Association of dental caries and BMI with Socioeconomic Status- a cross sectional study.

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Abstract

Background: Dental Caries is an irreversible microbial disease of calcified tissues of teeth, characterized by demineralization of the calcified tissues and destruction of the organic substance of the teeth. Dental Caries is caused by the action of acids on the enamel surface which is produced when sucrose in foods/drinks reacts with bacteria present in dental biofilm on tooth surfaces. Body Mass Index (BMI) is a measure of body fat based on height and weight that applies to adult man and woman. According to studies, socioeconomic status (SES) influences caries experience amongst individual in varied proportions which also is governed by BMI.

Aim To study the association of dental caries and BMI with socioeconomic status in different age groups of patients (above 12 years) visiting the out- patient department of our institution. Research Question: Is Dental Caries and BMI of individuals associated with socioeconomic status?

Materials and Methods: The study was carried out in our institution amongst age group of patients ranging from 12 to 65 years and above (according to Erik Ericson's classification). Standardized growth charts were used to measure BMI. The SES was assessed based on educational status and annual income of patients. Clinical examination for dental caries was performed by single examiner using DMFT.

Results and Conclusion: This study showed that lesser percentage of the patients had deficient height , weight and BMI. As the weight and BMI increased there was a significant increase in the number of caries and fillings amongst the patients.

Key words: Dental caries, DMFT, Body Mass Index, socioeconomic status.

Introduction

General health has a considerable impact on oral health & vice versa. Health as defined by WHO is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."Obesity &Dental Caries are global health problems that have shown a rising trend over the last few decades. The association of poor oral health with obesity & socio economic status is likely to be associated with the quality of the diet.

According to Shafer - Dental Caries is "an irreversible microbial disease of calcified tissues of the teeth, characterized by demineralization of the inorganic portion & destruction of organic substance of the tooth which leads to cavitation".

The relationship between diet and dental caries is characterized by the equation below:

Bacterial enzyme + fermentable carbohydrates =

Acid + Enamel = Dental Caries

Health in literature has been found to be associated with various factors most commonly Body Mass Index (BMI) & Socioeconomic Status(SES).

Body Mass Index (BMI) is an index that measures height for weight, which is frequently used to categorize underweight, overweight & obese individual.

$$BMI = WEIGHT \; (kg) / HEIGHT \; (m^2)$$

Socioeconomic status (SES) is the social standard or class of an individual or group. It is often measured as a combination of education, income & occupation.

Hence to find out the exact association/relationship between the above mentioned three entities, this particular study was carried out with the following parameter in mind.

Aim: To determine the association of dental caries and BMI with socioeconomic status in different age groups of patients.

Research Question: Is Dental caries and BMI of individuals dependent on socioeconomic status?

Materials and Methods:

The study was carried out in our institution amongst the age group of patients ranging from 12-65 years & above according to ERIK ERIKSON's classification (Fig 1). Standardized charts were used to measure BMI (Fig 2).The SES (Socioeconomic Status) was assessed based on education, income & occupation of patients (Fig 3). Clinical examination for dental caries is performed by single examiner using DMFT.
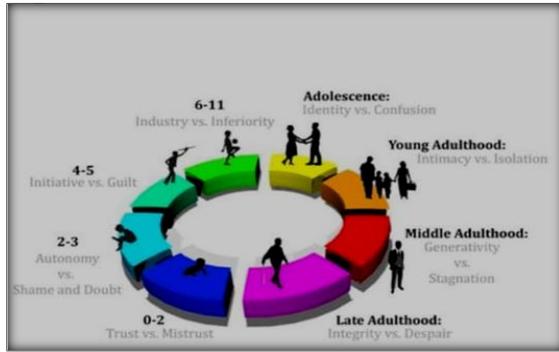
Fig 1: ERIK ERIKSON'S CLASSIFICATION

BMI is categorised according to WHO:

Fig 2- WHO BMI (Body Mass Index) classification.

(A)	Education of Head	Score
1	Post-graduate or professional degree	7
2	Graduate degree	6
3	Higher secondary certificate	5
4	High school certificate	4
5	Middle school certificate	3
6	Literate, less than Middle school certificate	2
7	Illiterate	1

(B)	Occupation of Head	Score
1	Professional	10
2	Semi-Professional	6
3	Arithmetic skill jobs	5
4	Skilled worker	4
5	Semi-skilled worker	3
6	Unskilled worker	2
7	Unemployed	1

The Socioeconomic Status was being calculated according to Sir Kuppuswamy's classification which is revised table for month of october 2018 showing the score for each socioeconomic class.

Fig 3: Sir Kuppuswamy's classification

	No	Minimum	Maximum	Mean	Standard deviation
Age	250	12	65	34.60	14.165

Gender	Frequency	Percentage
Female	108	43
Male	142	57
Total	250	100

When DMFT score was projected, we obtained a bar graph were a mean DMFT score of 4.16 distributed over the mean score of decayed, missing and filled.

	No	Minimum	Maximum	Mean	Standard deviation
Decay	250	1	9	2.60	1.595
Missing	250	0	7	1.00	1.621
Filled	250	0	4	0.56	0.873
Dmft	250	1	12	4.16	2.38

Result

When the data were tabulated on the designed Performa subjected to statistical analysis using software SPSS Version 20. This is table which highlights the total number of patients included in our study ranging between age groups 12-65 years.

This is the table of BMI which highlights, the minimum BMI is 13.5 and maximum is 38.9 distributed over 250 patients.

	No	Minimum	Maximum	Mean	Standard deviation
BMI (kg/m2)	250	13.5000	38.9000	24.736	5.0478816

When the tabulated data for Socioeconomic Status was subjected to statistical analysis, 7.6% of people fall in the upper middle socioeconomic status, 8% in the lower class, 29.2% in the lower middle class &

55.2% in the upper lower socioeconomic status.

SES	Frequency	Percentage (%)
Lower	20	8
Upper lower	138	55.2
Lower middle	73	29.2
Upper middle	19	7.6

When the Pearson's Correlation (r) value was carried out in all the entities correlated with BMI, showed following significant results.

	R value	P value
Decayed teeth & BMI	-0.013	0.03*
Missing & BMI	0.18	0.004*
Filled & BMI	-0.128	0.04*
Dmft & BMI	0.069	0.02*

*significant

Discussion

As the above said study, General health has a considerable impact on oral health and vice versa. Health is defined as state of complete physical, Mental and social well being and not merely the absence of disease or infirmity. The association of poor oral health with obesity and socio- economic status is likely to be associated with the quality of the diet. When DMFT score was projected we obtain a bar graph were a mean DMFT score of 4.16 distributed over the means score of decayed, missing and filled. The minimum BMI is 13.5 and maximum is 38.9 distributed over 250 patients. The Socio-Economic status was subjected to Statistical analysis, 7.6% of People fall in upper middle Socio-Economic status, 8% in lower class,

29.2% in lower middle class and 55.2% in Upper lower Socio-Economic class.

Conclusion:

Based on above result it can be concluded that according to our study as the weight and BMI increased there was a significant increase in the incidence of caries and fillings amongst the patients.

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