VOLUME - 15, ISSUE - 01, JANUARY - 2026 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Health Science

KAP OF OBESITY AND T2DM IN ADOLESCENT & IT'S PREVALENCE IN ADOLESCENT GROUP

Smriti Singh Associate Professor, MD, PG Department of Medicine, MLNMC Prayagraj.

Anubha Srivastava Professor, MD, PG Department of Medicine, MLNMC Prayagraj.

Richa Singh Associate Professor, MD, Community Medicine, MLNMC Prayagraj.

ABSTRACT

Background: Traditionally, pediatric diabetes has predominantly been attributed to Type 1 Diabetes Mellitus (T1DM). However, recent shifts in dietary behavior, coupled with sedentary lifestyles driven by increased engagement with technology, have contributed to rise in childhood obesity. These epidemiological trends underscore the critical role of balanced nutrition and adequate physical activity in modulating metabolic risk and preventing the onset of diabetes in children. We focus on school-based approaches to reduce obesity in order to prevent T2DM. We hope that the findings of this study will help in identifying high-risk groups and stimulate preventive strategies for noncommunicable diseases associated with childhood obesity in India.

Aim:

1. To investigate the Knowledge and Awareness of Obesity and T2DM in school going children above 15yrs (CLASS 9)
2. To assess prevalence of Obesity in children above 15yrs using anthropometric measurements

Methods: This study was conducted in 5 randomly selected rural and urban school of Prayagraj in a period of one year. 15 -19-year adolescent students studying 9th class or above. Anthropometric measurements (BMI, hip & waist circumference) of all students were taken. The prevalence of overweight and obesity has been reported according to the following age- and gender-specific BMI cutoffs available for children. BMI cutoffs for Indian adolescents for overweight and obesity in urban, rural Indian adolescents aged 14–18 years used the LMS method. **Results:** A total of 445 participants were enrolled the study. Male & female ratio was equal. The median age was 15.92±1.22, waist and hip circumference was 74.27±10.64 & 86.49±9.58. There is significant positive correlation between BMI & waist circumference ($p<0.001$). There is moderately significant positive correlation($p<0.001$) between BMI vs hip circumference and waist vs hip circumference. The average knowledge score for diabetes and obesity was good. 76.6% participants thought that antiobesity drugs & 75% participants thought food replacement are better way to reduce weight. **Conclusion:** It is important to improve education and awareness of DM and obesity among adolescent age, as it's essential for controlling the metabolic diseases in future. School should encourage students about physical activity and for healthy diet.

KEYWORDS :

INTRODUCTION

There are 537 million adults living with Type 2 Diabetes worldwide and is projected to rise by 2030 by 643 million (1). In 2019 77 million had T2DM in India which is expected to rise to 134 millions by 2045. The prevalence of T2DM in children is rising (2). In Lucknow and Chennai the proportion of T2DM in children is 12% and 26.7% .(3) According to UNICEF World Obesity Atlas for 2022. India is predicted to have more than 27 million obese children, making 1 in 10 children obese by 2030(4). The prevalence of Prediabetes among children and adolescent in South India is 3.7% which increased to 12.7% in girls with abdominal obesity (5).

Obesity is typically defined as having an excess of body weight caused by a chronic caloric imbalance with more calories being consumed than expended each day. Body mass index, or BMI, is a measure used to classify children as overweight or obese. A z-score is computed using the child's weight and height and the score is then compared to an age and gender percentile-based norms to determine weight status. The Centre for Disease Control uses the 85%ile and 95%ile as the cut offs for classifying a child as overweight and obese, respectively. Recent estimates from the National Health and Nutrition Examination Survey indicate that approximately one-third of children in the United States are overweight or obese, with approximately 17% meeting criteria for obesity. Obesity has been attributed to various factors including genetics, environment, metabolism, behavior, personal history of obesity, culture, and socioeconomic status (SES), Other aspects of the family environment are also highly influential, Parents' knowledge about nutrition and physical activity has also been found to be very strong predictors of children's weight status, Characteristics of the community have also been found to contribute to high rates of obesity. The current environments provide increased consumption of high density and high fat foods as against our ancestors. Various features like difficult access to parks, easy access to supermarkets, and convenience store hours, proximity of a person's home to fast food restaurants has been associated with metabolic risks. The role of consumption of healthy food and energy expenditure in the form of physical activity are imperative to maintaining healthy weight. Differences in physical activity and sedentary behavior can be associated with ethnic and SES disparities in obesity rates of children. Behavioral factors have significant effects on metabolic risk. Research has shown that youth who do not meet guidelines for dietary behavior, physical activity and sedentary behavior have greater insulin resistance than those who do meet guidelines (6).

