

A study to assess the incidence and associative factors of obesity among adolescent in selected schools of Pimpri Chinchwad municipal corporation area, Pune

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ABSTRACT

Introduction: Obesity is a nutritional disease, one of the most significant of the 21st century, that has grown to epidemic proportions. Overweight and obesity, once considered a problem in high-income countries, now affect low and middle-income countries, especially in urban areas. Overweight and obesity rates among children and adolescents are constantly rising.

Aims of the Study: to assess the incidence and associative factors of obesity among adolescent in selected schools of Pimpri Chinchwad municipal corporation area, Pune.

Methodology: The study adopted an exploratory approach with a cross-sectional design to assess the incidence and associative factors of obesity among adolescents in selected schools of Pimpri Chinchwad, Pune. A total of 200 adolescents (12–18 years) were selected using simple random sampling. Data were collected using a structured interview schedule and anthropometric measurements to calculate BMI. The tool included demographic data and factors such as dietary pattern, activity pattern, and personal and family history. A pilot study was conducted to test feasibility. Data were analysed using descriptive and inferential statistics.

Results: Most adolescents were aged 14–16 years, with nearly equal gender distribution and majority being Hindu, non-vegetarian, and from nuclear families. Among 200 adolescents, 45.5% were normal weight and 7.5% were obese, with higher obesity in girls. Dietary habits, physical inactivity, and stress showed significant association with obesity. Family income and religion were also significantly related, with higher BMI seen in higher income groups.

Conclusion: The study concludes that obesity among adolescents is present at a notable level, with significant association to dietary habits, physical inactivity, stress, family income, and religion. Early identification and lifestyle modifications are essential to prevent and control obesity among adolescents.

Keywords: assess, incidence, associative, factors, Obesity, adolescent.

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INTRODUCTION

Obesity is a major nutritional disorder and one of the most significant public health challenges of the 21st century. It is characterized by excessive accumulation of body fat that may impair health. According to the World Health Organization (WHO), overweight and obesity have reached epidemic proportions globally, affecting both developed and developing countries.¹

Adolescence is a critical period of growth and development, during which individuals are more vulnerable to developing unhealthy habits such as consumption of junk food, sedentary lifestyle, and irregular physical activity. These factors significantly contribute to the rising prevalence of obesity among adolescents. In India, the prevalence of adolescent obesity

has shown a steady increase, especially in urban populations, due to rapid urbanization, changing food habits, and decreased physical activity.²

Obesity during adolescence is associated with various health risks, including cardiovascular diseases, diabetes, musculoskeletal problems, and psychological issues such as low self-esteem and depression. It also increases the likelihood of obesity in adulthood, thereby contributing to long-term health complications.³

Obesity is a lifestyle-related condition and one of the most critical public health concerns of the 21st century, having escalated to epidemic proportions. Overweight and obesity rates among children and adolescents are constantly rising, and the problem has grown to epidemic proportions. Between 1975 and 2016, the incidence of overweight or

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obesity among children and adolescents aged 5–19 years increased more than fourfold worldwide, from 4 to 18%.⁴

The primary cause of obesity and overweight is a lack of energetic balance between consumed and expended calories. Increased consumption of high-energy products with high fat and sugar content, as well as increased physical inactivity due to sedentary leisure and rising urbanisation, have been noted worldwide. These dietary patterns, combined with lower levels of physical activity, are causing a sharp rise in obesity in children.⁵

NEED OF THE STUDY

Obesity among adolescents has emerged as a serious global public health concern. According to the World Health Organization (WHO), the prevalence of overweight and obesity among children and adolescents aged 5–19 years has risen dramatically from 4% in 1975 to over 18% in 2016, indicating a rapid increase worldwide (WHO, 2021). This growing trend highlights the urgent need to address obesity early in life to prevent long-term health complications.⁶

In India, the burden of adolescent obesity is increasing due to rapid urbanization, sedentary lifestyle, and unhealthy dietary habits. Studies have reported that the prevalence of overweight and obesity among Indian children and adolescents ranges from 10% to 30% in urban areas.⁷

At the state level, Maharashtra, particularly urban areas like Pune and Pimpri Chinchwad, has shown a noticeable increase in adolescent obesity due to changing lifestyles and socio-economic factors. Research conducted in urban Maharashtra indicates a higher prevalence of obesity among school-going adolescents, especially in middle- and high-income groups. This emphasizes the need for region-specific studies to identify contributing factors and implement appropriate preventive measures.⁸

