

A STUDY ON RELATIONSHIP BETWEEN LIFESTYLE FACTORS AND OBESITY AMONG TEENAGERS OF MYSORE

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ABSTRACT

The World Health organization (WHO) defines obesity as ‘global epidemic’. It was estimated that around 400 million people were suffering from obesity in which 84 million were teenagers. Developed nations are not only recognized obesity as a major public health problem; even developing countries consider obesity as an important health problem. Studies from different states of India suggested that the prevalence of obesity ranged from 10 – 50%. The pace of developmental transitions - urbanization, modernization, globalization marked in recent years has led to the double burden of ‘undernutrition’ and ‘obesity’ in developing countries. There are various factors that can cause obesity among teenagers and unhealthy lifestyle is on the top in the list.

In the present study an attempt was made to investigate the relationship between lifestyle factors such as television viewing, physical activities and obesity among teenagers of Mysore city. The study has consisted 240 teenagers aged 13 – 17 years, studying in high schools and colleges of Mysore city. Anthropometric measurements and information on television viewing behaviors, physical activities carried out daily, and consumption of foods during television viewing were collected.

The findings revealed that 81.6% of the teenagers were overweight (37.91%) and obese (43.75%) according to weight for height. Teenagers had spent average time of 1 hr 50 min per day and 2 hr 17 min on weekend on television viewing. Teenagers had spent more time on passive activities rather than on strenuous activities. Nearly 3/5th of teenagers (59.6%) have the practice of consuming junk foods and 12.9% of teenagers accustomed to consume carbonated drink while watching television. The results of this study proved that body weight of the teenagers significantly correlates with television viewing time and time spent on physical activities.

INTRODUCTION:

Obesity is a challenging multi-factorial problem increasing at an alarming rate across the globe in all age groups ^[1]. The World Health organization (WHO) describes obesity as one of today’s most important as well as most neglected public health problems. WHO also designated it as

'global epidemic' ^[2]. Obesity is often defined as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be negatively affected ^[1, 2, 3]. Obesity develops when there is a discrepancy between energy intake and energy output. During its development the original steady-state is disturbed and after a period of positive energy balance, a new steady state at a higher level with an increase in body fat stores is achieved ^[4]. Since the amount of body fat per se is difficult to determine exactly, for practical use, percentage overweight or the body mass index (BMI) or waist-hip ratio are used to classify and to identify obesity in persons.

Overweight and obesity are the fifth leading risk for global deaths. At least 2.8 million adults die each year as a result of being overweight or obese. According to WHO 1 in 6 adults were obese. It was estimated that half a billion people i.e. 12% of the world's population were obese ^[5]. WHO predicts there will be 2.3 billion overweight adults in the world by 2015 and more than 700 million of them will be obese ^[6]. According to NFHS data of 2007 ^[8], Punjab state has ranked first with high percentage (Male-30.3% and females-37.5%) of people who were overweight and obese while Tripura and Bihar States ranked 29th or last position with less percentage of males (5.2%) and females (10.5%) respectively. Karnataka state has ranked 11th with 14% of males and ranked 6th with 17.3% of females who were classified as overweight and obese.

Obesity has spread its major roots in children and adolescents. The term "childhood obesity" refers to both overweight and obesity in both children and adolescents. It is defined as excessive fat accumulation which presents a risk to health in a person under 18 years old. The most acceptable definition given by World Health Organization (WHO) and IOTF is in terms of BMI. This is a measure derived from dividing body weight in kilograms by the square of height in meters. BMI Cut-offs has been established to define childhood "overweight" and "obesity". Overweight children means children at or above the 85th percentile and below 95th percentile (BMI 25-30) of the BMI distribution for the reference group and obese children means children at or above the 95th percentile (BMI equal to or greater than 30) of the distribution for the reference group ^[7]. A significant increasing trend in the global prevalence of overweight and obesity has been documented in children and adolescents over the last few decades. Worldwide, more than 22 million children of less than 5 years of age and 155 million children of school age were severely overweight. This implies that one in 10 children worldwide were overweight ^[9, 11]. This global average reflects a wide range of prevalence levels, with the prevalence of overweight in Africa and Asia averaging well below 10% and in the Americas and Europe above 20% ^[10, 11].