In India various differences in regional, urban, rural, and social class exists which affect food habits, lifestyle practices. Due to consumption of high calorie 'fast foods', and limited open spaces for outdoor physical activities obesity more in cities. The prolonged period of Covid Lockdown and over usage of Internet and computers have also taken its toll especially on adolescents. However, very few studies have reported the prevalence of abdominal obesity in Indian children (7).

Children who are obese are at a high risk of physical and psychological comorbidities. There is increased metabolic risk factors for T2DM including high blood pressure, high cholesterol, impaired glucose tolerance, and metabolic syndrome. There can be other Orthopedic problems, sleep apnea, asthma, dental problems, and fatty liver disease also seen in obese children and adolescents (6). Abdominal adiposity is widely prevalent in adult Indians. Waist circumference (WC) is a reliable marker of abdominal obesity and has been shown to correlate with insulin resistance,

subclinical inflammation, and body fat in Indian adolescents. However, very few studies have reported the prevalence of abdominal obesity in Indian children (7). Indians have higher percentage of body fat and visceral fat as compared to Caucasians even with similar body mass index, this phenotype is present since birth and contributes to earlier development of T2DM and Metabolic Syndrome in children (8).

The rationale for studying the Knowledge and Awareness of Obesity and T2DM in adolescents will assess the Gap Analysis about the knowledge and awareness in adolescents about common lifestyle disorders, there is increase in childhood obesity both in urban and rural area and is matter of grave concern(9).

Obesity and T2DM represent significant public health issues with potentially great personal and societal cost. Research addressing the prevention of Obesity and T2DM among adolescents is urgently needed. Studying the prevalence of Obesity in Indian adolescents can help healthcare professionals, policymakers, and parents understand the burden of the disease and develop effective prevention and treatment strategies and thus reducing the burden in longer perspective It can also help identify risk factors associated with Obesity and T2DM and shed light on the cultural and social factors that influence in Indian adolescent. Overall, studying the prevalence of Obesity in Indian adolescents is an important step towards addressing this emerging public health issue and promoting awareness and lifestyle modification of young people in the country specially the tier 2 and tier 3 cities.

Hence, we focus on school-based approaches to reduce obesity in order to prevent T2DM.We hope that the findings of this study will help in identifying high-risk groups and stimulate preventive strategies for noncommunicable diseases associated with childhood obesity in India which is a burning issue and pose threat to T2DM in future. If we intervene at this stage with right lifestyle, it will go long way in reducing the burden of T2DM and Metabolic Syndrome.

This study was designed to assess the Knowledge and Awareness of Obesity and T2DM in children aged above 15 years going to senior secondary Urban and rural school from Prayagraj using a validated questionnaire. School-based Intervention are highly sought because schools provide an opportunity for education about healthy lifestyles and may help to prevent obesity. Schools can also help inform parents about their children's obesity status through screening programs which are generally well received. CATCH study showed improvement in physical activity, reduction in fat intake, and better overall health behaviors in children (10). The APPLES project a school-based program that improved children's nutritional knowledge, school meal quality, and healthy lifestyle behaviors. Promoting healthy eating can slow the rate of excessive weight gain in primary school age children (11). The incidence of overweight and Obesity among children has increased dramatically in recent decade which may lead to obesity associated health issues like Metabolic Syndrome and T2DM among young in later life (9).

Obesity and T2DM represent significant public health issues with potentially great personal and societal cost. Research addressing the prevention of Obesity and T2DM among adolescents is urgently needed. The initiation of Medical Nutrition Therapy early in overweight and obese children can be instrumental in breaking the chain of this pandemic of T2DM and Metabolic Syndrome.

MATERIALS AND METHODS

It was Survey based observational study which was conducted in the rural and urban schools of Prayagraj district from April 2024 to April 2025 over a period of one year. All school children studying in 9th class or above 15 yrs were included in this study those who were able to fill up the questionnaire. Children whose parents/guardians consented to participation in the study were included for anthropometric measurements. Those who were not giving consent were excluded from the study. The study was approved by the Institutional Ethical Committee.