Patil et al., (2025) conducted a cross-sectional study among 100 adolescents, which showed a higher prevalence of obesity associated with increased BMI, central obesity, and unhealthy dietary intake. The study concluded that abdominal fat and poor dietary patterns are key factors contributing to adolescent obesity.⁹

The researcher selected this topic due to the rising prevalence of obesity among adolescents in urban areas like Pimpri Chinchwad, Pune, where unhealthy dietary habits and sedentary lifestyles are common. Adolescence

is a critical stage, as habits formed continue into adulthood and may lead to long-term health problems. Observations during clinical exposure showed increasing cases of obesity, highlighting the need for early identification and prevention through appropriate health education and interventions.

MATERIALS AND METHODS

The present study adopted an exploratory research approach. A cross-sectional research design was used, in which data were collected at one point in time from adolescents aged 12 to 18 years. The study was conducted in Jain Sanghthan Senior Secondary School, Sant Tukaram Nagar, and Government Senior Secondary School, Vallabh Nagar, Pimpri Chinchwad, Pune. These schools were selected using non-probability convenient sampling based on feasibility, availability of samples, and inclusion of different socio-economic groups. The population consisted of adolescents aged 12 to 18 years studying in the Pimpri Chinchwad area, and the sample included 200 adolescents, with 100 selected from each school. The inclusion criteria included adolescents within 12–18 years, those willing to participate, and consideration of dietary pattern, activity pattern, and personal and family history as associative factors. A simple random sampling technique was used to select the samples from the list of students.

Data were collected using a structured interview schedule and anthropometric measurements such as height and weight, which were correlated with the WHO BMI scale to assess obesity. The tool was developed through literature review and expert suggestions and consisted of three sections: demographic data, BMI assessment, and associative factors including dietary pattern, activity pattern, and personal and family health history. Content validity was ensured through expert review, and necessary modifications were made. Reliability was maintained by proper checking of instruments. A pilot study was conducted on 20 adolescents to test feasibility and plan for statistical analysis. Data analysis was carried out using descriptive and inferential statistics, including frequency, percentage, mean, standard deviation, pie charts, and ANOVA to determine relationships between variables.

RESULTS

SECTION I

DESCRIPTION OF SAMPLE ACCORDING TO DEMOGRAPHIC

Table no.1: Description of sample according to demographic / personal characteristics N = 200

| Sr. No. | Characterisits | Frequency (F) | Percentaeg (%) |
|---------|------------------------------------|---------------|----------------|
| 1 | Age of the child (in years) | | |
| | 11 years to 13 years | 20 | 10.00 % |
| | 14 years to 16 years | 168 | 84.00 % |
| | 17 years to 19 years | 12 | 6.00 % |
| 2 | Gender of the child | | |
| | Male | 102 | 51.00 % |

| | | | |
|----------|-------------------------------------|-----|---------|
| | Female | 98 | 49.00 % |
| 3 | Religion | | |
| | Hindu | 178 | 89.00 % |
| | Muslim | 12 | 06.00 % |
| | Christian | 03 | 01.50 % |
| | Jain | 02 | 01.00 % |
| | Buddha | 05 | 02.50 % |
| 4 | Dietary Pattern | | |
| | Vegetarian | 31 | 15.50 % |
| | Non-vegetarian | 169 | 84.50 % |
| 5 | Types of the family | | |
| | Nuclear family | 159 | 79.50 % |
| | Joint family | 41 | 20.50 % |
| 6 | Occupation of father | | |
| | Service | 135 | 67.50 % |
| | Business | 51 | 25.50 % |
| | Laborer | 14 | 07.00 % |
| 7 | Occupation of Mother | | |
| | Service | 55 | 27.50 % |
| | Business | 09 | 04.50 % |
| | House wife | 107 | 53.50 % |
| | Laborer | 29 | 14.50 % |
| 8 | Monthly income of the family | | |
| | Up to Rs. 10,000 /- | 45 | 22.50 % |
| | Rs. 10,001/- to 20,000/- | 109 | 54.50 % |
| | Rs. 20,001/- to 30,000/- | 46 | 23.00 % |
| | More than Rs. 30,000 /- | 00 | 00.00 % |