In developing countries like India, childhood obesity has doubled and reached epidemic level over the past two decades. The various studies done in different states of India have looked at prevalence of overweight and obesity among children and adolescents. But there are no nationally representative studies available on childhood obesity. The prevalence rate of overweight and obesity according to available studies of different parts of the county are presented in the following

Delhi: The prevalence of overweight and obesity among the upper socio-economic status children in Delhi was 16.75% and 5.59% in boys and 19.01% and 5.03% girls respectively ^[12]. Another study revealed 22% prevalence of overweight and 6% of obesity among children in the age range 4 to 17 years of Delhi ^[13]. A study amongst school children in Delhi indicated the prevalence of overweight and obesity was 20.4% and 13% respectively. The prevalence of overweight and obesity was greater in higher economic groups compare to lower and middle economic groups. The prevalence of overweight and obesity was greater in male than females in all socioeconomic groups ^[14].

Punjab: In Ludhiana, the prevalence of obesity and overweight was found to be 11.1% and 14.2% among school children aged 9 – 15 years ^[15]. According to another study carried at Ludhiana 11.63% the prevalence of overweight and 2.45% obesity in urban areas and 4.7% prevalence of overweight and 3.63% obesity in rural areas was observed among school going children aged between 11-17 years ^[16]. According to recent study ^[17] the prevalence of obesity among affluent school children in Patiala city of Punjab was found to be 7.6%.

Rajasthan: In Udaipur city of Rajasthan, the prevalence of obesity and overweight was 3.73% and 4.85% in affluent group of children between the ages of 12 – 17 years. On the contrary, 1.6% of children were found to be overweight while obesity was 0% among the non-affluent children ^[18].

Gujarat: According to study among school children in Bhavnagar of Gujarat, the prevalence of overweight was 9.25% and prevalence of obesity was 5.55% ^[19]. Another study revealed the prevalence of overweight was 14.3% among boys and 9.2% among girls where as prevalence of

obesity was 2.9% in boys and 1.5% in girls. The prevalence of overweight among children was higher in middle SES group where as the prevalence of obesity was higher among in higher SES groups than their respective counterparts ^[20]. According to recent study ^[21] the overall prevalence of obesity and overweight was 6.55% and 13.9% among affluent adolescent in Surat City of South Gujarat. Another community based cross sectional study among adolescents of Ahmadabad city of Gujarat revealed 13.3% prevalence of overweight and 5.4% prevalence of obesity. Overweight/obesity was significantly associated with higher socio-economic status ^[22]. A latest study carried out in Mehsana district of Gujarat revealed the prevalence of overweight and obesity among school children was 33.8% and 10.67% respectively. The prevalence rates was higher in males (34.82% and 13.39%) than females (32.95% and 7.95%) ^[23].

Madhya Pradesh: The prevalence of obesity among school children of Indore district of Madhya Pradesh was found to be 14.97%. Prevalence of obesity was found significantly higher in children belonging to higher SES class as compared to lower and middle SES class ^[24].

Maharashtra: The prevalence of obesity was found to be 5.7% and the prevalence of overweight was 19.9% among boys between the ages of 10 – 15 years of affluent schools in the city of Pune ^[25]. In Rural Wardha, 2.2% prevalence of overweight was observed among adolescents ^[26]. Another study among school going children of Wardha city, the prevalence of overweight and obesity was 3.1% and 1.2% respectively, together constitute 4.3% of overweight/obesity ^[27]. A study conducted among adolescents of affluent public schools in Meerut shows the prevalence of obesity and overweight was found to be 8.6% and 14.6% respectively ^[28].

Chennai, Tamil Nadu: The prevalence of overweight was high among urban southern Indian children (17.8% of boys and 15.8% of girls) of 13 – 18 while obesity was seen in 3.6% of boys and 2.9% of girls ^[29]. The prevalence of 9.6% prevalence of overweight and 6% prevalence of obesity was observed in adolescent girls (10 – 15 years) at Chennai ^[30]. A cross sectional study on primary and secondary school children aged 8 to 15 years in Chennai revealed the overall prevalence of overweight was 12.1% among the children (8-12 years) and 15.5% among the adolescents (13-19 years). Both overweight (22%) and obesity (13.7%) were highest among girls from affluent families than boys (13.5% and 10.3%) ^[31].

Andhra Pradesh: In The prevalence of overweight and obesity among urban adolescents of 12 to 17 years old in Hyderabad was 6.1% and 1.6% in boys and 8.2% and 1.0% in girls respectively [32].