Body weight (to the nearest 0.1 kg) and height (to the nearest 0.1 cm) of every student were recorded without shoes, accessories and allowing only light indoor clothes. Weight was measured using daily calibrated weighing scale (TANITA model BC 545N), the machine was set to detect 0.5kg (clothing weight) before starting measurements The body mass index (BMI) was calculated using the formula: weight (kg)/height (m^2). WC (to the nearest 0.1 cm) was measured midway between the iliac crest and lowermost margin of the ribs in schoolchildren. Height was measured to the nearest 0.1cm using the TANITA height rod with children standing straight with the head in the Frankfurt plane. WC is a simple and effective measure of abdominal obesity in children and is also considered an indicator of visceral fat.

The questions relevant to Knowledge and Awareness in T2DM (anexure1) & Knowledge and Awareness questionnaire for obesity (anexure2) were given to all students to fill it. The questions relevant to Knowledge and Awareness in T2DM were derived from the validated questionnaire from Knowledge and Awareness of Diabetes Questionnaire developed for the Chennai Urban Rural Epidemiology Study (12). The knowledge part of the questionnaire on Obesity contains 14 items which emphasizes mainly on participants' knowledge regarding risk factors and complications associated with obesity (13).

For Knowledge and Awareness questionnaire in Diabetes the scoring was done as follows: (a) For closed questions, correct answers were graded as 1 and incorrect answers (inclusive of "don't know") as zero. (b) For causative factors for diabetes, the highest score of '4' were awarded to subjects who tick obesity, high blood pressure, lack of physical activity or family history of diabetes, '3' were given to those who will tick "consuming sweets," '2' to those who were tick "mental stress" and '1' for any other answer which made sense or was close to the above answers, while all other answers were scored '0'. (c) Thus, the least possible score was '0' if all answers were incorrect and the maximum score will be '8', if all answers were correct. (d) A composite score in percentage was then derived by dividing each individual's score by the maximum score possible (12). For Knowledge and Awareness questionnaire for Obesity; each question had five response items (a to e). The best possible response were got a score of 5 and the wrong response got a score of 1 (13).

Statistical Analysis:

Data were entered into Excel spreadsheets. Prevalence data were expressed as percentages and compared using the chi-square test. The prevalence of overweight and obesity was reported according to the following age- and gender-specific BMI cutoffs available for children. BMI cutoffs for Indian adolescents aged 14-18 years, for overweight and obesity in urban, rural settings, were determined using the LMS method(6). Abdominal obesity was defined according to the International Diabetes Federation (IDF) consensus statement for at-risk children and adolescents. Waist Circumference cut offs of 90 cm for males and 80 cm in females were used for Indian adolescents aged 14–18 years (14,15). Univariate associations of age, gender, type of school with overweight and abdominal obesity were determined. Multivariable logistic regression was used to identify the independent factors associated with overweight and abdominal obesity in adolescent children. The level of significance was set at $p <$

.05 for all statistical tests.

RESULTS

We visited 5 schools from rural and urban area. 445 students had given consent for study. 223 were male and 222 were female. Mean age of students were 15.92±1.22 years, indicating that sample predominately consisted of mid adolescent individuals. The median age was 16 years. The mean BMI was 20.01±3.60kg/m^2, falling within the normal physiological range for adolescents. The median BMI was 19.43 kg/m^2 indicating the presence of both underweight and overweight individuals. Out of the total students 339(89%) found to falling in the normal BMI category. 35(7.8%) ere underweight and another 4(0.8%) severely underweight, 9(2%) were overweight and one child was obese. Overweight and obesity was more prevalent in private school; as compared to government school children. As far as gender wise results are concerned, underweight was more prevalent in females in both government and private schools as compared to males whereas overweight and obesity was more prevalent among males in both government and private schools.

Table1. Anthropometric Measurements

	Mean±SD	Median	Min	Max	Percentile 25	Percentile 75
Age(years)	15.92±1.22	16.00	12.00	19.00	15.00	17.00
BMI(kg/m^2)	20.01±3.60	19.43	14.10	35.49	17.21	22.20
Waist circumference(cm)	74.27±10.64	74.00	24.00	119.00	67.00	81.00
Hip circumference (cm)	86.49±9.58	86.00	26.00	120.00	82.00	92.00

Table 2 Provides An Overview Of BMI Classification Of Students.

