant $p< 0.001$. By Pearson correlation DMFT was compared with BMI and $p <0.001$, showing highly significant results.

Conclusion: Obesity and Dental caries share common lifestyle factors among adolescents. Our study shows a significant correlation between BMI with DMFT index. Thus, dental health is a global health concern.

INTRODUCTION

Dental caries is an irreversible microbial disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth, which often leads to cavitations.

It is a complex and dynamic process where a multitude of factors initiate and influence the progression of disease. Although effective methods are known for prevention and management of dental caries, it is a major health problem with manifestations persisting throughout life despite treatment. It is seen in all geographic areas in the world and affects persons of both genders in all races, all socioeconomic strata, and every age group.[1]

During the last decades, changes in diet and lifestyles have accelerated with industrialization, urbanization, economic development, and market globalization. This has had a significant impact on the health and nutritional status of populations (WHO, 2003) standards of living have improved, food availability has expanded and become more diversified, However, there have also been significant negative consequences in terms of inappropriate dietary habits, decreased physical activity, and increased tobacco use, and at the same time a corresponding increase in diet-related chronic diseases at the global level (WHO, 2003).

Obesity and dental caries are among the chronic diseases with a growing global pandemic occurrence afflicting both developed and developing countries.[2] Obesity is defined as a condition of abnormal and excessive fat accumulation in adipose tissue to the extent that health may be adversely affected.[3] The World Health Organization {WHO} estimates that it is the fifth leading cause of mortality worldwide.[4] Obesity rates have doubled within the last 20 years in many developing and developed countries.[5] Moreover, it is a risk factor for many diseases such as type 2 diabetes, hypertension, hyperlipidemia, cerebrovascular diseases and certain types of cancers.[6] Increasing consumption of animal products and refined foods at the expense of vegetables and fruits these dietary changes are considered to be one of the potential causes for the observed increase in the prevalence of both overweight and obesity among the Indian population.[7] There is a positive correlation between dental caries and BMI. Body Mass Index is widely used as a surrogate measure for obesity because it corrects for an individual's height in relation to weight, and is a commonly used indicator to indicate nutritional status. Dental caries rates and BMI both

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measure diet-related health outcomes, an association between the two is not surprising.[8]

MATERIALS AND METHODS

The study was conducted in the Department of Oral Pathology, Vinayaka Missions Sankarachariyar Dental College Salem. The aim of this study was to assess the prevalence of dental caries and its relationship to BMI. The present study was carried out in 200 patients who were students of our dental college and who were willing to participate within the age range of 17- 25 years. Ethical clearance was obtained from ethical committee of the institution.

Consent form was signed from all the students. Data was collected through interview and a self-report questionnaire. The prevalence of dental caries was obtained using WHO standard criteria for dental caries diagnosis namely decayed, missing, and filled teeth (DMFT) index by using mouth mirror, probe, explorer and tweezer. Weight and height were measured and BMI was calculated using metric BMI calculator. BMI was categorized into Underweight (BMI <18.5), Normal (BMI 18.5-24.9), Overweight(BMI 25-29.9), Obese(BMI >30). Crave for sweets, drinking coffee / tea and brushing habits were collected.

Inclusion criteria

Students in the age group of 17 to 25years, students of both sexes, teeth with caries and fillings involving the surfaces of tooth

Exclusion criteria

Students who were not willing to participate

Equipment's & Apparatus

Mouth mirror, probe, explorer, tweezer, weighing scale, height tape

Statistical Analysis

ANOVA test was used for correlation between BMI and DMFT. By Pearson correlation DMFT was compared with BMI.

RESULTS

We observe that there is a positive correlation between BMI and dental caries.

Category	Frequency	Percent
Under weight	16	8.0
Normal	117	58.5
Over weight	50	25.0
Obesity	17	8.5
Total	200	100.0

There were 8% of underweight students, 58.5% normal weight students, 25% overweight students and 8.5% overweight students.

Correlation between BMI and DMFT Index

		DMFT Index
BMI	Pearson Correlation	.650(**)
	p	< 0.001
	N	200

** Correlation is significant at the 0.01 level

Pearson Correlation was used to correlate BMI and DMFT and the p value was <0.001 and was significant.