Kerala: In Ernakulum district of Kerala, the prevalence of overweight children increased from 4.94% in 2003 to 6.57% in 2005. The proportion of overweight children was significantly higher in urban areas and in private schools [33]

Karnataka: In Bangalore, 6.4% of the children aged 6 to 16 years were overweight [34]. In Davangere, the prevalence of obesity was 5.74%. Prevalence of obesity was more in girls (8.82%) than boys (4.42%). Prevalence of obesity increased with increase in age in both boys and girls [35]. Another study among adolescent school children of South Karnataka indicated the overall prevalence of overweight was 9.9% and obesity was 4.8%. The prevalence of overweight among girls (10.5%) were higher than boys (9.3%) while the prevalence of obesity among boys (5.2%) were higher than girls (4.3%) [36]. A study carried out in rural and urban areas of Mysore revealed the prevalence of overweight/obesity among school children was 0.8% and 8.75% in urban and rural areas respectively [37]. The overall prevalence of obesity and overweight among high school children in Dakshina Kannada and Udapi Districts was found to be 2.6% and 3.0% respectively. Prevalence was found to be higher in males, those studying in private schools, staying in nuclear family [44].

From these studies it is understood that the prevalence of overweight and obesity in India is diverse, it ranges from 1% to 35% and 1% to 15% respectively. The prevalence rate of overweight/obesity was increasing year by years and reached 'global epidemic' level. Higher percentage of Males than females, children of affluent families/ high socioeconomic class, children of urban areas were overweight and obese than their counterparts.

Over the past few years, obesity is increasingly being observed in children and adolescents with the changing lifestyle [27]. The pace of developmental transitions - urbanization, modernization, globalization marked in recent years has led to the double burden of 'undernutrition' and 'obesity' in developing countries. Current evidence indicates that obesity is influenced by many factors including genetic, demographic, lifestyle factors. Under the notion of "lifestyle" are included dietary changes, changes in work and leisure patterns, cultural, behavioral, geographical,

environmental, social and economic factors ^[11, 38] and these Obesity associated lifestyle factors are often modifiable ^[39]. Unhealthy lifestyle is on the top in the list of causative factors of obesity. Lifestyle factors contributing to childhood obesity have been well documented in Western countries. Factors contributing to childhood obesity such as eating behaviours, TV viewing and lack of physical activity have been recognized in various Western research studies ^[34]. Children who spend more time watching television have a higher BMI and a higher percent of body fat and are less physically active ^[34, 40]. Watching television can decrease the amount of time spent on performing physical activities and has also been associated with increased food consumption either during viewing or as a result of food advertisements. It has been reported that children are spending more time in front of the television, watching television and playing video games, than doing any other activities besides sleeping. An increase in dietary energy intake combined with decreased energy expenditure contributes to weight gain ^[34, 40, 41]. Another study in California on 385 sixth and seventh grade students (11 to 13 years old) concluded that time spent watching television was significantly associated with obesity ^[40]. Fast food consumption is another leading suspect in the childhood obesity epidemic. Fast food typically includes all of the things that nutritionists warn against: 'saturated and trans fats', high glycaemic index, high energy density ^[41, 43]. Sweetened soft drinks contain empty calories and contribute to the total caloric intake, which is an important contributing factor to the rise in adolescent obesity ^[40, 43]. Children with a sedentary lifestyle, large at birth, with high risk family health behaviours (overweight mothers, smoking near the child, missing breakfast) and from a family with low income or low educational attainment, were more likely to be obese regardless of ethnicity ^[44].

India is in the midst of an escalating epidemic of life style disorders associated with childhood obesity ^[45]. Information on life style factors associated with obesity in adolescents of India was not much. The available studies provided the evidence that TV viewing, sleeping time and physical activity were associated with childhood overweight and obesity. A study among urban and semi-Urban South Indian children revealed that the duration of sleep (<8.5 hours/day) and TV viewing (≥ 1.5 hours/day) were significantly associated with overweight ^[34]. Another study among adolescent school children of South Karnataka indicated that the risk of overweight was 2 times higher among the adolescents of high SES, 21 times higher among those participating <2 hours/week in any type of physical activity, 7.3 times higher among those who reported watching television and playing games on the computer for ≥ 4 hours/day and 5.6 times higher among those who ate chocolates daily in addition to a normal diet ^[36].