Category	Total	Private school		Government school	
		Male	Female	Male	Female
Severely underweight	4 (0.8%)	1 (0.6%)	1 (0.7%)	0	2 (2.2%)
Underweight	35 (7.8%)	11 (7.1%)	13 (9.9%)	2 (2.9%)	9 (9.9%)
Normal	396 (89%)	134 (87.5%)	115 (87.7%)	68 (97.7%)	79 (86.8%)
Overweight	9 (2%)	6 (3.9%)	2 (1.5%)	0	1(1.1%)
Obese	1 (0.2%)	1 (0.6%)	0	0	0
Total	445	153	131	70	91

Table3. Correlation Between Age, BMI, Waist & Hip Circumference

Spearman's rho Correlations		Age	BMI	Waist circumference	Hip circumference
Age (years)	R	1.000	-.015	.089	.109
	p value	.	.756	.061	.022
	N	445	445	445	445
BMI (kg/m^2)	R	-.015	1.000	.369	.420
	p value	.756	.	<0.001	<0.001
	N	445	445	445	445
Waist circumference (cm)	R	.089	.369	1.000	.648
	p value	.061	<0.001	.	<0.001
	N	445	445	445	445
Hip circumference (cm)	R	.109	.420	.648	1.000
	p value	.022	<0.001	<0.001	.
	N	445	445	445	445

Waist circumference mean was 74.27(±10.64) and hip circumference was 86.49(±9.58).Age vs Hip Circumference shows weak but significant positive correlation. No significant correlation between Age vs BMI / Waist circumference. BMI vs Waist Circumference shows moderate, significant positive correlation ($p < 0.001$). BMI vs Hip Circumference has significant positive correlation ($p < 0.001$). Waist vs Hip Circumference shows Strong, significant correlation ($p < 0.001$)

Out of 445 students in our study 360 (80.9%) students were aware about diabetes. Out of 360 students 24% were not aware that more people now a days affected by diabetes but 76 % were aware about it. The questions to assess knowledge of were administered only to the 360 students who were aware of diabetes. As the questions to assess attitude towards diabetic that could not be administered to 85 students. Out of 360 students 259 (72.1%) students were aware that diabetes can affect organs but 101 (27.9%) that diabetes could not affect any organs. Out of 259 students 49.9%(n=129) were aware that diabetes can affect 1 organ, according 13.2% (n=34) affect 2 organs, 11.83%(n=31) affect 3 organs, 9.9%(n=26) affect 4 organs, 7.47%(n=19) affect 5 organs, 2.18%(n=6) affect 6 organs, 2.18%(n=6) affect 7 organs, 0.6%(n=1) affects 8 organs and 2.8%(n=7) students were aware that diabetes affects all the organs.

Out of 360 students 74.4%(n=268) students were aware that there were multiple risk factors for diabetes. According to 40.4% obesity, high blood pressure, lack of physical activity or family history was the risk factor for diabetes, 20.2% thought consuming sweets were one of the risk factors, 9.8% thought that mental stress is one of the risk factors for diabetes.

316 (71%) students thought that diabetes can be prevented but 129 (29%) students thought that diabetes can't prevented. Out of 316 students 27(8.54%) students thought that only with diet diabetes can controlled, 53(16.8%) students thought that only exercise and 39 (10.80%) students thought that other methods can also controlled diabetes but 197 (62.34%) students thought that combination of diet & exercise.

Out of 445 students, 330(74.2%) were well aware that obesity can be measured by BMI, only 59 (13.3%) students had never heard of BMI. 248 (55.7%) students knew that more fat over abdomen is dangerous, but 76(17.1%) students don't seem to think so and 74(16.6%) students had no idea about this. 257 (57.8%) students think that obesity is associated with heart disease but 104(23.4%) students think that this is not so and 84 (18.9%) students have no idea about it. Is obesity related to diabetes? Regarding this, 290 (65.2%) students said that yes, it is related to it, 61(13.7%) students feel that there is no such relationship and 54 (21.2%) not sure about it. 263 (59.1%) thought that osteoarthritis definitely related to obesity but 77(17.3%) thought that there is no such relation and 105 (23.6%) had no idea. 258(58%) students think that constant stress is one of the risk factors for obesity but 41(9.2%) think that stress can't causes obesity.

