Review on obesity in school children

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Abstract

Obesity is an increasingly frequent condition that the WHO has classified as a disease. Obesity and its negative repercussions are a significant concern in developing economies due to the consumption of energy rich meals (i.e., poor eating practices), sluggish lifestyles, a provision of primary care, and monetary incentives. Obesity is one of the government's biggest medical and budgetary headaches. This review paper has been designed with an aim to assess prevalence trends in measured overweight and obesity with blood pressure school among children across Ernakulam District, Kerala. To choose the kids, a stratified random cluster sampling technique was employed. The Students 't' test was used to determine the statistical significance of the difference in the mean impact of multiple parameters between the 2 categories. Using accepted techniques, the odds ratio and the related confidence intervals were calculated. This was accomplished using the SPSS software. According to the body mass index for gender and age, being overweight or obese was defined. Age, size, and sexual preference were taken into account while assessing hypertension. Urban areas and private institutions had much high levels of overweight students, and only private institutions were seeing the strong growth. The findings point to the need for more public education and initiatives to avoid blubber crisis and hypertension.

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1) Introduction

Obesity is a disparate syndrome that is frequently correlated to a range of other debilitating conditions, namely diabetes, high blood pressure, and certain other cardiovascular disorders, psoriatic arthritis, and some carcinomas. According to latest researches, more than 2 billion individuals worldwide are overweight, with 650 million being obese. Overweight or obesity is said to be the cause of 2.8 million deaths per year.

Children's excess weight is amongst the most pressing public health concerns of the twenty-first century. The middle- and low-income countries are largely impacted by this issue. Obesity is defined as extravagant fat accumulation that impairs health. The classification of obesity in adults can be done by using Body Mass Index (BMI). BMI is basically a ratio of weight in kilograms to the square of height in meters squared (kg/m2) [1].

It is observed that in the last four decades, the number of children who are obese has increased dramatically, especially in the industrialized countries. In the previous decade, studies from several parts of India have revealed a similar pattern. This viewpoint has been challenged in recent years, and we now regard these as distinct epitomes of the worldwide malnutrition problem. This new way of thinking allows us to address the core causes of nutritional inadequacies at the same time, which helps to promote cohesion [1].

Prevalence of obesity among children has a major impact on both health and development. For example, hypertension and infertility are all linked to blubber. Moreover, obese children and adults are observed to be more depressed and have some psychological illnesses. Overweight children are in more danger of developing cardiovascular and digestive disorders, as well as to die from any cause than lean children.

The skin fold thickness (noninvasive method of body mass estimation) of 3,300 children aged 5-18 years was assessed. Based on that information, individuals are considered obese if one's visceral fat proportions are approximately 25% and 30% for males and women, correspondingly.

There are also multiple strategies for assessing the proportion of body fat. Some of them are skewing beneath water, bioelectric impedance

evaluation at several frequencies and magnetic resonance imaging. In clinical contexts, procedures like BMI (Body Mass Index) were generally implemented. Although they are less accurate yet these methodologies are quite effective in assessing danger. While BMI appears to be a good way to differentiate between adults, it may not be effective for children owing to the constant shift in their body forms as they develop. The use of bioelectrical impedance analysis (BIA) in large studies based on demographic and clinical situations is prevalent. Furthermore, the specimen of maturity varies between genders and general population.

2) Keywords: Causes of obesity, obesity, factors of obesity, trends in obesity, obesity in school kids, comparison of obesity with blood pressure.

3) Causes

When calorie consumption surpasses caloric intake, obesity is verified. As a result, because there are several etiologies for the increased incidence of obesity, one etiology cannot be addressed. Genetic determinants have one influence in a toddler's predisposition to an adiposity atmosphere. Obesity's rising prevalence cannot be remedied by a central entity since such imbalance is induced by a myriad of causes. A child's vulnerability to an obesity-prone environment is also influenced by genetic factors. Environmental determinants, lifestyle choices, and the cultural milieu, on the other hand, appear to play a significant part in the worldwide obesity epidemic. Rarely, genes such as leptin insufficiency induce childhood obesity. Hypothyroidism or growth hormone deficiency are some of the medical issues. Obesity is frequently influenced by an individual's lifestyle choices as well as their cultural context. The key factors responsible for this problem are as follows:

(a) Diet: Junk food, muffins, and Snacks from machines are all high-calorie meals that can cause a child to gain weight if consumed on a regular basis. Sweets and desserts can also lead to obesity. Sugary beverages, such as fruit juices and sports drinks, are increasingly being linked to obesity in some people.

(b) Lack of exercise: Since they don't combust a lot of calories if they're not active, infants who are not energetic are more inclined to build weight. Excessive time spent on desk-bound activities such as watching TV or playing video games leads to this problem. TV shows also often have commercials about unhealthy foods which influences them too.

(c) Family factors: If your kid comes from a family with several overweight people, he or she may be more likely to gain weight.

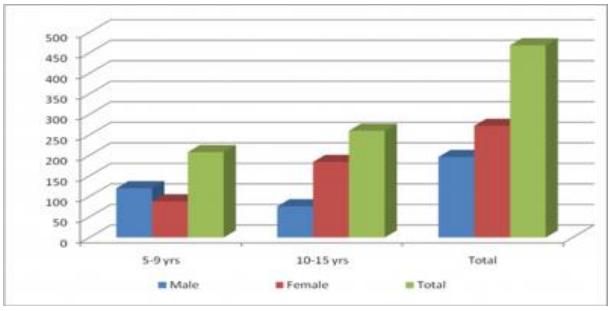
(d) Psychological factors: Personal, parental and family stress will cause increase within the risk of blubber in children. Some kids binge eat to cope with problems or sensations like boredom or worry. It's possible that their ancestors had comparable proclivities.