A community based study among adolescents of Ahmadabad city of Gujrat concluded that mean time sitting idle for ≥ 2 hrs, and < 7 hours of sleep at night were the risk factors of overweight/obesity ^[22]. Another study among high school children revealed that regular physical activity is inversely related to obesity. The percentage of obese is high in those who don't exercise regularly as compared to those who exercise regularly (2.31% and 1.77%) and in those who exercise for less than 2 hrs. a day (3.21% and 3.92%). The study also revealed a positive co-relationship between overweight and obesity with the consumption of fried foods, energy drinks, pastries and fruit juices regularly as the percentage is much higher in these (4.88% and 4.44%) compared to those who don't consume these regularly (0.72 and 1.81%) ^[42]. Children of higher classes (above 8th standard) belonging to higher socioeconomic group with less outdoor activities and consuming fast foods were more predisposed to overweight/obesity ^[46].

The studies on determinants of childhood obesity clearly stated that more hours of TV viewing, lack of sleeping time, physical inactivity, high socioeconomic status and dietary transitions were major lifestyle factors causing overweight and obesity among children and adolescents. However Data on local studies to assess lifestyle factors and its association with childhood obesity in and around Mysore are scanty/not available. By considering the fact that Mysore city has been experienced vast lifestyle changes in recent years, there is need to assess the prevalence of lifestyle disorder i.e. childhood obesity and lifestyle risk factors. A better understanding in this view is very much essential to adopt effective strategies to prevent and management of obesity in adolescents. In the present study, an attempt was made to study the relationship between lifestyle factors and obesity among teenagers of Mysore city in the State of Karnataka, India. Accordingly the objectives of the study was to evaluate the prevalence of overweight and obesity, the relationship between lifestyle factors – television viewing, physical activities and obesity among adolescents of Mysore.

MATERIALS AND METHODS

This study was a school based, cross-sectional study carried out among teenagers studying in selected High Schools and Pre-university Colleges come under the jurisdiction of Mysore city. Educational institutions – schools and colleges were selected based on cooperation extended by the Intuitional authority and the distance of coverage areas from University of Mysore campus. Permission was obtained from the Head of the Institution.

The study included 240 teenagers in the age group of 13 to 17 years. The sample consisted equal number of males (120) and females (120) selected at randomly from each class i.e. 8th standard to 10th standard and 1st PUC colleges in the city of Mysore, Karnataka, a Southern State of India.

A pre-designed and pre-tested questionnaire was used to elicit the information for the study. The general information on individual characteristic like age, sex, ordinal position, education, school and residential address with contact number and family characteristics like family size, type of family, religion, caste, mother tongue, parents' education, occupation and income, details about family members, total income of the family, living conditions at home were taken. The specific information on teenager's daily activities, TV viewing behaviour pattern, eating habits while watching TV were included.

Anthropometric measurements included body weight, height, mid upper arm circumference, triceps skin fold thickness, waist circumference and hip circumference. Measurements were recorded by the Investigator using standardized procedures [Jelliff, 1966]. Body weight was measured to the nearest to 100g with minimal clothing and without shoes, using portable personal weighing balance. Height was measured to the nearest cm with subject in the full standing position without shoes using stature meter. Mid-upper arm circumference was taken at biceps using non stretchable measuring tape. Waist and hip circumference was measured to the nearest 0.1cm using non-stretchable measuring tape. The waist circumference was measured at the level of the umbilicus with the subject standing erect. The hip circumference was measured with the subject standing erect taking measurement of the maximum gluteal (bullock) circumference. Body Mass Index (BMI) was calculated as body weight in kg divided by height squared in meters. BMI-for-age and sex appropriate z-score classification was used as indicator to classify underweight, normal weight, overweight and obesity. Weight for height and Waist-hip ratio were also calculated to identify obesity among teenagers. The collected data were analysed using IBM SPSS Statistics 19 version. The prevalence of underweight, overweight and obesity was calculated under each gender and age. Frequency distribution and Percentages were computed. Mean and Standard deviation was also calculated for television viewing time, sleeping time and time spent on physical activities. Group comparisons were performed using t-Test, ANOVA test and Chi-square test as appropriate. Multivariate analysis and Correlation was done to see the interaction of various lifestyles factors and relationship with overweight and obesity among teenagers.

