Body mass characterization of dental diseases — A quantitative prospective study

Jaspal Singh[a,*], Anshu Sharma[b], Nishita Garg[c], Pathivada Lumbini[c]

ABSTRACT

Dental caries is the result of confluence of 4 major factors host, agent, environment and time. Diet is one such factor which is common to this cascade, diet contributes not only to obesity but it affects periodontal status as well. Overweight and obesity, especially in children, are increasing public health problems worldwide. Obesity can be very well calculated by Body mass index (BMI). The body mass index (BMI), or Quetelet index, is a heuristic proxy for human body fat based on an individual's weight and height.1) BMI was found to have a negative correlation with DMFT ($r = -0.011$) which was statistically non-significant. BMI was found to have a negative correlation with periodontal Index ($r = -0.062$) which was statistically non-significant. The mean values for BMI, DMFT and PI scores were 19.74, 1.29 and 0.24, respectively. The distribution of BMI for levels 1, 2, 3 and 4 was 43.5, 44.8, 8.3 and 3.5%, respectively. The caries prevalence for the whole sample was 36.8%, and it ranged from 28.6% (BMI-4) to 42.4% (BMI-3).

© 2012 Indian Journal of Dentistry. All rights reserved.

Keywords: Dental caries, Quetelet index, DMFT, BMI, Obesity

INTRODUCTION

Dental caries is defined as an infectious disease of microbial origin which is related to every specialty of dentistry in one or the other way.[1] Dental caries is the result of confluence of 4 major factors host, agent, environment and time. Diet is one such factor which is common to this cascade, diet contributes not only to obesity but it affects periodontal status as well. Overweight and obesity, especially in children, are increasing public health problems worldwide. Obesity can be very well calculated by Body mass index (BMI). The body mass index (BMI), or Quetelet index, is a heuristic proxy for human body fat based on an individual's weight and height. It was invented between 1830 and 1850 by the Belgian polymath Adolphe Quetelet during the course of developing "social physics". Body mass index is defined as the individual's body weight divided by the square of his or her height. Significantly, obesity is increasing rapidly in developing countries undergoing rapid nutrition and lifestyle transition, and it often coexists with under-nutrition. Recent trends in Indian population indicate a rise in obesity in children. Recent data shows that the prevalence of obesity among adolescent children (14—17 y) was 29% in private schools and 11.3% in government funded schools in 2006—2007.[2] Overweight and obese children are at increased risk for developing psychosocial and medical problems compared with individuals with normal weight.[3,4] A diet of high sugar intake, including snacks and soft drinks, is more common among overweight and obese children/adolescents than those with normal weight.[5] Frequent sugar intake is also a recognized risk factor for dental caries. Thus, the diet pattern may be a common risk factor for overweight and caries. Periodontal status of an individual may be also affected according to the nature of diet. Periodontal disease is a serious and prevalent condition, affecting roughly 80 percent of adults.

Left untreated, early stages of the disease − characterized by gum inflammation and oral bleeding − can advance to more chronic levels, resulting in bone decay, loss of connective tissue and even the removal of teeth. Though periodontal disease results from a number of lifestyle and genetic factors, diet plays an important role in its progression and prevention. Hence the present study was under taken to determine dental caries status of an individual and its correlation with BMI and periodontal status of an individual.

MATERIALS AND METHODS

Sample collection

A cross-sectional survey was conducted among 400 individuals between 18 and 22 years of age were randomly selected from schools in the city of Moradabad. Only the children whose parents had signed an informed consent form were included. Authorizations were obtained from the ethics committee who officially informed the heads of the schools about the procedure.

Inclusion criteria

1) All children selected were of the same religion, and same ethnic origin

2) Children selected were free from any systemic disease

3) Children selected were following same dietary pattern and belong to same geographic area.

4) Fluoride content in the water of the residing area was determined previously.

Exclusion criteria

1) children suffering from any disease or systemic illness were excluded from the study.

2) children who had history of antibiotic consumption in the recent past were excluded from the study.

3) those having mixed diet were excluded from the study.

Dental caries examination

Relevant case history was obtained from the study cohort and dental caries was recorded using 'DMFT' index for permanent teeth, with the help of a right angle probe

(no.17), shepherd probe (no. 23), and odontoscope (mouth mirror) under natural diffused light source. Sterile cotton was used during the procedure so as to clean the tooth during examination procedure.

BMI CALCULATION

Height and weight were measured of the selected children by using a standard physician scale and a weighing scale, respectively. In each child height was measured to the nearest full centimeter and body weight was measured to the nearest 0.1 kg. Measurements were made with the children wearing light clothing and without footwear. BMI was calculated by using the following formula

$$BMI = \frac{mass(kg)}{(height(m))^2}$$

BMI was categorized into four groups as follows: BMI-1 = Insufficient (underweight), under 18.5 kg/m^2; BMI-2 = normal weight, between 18.5 and 25 kg/m^2; BMI-3 = overweight, between 25 and 30 kg/m^2; BMI-4 = obesity, over 30 kg/m^2. Other potential explanatory variables with regard to caries experience were included in the analysis: gender, type of school (public or private), sugar consumption (less than 3 times a day/3−5 times a day/6 times a day or more) and soft drink consumption (less than once a day/once a day or more).

Periodontal examination

The condition of the periodontium was estimated by using the Periodontal Index developed by Russell.[8] The Periodontal Index (PI) has a possible range of scores from zero to eight-the poorer the condition of the periodontal tissues, the larger the assigned score.

Statistical methods

Descriptive statistics were firstly performed to compute means and standard deviations of age, height, weight,

Table 1 Descriptive statistics.

Parameter	Number	Mean	Std. Deviation
Age	400	13.66	0.94
Weight	400	49.28	11.55
Height	400	1.58	0.08
BMI	400	19.74	3.94
DMFT	400	1.29	2.46
PI index	400	0.24	0.612