Anova Test

	Category	N	Mean	SD	ANOVA	P
Age	Under weight	16	20.06	1.48	2.10	0.101
	Normal	117	20.28	3.40		
	Over weight	50	21.74	5.01		
	Obesity	17	20.18	1.19		
	Total	200	20.62	3.69		
Decayed	Under weight	16	2.31[a]	2.57	10.87	< 0.001**
	Normal	117	2.09[a]	2.40		
	Over weight	50	3.20[a]	2.37		
	Obesity	17	5.47[b]	2.32		
	Total	200	2.68	2.58		
DMFT Index	Under weight	16	2.44[a]	2.50	8.75	< 0.001**
	Normal	117	2.45[a]	2.53		
	Over weight	50	3.46[a]	2.73		
	Obesity	17	5.71[b]	2.54		
	Total	200	2.98	2.73		

BMI was compared with age using ANOVA Test and P value was 0.101 and is found to be not significant.

BMI was compared with decayed teeth and was found to be highly significant $p < 0.001$.

BMI was compared with DMFT and was found to be highly significant $p < 0.001$

DISCUSSION

Many authors have suggested a positive association between dental caries and BMI, Reifsnider *et al*. (2004) stated higher dental caries associated with higher BMI and Willershausen *et al*. (2004) reported higher rates of dental caries associated with higher BMI in both permanent and deciduous teeth.

The study of dental caries and its associated factors remains a daunting task to the healthcare professional due to its multifactorial nature. Due to recent increase in global prevalence of obesity, a plausible biological gradient between obesity and dental caries was proposed in the literature using diet as a common risk factor. The mean DMFT, in the present study population, was considered low according to WHO criteria. Little or no association was found between BMI and caries scores in some previous reports On the contrary, elevated BMI was found to be associated with increased dental caries in other studies.

The present study showed that overweight and obese persons had higher caries experience than underweight or normal person. This is one of the first studies to be carried out in adolescents, while all other studies were reported in kids.

Many factors contribute to obesity but evidence does not single out dietary sugar as a cause.[9] On the other hand, dental caries is a chronic multifactorial disease whose risk factors include sugars, oral bacteria, saliva, tooth enamel, food substrate and host susceptibility.[10] A possible factor in the relationship between obesity and dental decay was the tendency of frequent snacking on food high in fat or sugar among people. Barkeling *et al* showed that the mutans streptococcus count correlated with BMI and intake of sweet foods.[11] Previous studies of caries-related factors showed that caries associated dietary habits during infancy are maintained throughout early childhood. Consequently, it was assumed that early established behaviour with a high-sucrose intake appears to persist during childhood and adolescence. In future

preventive programmes, the strategies should aim at reducing frequency of intake of snacks and fermentable carbohydrates to avoid overweight/obesity and caries.

Both obesity and dental caries have common risk determinants and require a comprehensive multidisciplinary approach to paediatric patients by both medical and dental healthcare professionals.[12]

DMFT and obesity are connected by sharing some common underlying lifestyle factors, and both refer to a common parameter, namely health. Over nutrition is a type of malnutrition, and defined as "a chronic condition where intake of food is in excess of dietary energy requirements by over-consumption of energy-dense, nutrient-poor foods and leisure time activities" (WHO, 2009b). The intake of unhealthy food (eg, soft drinks, snacking) is increased in a diet whereas the healthy dietary habits such as daily consumption of fruit and regularly eating breakfast are reduced (Utter *et al*, 2007a; Verzeletti *et al*, 2009).

Therefore, it is important that health professionals and health educators combine their efforts to promote the message of healthy eating, and quitting smoking and beverages. The dental team, with its regular and periodic recall of adolescents, has a unique opportunity to promote healthy eating and healthy weight. A healthy diet can only provide a healthy weight.

CONCLUSION

Dental caries and obesity are two of the most prevalent health conditions seen in the world population.Obesity and dental caries share common lifestyle factors among adolescents, regardless of nationality and different health-care systems. Thus, it seems that dental health is a global health concern. Obesity increases the risk of dental caries and it significantly affects the oral health. There is a need for collaboration between dental and general health-care providers to manage both obesity and dental caries in adolescents by using a holistic approach.

Our Motto should be Better Oral Health Through Better General Health

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