The table no.1 shows that the majority of adolescents (84%) were in the age group of 14–16 years, while only 10% were 11–13 years and 6% were 17–19 years. Gender distribution was almost equal, with 51% males and 49% females. Most participants were Hindu (89%), followed by small proportions of Muslim (6%), Buddha (2.5%), Christian (1.5%), and Jain (1%). A large majority (84.5%) followed a non-vegetarian diet. Most adolescents (79.5%) belonged to nuclear families. Regarding parental occupation, most fathers were in service (67.5%), while most mothers were housewives (53.5%). In terms of

income, the majority of families (54.5%) had a monthly income of Rs. 10,001–20,000, indicating a predominantly middle-income group.

SECTION II

ANALYSIS OF DATA RELATED TO THE INCIDENCE OF OBESITY IN STUDY GROUP

It deals with the analysis of data related to assessment of obesity among adolescent.

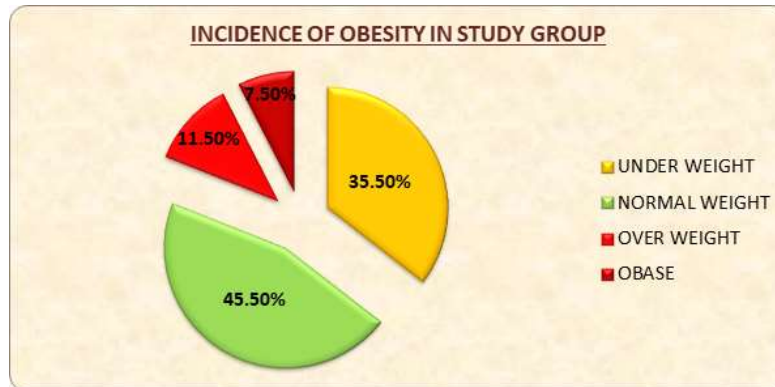


Figure - 1 Pie graph showing analysis of data related to assessment of obesity among adolescent

The figure shows the distribution of obesity among adolescents in the study group. It indicates that the majority of adolescents (45.5%) had normal weight, while 35.5% were underweight. A smaller proportion, 11.5%, were overweight, and only 7.5% were found to be obese.

This suggests that although most adolescents fall within the normal weight category, a considerable number are either underweight or at risk of overweight and obesity, highlighting the need for nutritional awareness and lifestyle modifications.



Figure – 2 Pie graph showing Gender distribution among obesity group

The figure shows the gender-wise distribution in the obesity group. It indicates that a higher proportion of

females (60%) were found to be obese compared to males (40%). This suggests that obesity is more prevalent among female adolescents in the study group.



Fig No.3 Pie graph showing monthly income of family distribution among obesity group

The figure shows the income-wise distribution in the obesity group. It indicates that the majority of obese adolescents (54.5%) belonged to families with a monthly income of Rs. 10,001–20,000, followed by 23% from families earning Rs. 20,001–30,000, and 22.5% from families with income up to Rs. 10,000. This suggests that

obesity is more common among adolescents from middle-income families.

SECTION III

ANALYSIS OF DATA RELATED TO ASSOCIATIVE FACTORS FOR OBESITY IN OBESITY GROUP

Table-2: Description of associative factors for obesity in obesity group N = 15

| SR. NO. | ASSOCIATIVE FACTORS | DF | SS | MS | P VALUE | |
|-----------|--|----------------------------------|----|--------|---------|-------|
| 1. | DIETARY PATTERN | | | | | |
| | CONSUMPTION OF BEVERAGES,SNACKS | COFFEE | 1 | 7.376 | 7.376 | 0.007 |
| | | MILK | 2 | 6.664 | 3.332 | 0.049 |
| | | SOFT DRINKS | 1 | 4.485 | 4.485 | 0.049 |
| | | SWEETS | 1 | 5.762 | 5.762 | 0.022 |
| | | BREAD JAM | 2 | 9.546 | 4.773 | 0.007 |
| | CONSUMPTION OF DESSERTS | ICE CREAM | 2 | 8.615 | 4.308 | 0.014 |
| | | JUICE | 2 | 11.206 | 5.603 | 0.001 |
| | EATING TIME | HURRY, WORRY, SLOWLY | 1 | 4.439 | 4.439 | 0.051 |
| 2. | ACTIVITY PATTERN | | | | | |
| | | Participation in active sports | 1 | 5.122 | 5.122 | 0.033 |
| | | Daily day time rest | 2 | 7.695 | 3.848 | 0.026 |
| | | Hours of sleep during night | 2 | 9.124 | 4.562 | 0.009 |
| 3. | PERSONAL HISTORY OF HEALTH PROBLEMS | | | | | |
| | | Reason to take more or less food | 1 | 4.791 | 4.791 | 0.041 |