DISCUSSION

In the present study, the prevalence of overweight and obesity (based on BMI) among teenagers were 13.3% and 4.2% respectively. Our results are consistent with previous studies by Mohan Kumar et.al (2004), Goyal Ramesh et.al (2010), Brahmhatt Krutarth and Oza Umesh, (2012). The prevalence of overweight/obesity (17.5%) of our study was much higher compared to another study carried out among school children of rural and urban areas of Mysore (Saraswathi et.al 2011) who reported the prevalence of overweight/obesity was 8.75% in urban areas and 0.8% in rural area. Compared to other studies in different states of India, the prevalence of overweight and obesity our study was within the range. The prevalence of overweight and obesity among school children and teenagers ranges between from 1% to 35% and 1% to 15% respectively. The difference in reported prevalence of overweight and obesity in Indian studies could be due to different age range of children and adolescents studies, non-uniformity in the criteria to define socioeconomic status, regional difference. Even the parameter used (Weight for age, weight-for-height, body mass index, waist-hip ratio) and reference standard method (national or internal cutoffs) adapted to define overweight and obesity could be the reason for difference in the prevalence rates of overweight and obesity. However, recent studies in India revealed that overweight and obesity is becoming a growing health problem among children and adolescents especially in urban, affluent families. In our study, we have also found prevalence of 10.4% underweight among teenagers. This result again provided the evidence to the statement that in India, obesity is paradoxically coexisting with under nutrition imparting double burden of disease. In the present study, the prevalence of obesity was significantly high among girls (5%) than boys (3.3%). Our results are consistent with study carried out by Kumar et.al (2007) who also reported the prevalence of obesity was more among girls (8.82%) than boys (4.42%). In other studies the prevalence of obesity was higher among boys than girls (Marwaha Raman, et.al, 2006; Kaur Supreet, et.al, 2008; Goyal Ramesh et.al, 2010). However, this result signify that gender differences was effect modifier and this difference could be explained by various lifestyle factor like physical activities, dietary pattern, time spent on television viewing, video games and socioeconomic status.

Life style factors are important determinants of overweight and obesity. In this study, teenagers spent 1 hr 50 min on television viewing per day and spent 13 hrs 54 min of time on television viewing for whole week. Overweight and obese girl spent slightly more time on television viewing than normal girls while overweight boys spent slightly more mean time than obese as well as normal weight teenagers. In this study, television viewing time is not associated with overweight or obesity. This finding is similar to those of earlier studies that reported no

association between television viewing time and obesity^[39, 48]. On the other hand, various studies have indicated the significant associations between television viewing and obesity in Children and adolescent^[17, 21, 22, 23, 32, 34, 36, 37, 49]. Another important lifestyle factor determines the overweight and obesity among the teenagers is sleeping time. In this study, teenagers spent the mean time of 7 hr 24 min per day and 7 hrs 58 min on weekends for sleeping. Significantly different mean time was spent by boys (4hrs 45 min) and girls (4hrs 10min) in various physical activities. The current study also indicated that there is no association between time sleeping time and obesity and this result is consistent with the results of study carried out by Goyal Jagdish et.al. 2011^[21]. This result is inconsistent with the results of studies that reported the duration of sleep less than 8.5hrs /day^[34] had significant association with obesity among children. Studies on television viewing and physical activities have suggested that television viewing time and physical activities may influence the body status of children and adolescents. In our study, there was no association found between teenagers with different body weight and the time spent on physical activities per week. Contrary to this finding, earlier studies revealed that physical inactivity is a risk factor for overweight and obesity^[17, 32, 36].

In the present study, more than 90% of have the habit of eating in-front of television. And 59.6% of the teenagers have the habit of consuming junk foods at least weekly once (33.3% of girls and 31.7% of boys) while watching television. 12.9% of teenagers have the habit of consuming carbonated drinks while viewing television. Nearly 1% of the teenagers of the present study, daily consumed carbonated drinks while watching television. The significant difference was observed between gender as well as age groups with regard to frequency of consumption of junk food while watching television. The significant difference between gender and age groups was not found with regard to consumption of carbonated drinks among teenagers. Since the less number of teenagers consumes junk food and carbonated drinks and frequency of consumption is not regularly observed, further, this information was not subjected to multivariate analysis. Earlier studies revealed that consumption of carbonated drinks and junk foods were an independent significant risk factor for overweight and obesity^[21, 50]. The limitations of the study are sample size under age group is small. The potential for recall bias in the frequency of physical activity, television viewing sleeping time dietary habits cannot be excluded.

CONCLUSION:

The present study investigated the relation between life style factors with overweight and obesity among teenagers. The prevalence of overweight and obesity along with underweight among teenagers indicates that our country is facing double burden of diseases and prevalence of obesity is increasing year by year. The lifestyle factors do have the influence on body weight of adolescents. Physical inactivity, television viewing and sleeping time are the risk factors for overweight and obesity. The in-depth study on association of lifestyle factors with body status on large population group of children and adolescents are in need to answer specifically relation between lifestyle factors and obesity among teenagers.

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