226 (50.8%) students think that fasting/ skipping meal is the

best way to lose weight, 42(9.4%) students think that probably it's good idea but according to 177(39.8%) students think it doesn't work. 223(50.1%) students believe that eating sweets increase weight ,19 (4.3%) students think that eating sweets probably causes weight gain, 57 (12.8%) students think that excess consumption of sweets does not lead to obesity and 120(27%) students had no idea about it.230 (51.7%)student think that frequent consumption of sweetened beverage definitely increase obesity but according to 122 (27.4%) they have no idea and 46 (10.3%) thought that these drink can't cause obesity. According 228 (51.2%) students fried food, 237 (53.3%) students refined oil causes obesity & 46 (10.3%) students and 63(14.2%) respectively thought that these are not causative factors. According 256 (57.5%) students regular aerobic exercise is good way to decrease weight but 59(13.3%) thought it's not a good way and 130(29.2%) had no idea. 341(76.6%) students thought anti-obesity drugs is preferred way to decrease weight but 67(15.1%) thought should not take anti-obesity, 37(8.3%) don't know about it. 334 (75%) thought that meal replacement/ supplements are good way to reduce weight, according to 67(16.4%) students it is not good way and 44(9.9%) had no idea.

DISCUSSION

The present study critically examined knowledge, attitude, and practices related to diabetes and obesity among students using a validated KAP questionnaire. While overall awareness of these conditions was relatively high, a detailed comparison with previous studies revealed persistent gaps in preventive knowledge and health-related practices, highlighting limitations in current health education strategies. Consistent with earlier studies conducted among adolescent populations in India, the present study observed a predominance of normal BMI values, accompanied by considerable variability in anthropometric measures. Similar patterns were reported by Singh et al. (2025), who also noted moderate nutritional variability despite normal BMI distribution (16). However, unlike some studies that reported a stronger influence of age on adiposity, the present findings demonstrated minimal correlation between age and BMI or central obesity measures, suggesting that modifiable lifestyle factors may exert a greater influence than age in this cohort. The strong association between BMI and waist and hip circumference observed in this study aligned with existing evidence emphasizing the importance of central adiposity as a predictor of metabolic risk. Previous studies have similarly highlighted waist circumference as a superior marker of cardiometabolic risk compared to BMI alone (17). However, the limited awareness of android obesity among participants contrasted sharply with the clinical significance attributed to central obesity in the literature, indicating a substantial disconnect between epidemiological evidence and student-level understanding.

Participants demonstrated adequate recognition of diabetes as a systemic disease and were familiar with common risk factors. However, preventive knowledge was markedly lower, a finding consistently reported across Indian and international studies. Singh et al. (2025) similarly identified moderate knowledge but insufficient emphasis on prevention, suggesting that educational interventions often focus on disease recognition rather than actionable preventive behaviors(16).

Obesity and BMI was widespread, a significant proportion of students failed to recognize obesity as a risk factor for cardiovascular disease and diabetes mellitus. This finding contrasted with studies from urban adolescent populations where cardiovascular risk awareness was higher, possibly reflecting differences in educational exposure or health messaging(18). Conversely, the findings were comparable to those reported by Peace et al. (2022) in Uganda, where adolescents demonstrated inadequate understanding of obesity-related health consequences, indicating that this knowledge gap may be a broader global issue (19).

Dietary risk factor awareness in the present study was moderate, with over half of participants correctly identifying unhealthy dietary habits as contributors to obesity. However, this level of awareness remained lower than that reported in some urban Indian studies, where greater exposure to nutrition education resulted in better dietary knowledge (20).

The analysis of weight management practices revealed a critical divergence from evidence-based recommendations. Only half of the students correctly identified physical activity as the most effective approach for weight reduction, while a larger proportion favored anti-obesity drugs or meal-replacement therapy. The preference for medicalized weight loss strategies may reflect the influence of media and commercial weight loss narratives rather than scientifically grounded health education. Similar observations were reported by Baohong et al., who found inadequate knowledge regarding obesity among college students despite a generally positive attitude toward prevention through diet and exercise (21).