The table shows that various dietary, activity, and personal factors have a significant association with obesity among adolescents. Dietary factors such as consumption of coffee (0.007), milk (0.049), soft drinks (0.049), sweets (0.022), bread-jam (0.007), ice cream (0.014), and juice (0.001) are

significantly associated with obesity, indicating that unhealthy food habits contribute to increased BMI. Activity patterns like participation in active sports (0.033), daytime rest (0.026), and hours of sleep (0.009) also show significant association, suggesting that reduced physical

activity and improper rest patterns influence obesity. Additionally, personal factors such as reasons for altered food intake (0.041) are significantly related to obesity. Overall, dietary habits, physical inactivity, and personal factors play an important role in the development of obesity among adolescents.

DISCUSSION

The findings of the present study were discussed in relation to the objectives and supported by similar studies. The analysis revealed that the majority of adolescents (84%) belonged to the age group of 14–16 years, with a slightly higher proportion of males (51%). Most participants were Hindu (89%), non-vegetarian (84.5%), and from nuclear families (79.5%). The majority of fathers were employed in service (67.5%), while most mothers were housewives (53.5%). More than half of the families (54.5%) had a monthly income between Rs. 10,001–20,000.

The Body Mass Index analysis indicated that 7.5% of adolescents were obese. The study identified significant associations between obesity and various dietary factors such as consumption of coffee, soft drinks, sweets, bread-jam, ice cream, and juice. These findings suggest that unhealthy dietary patterns and increased intake of high-calorie foods contribute to higher BMI among adolescents.

Activity patterns also showed a significant influence on obesity. Lack of participation in active sports, increased daytime rest, and variations in sleep duration were associated with higher BMI. It was observed that adolescents with sedentary lifestyles were more likely to be obese, while those engaged in physical activities maintained better BMI levels.

Personal factors such as stress, anxiety, and depression were also found to influence BMI, indicating the role of psychological factors in obesity. Furthermore, demographic variables such as religion and family income showed a significant relationship with BMI, with higher income groups showing increased obesity prevalence.

These findings are consistent with studies conducted by Chhatwal et al. and other contemporary studies, which reported increasing prevalence of obesity and its association with dietary habits, physical inactivity, and socio-economic status. The study highlights that childhood obesity is an emerging health problem and emphasizes the need for preventive strategies such as promoting healthy eating habits, increasing physical activity, and providing health education to adolescents, parents, and teachers to reduce the risk of obesity.¹⁰

CONCLUSION

The present study concludes that obesity among adolescents is an emerging public health problem in urban areas like Pimpri Chinchwad, Pune. The findings revealed that 7.5% of adolescents were obese, indicating a noticeable presence of the problem among school-going children. The study identified several significant associative factors contributing to obesity, including

unhealthy dietary patterns such as frequent consumption of high-calorie foods, beverages, and desserts.

Activity-related factors such as lack of participation in physical activities, increased daytime rest, and improper sleep patterns were also found to significantly influence Body Mass Index (BMI). In addition, psychological factors like stress, anxiety, and emotional disturbances showed an impact on adolescents' eating behavior and BMI. Demographic variables, particularly family income, were significantly associated with obesity, with higher prevalence observed among middle-income groups.

Overall, the study highlights that obesity is a multifactorial condition influenced by lifestyle, behavioral, and socio-economic factors. Early identification of these factors is essential to prevent long-term health complications. Therefore, there is a need to implement effective preventive strategies, including health education, promotion of balanced diet, encouragement of regular physical activity, and awareness programs for adolescents, parents, and teachers to control and reduce obesity.

DECLARATION BY AUTHORS

Ethical Approval: The study was approved by the institutional ethics committee of Dr. D.Y. Patil University, College of Nursing, Pune. The study participants were briefed about the purpose and nature of the study and written informed consent was obtained before data collection.

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