The present findings reinforced the recurring theme of a mismatch between knowledge, attitude, and practice among adolescents. While attitudes toward diabetes and obesity were generally positive, incomplete understanding and inappropriate practices persisted. These findings underscore the need for comprehensive, behavior-focused health education interventions that go beyond awareness generation. Integrating practical lifestyle skills, critical thinking, and long-term risk communication into school curricula may be essential to address the growing burden of obesity and diabetes in adolescents. The persistence of misconceptions regarding obesity prevention further highlighted weaknesses in current health education. While many students expressed a favorable attitude toward obesity prevention, this attitude did not consistently translate into appropriate practices. This knowledge–practice gap suggested that students may be exposed to fragmented or superficial health information, possibly influenced by media portrayals that emphasize rapid weight loss through pharmacological or commercial interventions rather than lifestyle-based approaches. Consistent with the findings of Samudre et al., the present study demonstrated inadequate knowledge regarding the consequences and prevention of overweight and obesity. In their study, only one-third of participants were aware of the health consequences of obesity, while knowledge regarding contributing factors and treatment measures remained incomplete. The similarity between these findings and the present results suggested that inadequate obesity-related health literacy among students is a persistent and widespread issue rather than an isolated observation (22).

CONCLUSION

BMI values reveal a normally distributed population with wide range, suggesting heterogeneity in nutritional status. Students of urban area had better knowledge about DM and obesity in comparison to rural area, they have better knowledge about DM in comparison to obesity. Comparatively, while awareness of dietary risk factors such as excessive consumption of unhealthy foods was moderate, comprehensive understanding of obesity-related complications remained limited. This selective knowledge may reduce perceived susceptibility to long-term complications, thereby diminishing motivation for behavioral change. Adolescents and young adults often underestimate the seriousness of obesity-related morbidity, leading to delayed adoption of preventive behaviors. Overall, the present study reinforced evidence that students often possess fragmented knowledge, favorable attitudes, and suboptimal

practices regarding obesity and diabetes prevention. These findings underscored the urgent need for comprehensive, behavior-oriented educational interventions that integrate scientific knowledge with practical lifestyle skills. Strengthening health education curricula to emphasize physical activity, balanced nutrition, and long-term risk awareness may be critical to translating positive attitudes into sustained healthy practices and reducing the future burden of obesity and diabetes.

Limitations:

The limitation of this study is that - the sample consists of adolescents from a single region, i.e. Prayagraj, which might limit the generalizability of the findings to other populations. Finally, the study relies on self-reported data, which might also be subject to response bias. Life style interventions LSM will depend on the motivation of adolescents and support of their parents.

Annexure 1

Questions used for obtaining data regarding knowledge of diabetes were as follows (10)

1,Have you heard of a condition called diabetes? Yes/No

2.If yes, do you think in general more and more people are getting affected with diabetes nowadays? Yes/No/Don't know

3Do you think diabetes can affect other organs? Yes/No/Don't know

If yes, which organs? Eyes/Heart/Lungs/Stomach/Kidneys/ Feet/Brain/Hands/ Nerves/Others (Specify)/Don't know

4.What are the risk factors for diabetes? Overweight/High blood pressure/Family history of Diabetes/Consuming more sweets/Lack of physical activity/Mental stress/Others (Specify)/Don't know

5. Can diabetes be prevented? Yes/No/Don't know

6. If yes, how can it be prevented? Diet/Exercise/Others (Specify)

ANNEXURE 2

Questionnaire for assessment of Knowledge and Awareness about obesity (11)

1. Obesity can be assessed by an entity called BMI

a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

2. More fat over abdomen is dangerous than overall increase in the distribution of fat in terms of causing increased cardiovascular problems

a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

3. Obesity is associated with heart diseases, such as heart attack, increased blood pressure, increased cholesterol levels, etc.

a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

4. Obesity is associated with diabetes a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

5. Obesity is associated with osteoarthritis (joint problems) a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

6. Fasting/skipping meals is a good way to lose weight a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

7. Excess sugar consumption in the form of sweets; additional sugars in coffee/tea/milk etc., is an important risk factor which leads to overweight/obesity

a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

8. Frequent consumption of sugar-sweetened beverages (pepsi/coca-cola/sweetened juices, etc.) leads to weight gain

a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

9. Frequent fried food consumption (samosa, fries, wafers, etc.) leads to weight gain a) Definitely b) Probably c) Probably not d) Definitely note) Don't know

10. Excessive consumption of refined foods (bread/biscuits/ momos, etc.) leads to weight gain a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

11. Constant stress is a risk factor which leads to weight gain a) Definitely b) Probably c) Probably not d) Definitely not e) Don't

12. Regular aerobic exercises, such as running, jogging, swimming, playing outdoor sports, etc., is an important way of losing weight a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

13. Anti-obesity drugs are the preferred way of reducing weight a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

14. Meal replacers/supplements are a healthy way to lose weight a) Definitely b) Probably c) Probably not d) Definitely not e) Don't know

REFERENCES:

1. International Diabetes Federation; Diabetes facts and figures : 9/12/21.
2. Pradeepa R, Mohan V. Epidemiology of type 2 diabetes in India. Indian J Ophthalmol. 2021 Nov;69(11):2932-38.
3. Kalra S, Dhingra M. Childhood diabetes in India. Ann Pediatr Endocrinol Metab. 2018 Sep;23(3):126-30.
4. UNICEF World Obesity Atlas 2022.
5. Anjana RM et al. ICMR–INDIAB Collaborative Study Group. Prevalence of diabetes and prediabetes in 15 states of India: results from the ICMR-INDIAB population-based cross-sectional study. Lancet Diabetes Endocrinol. 2017 Aug;5(8):585-96.
6. NFHS -5 National Report.
7. Misra A et al: The high burden of obesity and abdominal obesity in urban Indian schoolchildren: a multicentric study of 38,296 children. Ann Nutr Metab. 2011;58(3):203-11.
8. Kalra S, Dhingra M. Childhood diabetes in India. Ann Pediatr Endocrinol Metab. 2018 Sep;23(3):126-30.
9. Pulgaron ER, Delamater AM. Obesity and type 2 diabetes in children: epidemiology and treatment. Curr Diab Rep. 2014 Aug;14(8):508.
10. Perry C L, Sellers DE, Johnson C, Pedersen S, Bachman KJ, Parcel GS et al: The child and adolescent trial for cardiovascular health (CATCH): intervention, implementation, and feasibility for elementary schools in US. Health Educ Behav.1997 Dec:24(6):716-35.
11. Taylor RW, Mcauley KA, Barbezat W, Strong A, Williams SM, Mann JI: The American J of Clinical Nutrition.2007 Sep:86(3):735-42.
12. Deepa M et al Knowledge and awareness of diabetes in urban and rural India: The Indian Council of Medical Research India Diabetes Study (Phase I): Indian Council of Medical Research India Diabetes 4. Indian J Endocrinol Metab. 2014 May;18(3):379-85.
13. Reethesh SR et al Development and validation of a questionnaire assessing knowledge, attitude, and practices about obesity among obese individuals. Indian J Endocr Metab 2019;23:102-10.
14. Pandey RM, Madhavan M, Misra A, Kalaivani M, Vikram NK, Dhingra V: Centiles of anthropometric measures of adiposity for 14- to 18-year-old urban Asian Indian adolescents. Metab Syndr Relat Disord 2009;7: 133–141.
15. Khadilkar VV, Khadilkar AV, Borade AB, Chiplonkar SA. Body massindex cut offs for screening for childhood overweight and obesity in Induan children. Indian Pediatr.2012;49:29-34.
16. 23. Singh B, Garg R, Saroha R, Arjun KS; Knowledge, Attitude, and Practices Toward the Role of Diet and Exercise in Preventing and Managing Diabetes Among Young Students in Ghaziabad; 2025:July;15(7),20 – 26.
17. Cibickova et al; Superior role of waist circumference to Body Mass Index in Prediction of Cardiometabolic risk in dyslepedemia patients. Physiol Res.2019;68:931-38.
18. Rizvi JZ, Kumar P, Kulkarni MM, Kamath A; Awareness and Association of obesity risk reduction factors among junior high school of South India. IJCH. 2019;31(4),506-12.
19. Peace K, Andrew T, Atuheire G K. Nutritional Knowledge, Attitude and Practices of Adolescents Towards Healthy Eating in Secondary Schools in Sheema Municipality, Sheema District, Uganda: A Cross Sectional Study, Journal of Scientific Research. 2022;9(1) 34–51.
20. Manasa T, Lakshmi V V; A study on awareness levels of rural and urban consumers about branded food products. AATCC Revivews journal. 2023;11(4) 251-57.
21. Baohong X et al; Knowledge, attitude, and practice of obesity among university students.Annals of Palliative Medicine.2021;10(4).
22. Samudre M, Kulkarni S M; Knowledge on Prevention of Obesity Among the Students From Selected High Schools. International Journal of Science & Research. 2016;5(3) 682–687.