(e) **Factors of society and economy**: People in some communities have restricted resources and limited access to supermarkets. As a result, they will get prepared meals that do not spoil such as frozen meals, crackers and cookies. Furthermore, individuals who live in urban areas wouldn't have right to a reliable location to workout.

(f) Certain drugs: Certain prescription drugs will increase your risk of developing blubber. Anti-inflammatory, lithium, tricyclic antidepressant, paroxetine, gabapentin and propranolol are some of the examples.

4) Comparison

The percentage of overweight children grew considerably during a two-year period, affecting both sexes and all age categories. Along with it, there was an upward trajectory in overall average BMI levels for all age cohorts. Government schools did not see the spike, which was significant in private schools. Urban schools had quite a substantial amount of overweight students than rural schools, although both exhibited an increased tendency over the course of the two years. This fast growth over a two-year period acquires significant etiological significance. A large BMI substantially corresponds with indicators of secondary consequences from obesity. There are clear regional disparities in the prevalence of overweight and obesity, according to data from many national health surveys conducted across Asia.



(Fig1)

The frequency of childhood obesity has risen sharply in Asian nations like Taiwan and China. Many nations' dietary, economical, and health conditions have improved as a result of strong economic expansion. With this dietary adaptation, obesity has significantly grown in several Asian nations. India is also undergoing a similar dietary change at this time.

(Table 1)

Age	Boys						Girls					
(years)	*n*	Height (cm)	Weight (kg)	BMI	SBP	DBP	*n*	Height (cm)	Weight (kg)	BMI	SBP	DBP
5	198	111.6 (5.63)	17.8 (3.19)	14.2 (1.53)	95.2 (8.15)	61.0 (8.41)	222	110.0 (5.52)	17.2 (2.89)	14.2 (1.57)	94.1 (9.25)	5.92 (9.20)
6	689	116.1 (5.61)	19.5 (3.77)	14.4 (1.85)	96.5 (8.68)	60.9 (8.93)	563	114.8 (5.55)	18.9 (3.36)	14.2 (1.66)	95.9 (8.44)	61.7 (7.97)
7	729	122.0 (5.61)	21.9 (4.71)	14.6 (2.20)	97.7 (8.22)	62.9 (8.75)	594	121.6 (5.73)	21.8 (4.61)	14.6 (2.20)	97.9 (8.35)	63.3 (8.32)
8	788	127.4 (6.26)	24.5 (5.32)	15.0 (2.26)	99.5 (9.09)	64.3 (8.68)	667	126.2 (6.33)	23.8 (4.99)	14.8 (2.16)	98.8 (9.36)	63.7 (8.51)
9	912	132.1 (6.32)	26.8 (5.76)	15.2 (2.32)	100.5 (8.56)	66.0 (8.31)	855	132.3 (6.58)	26.7 (5.69)	15.1 (2.32)	101.5 (9.36)	66.5 (8.38)
10	1109	137.1 (6.48)	29.3 (6.50)	15.4 (2.48)	102.1 (8.67)	67.3 (8.08)	1178	137.6 (7.08)	29.9 (7.10)	15.7 (2.62)	104.4 (9.87)	68.5 (8.17)
11	1126	141.9 (7.24)	32.6 (7.94)	16.1 (2.83)	103.5 (9.60)	68.3 (8.24)	1301	142.8 (7.33)	33.7 (8.01)	16.3 (2.77)	107.3 (10.01)	70.0 (7.85)
12	1125	146.7 (7.87)	35.9 (9.13)	16.5 (2.96)	105.3 (10.00)	68.6 (8.08)	1269	148.6 (6.68)	38.2 (8.07)	17.2 (2.83)	109.8 (10.35)	71.7 (7.62)
13	1024	153.7 (8.83)	40.9 (9.71)	17.2 (2.99)	108.0 (11.20)	69.1 (8.67)	1388	152.1 (6.24)	41.5 (7.82)	17.9 (2.84)	112.3 (10.57)	72.6 (7.80)
14	1088	159.8 (8.36)	45.1 (9.60)	17.5 (2.79)	111.0 (11.29)	71.2 (8.25)	1481	154.2 (5.99)	44.0 (8.53)	18.5 (3.08)	113.2 (10.42)	73.3 (7.85)
15	687	164.2 (7.71)	49.3 (10.51)	18.2 (3.05)	113.8 (10.92)	72.8 (8.46)	813	155.3 (6.28)	45.8 (8.39)	19.0 (2.88)	114.4 (10.47)	74.2 (7.94)
16	279	165.9 (7.50)	52.4 (11.42)	18.9 (3.28)	115.1 (11.44)	73.2 (8.20)	178	155.2 (6.58)	46.6(8.92)	19.3 (3.28)	114.7 (10.87)	74.5 (7.10)

BMI body mass index SBP systolic blood pressure in mmHg DBP diastolic blood pressure in mmHg All values are mean (SD)

(Table II)

Percentages of overweight and obese children in 2005 and 2003

Dataset	Overweight			Obese		
	Overall	Boys	Girls	Overall	Boys	Girls
2005 (*n*=20 263)	6.57	7.33	5.87	1.89	2.47	1.34
2003 (*n*=24 842)	4.94	5.38	4.57	1.26	1.65	0.93
Odds ratio	1.36*	1.39	1.30	1.51*	1.51	1.45
95% confidence interval	1.25–1.47	1.24–1.56	1.16–1.46	1.29–1.76	1.24–1.84	1.13–1.85
p value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.003

* Odds ratio adjusted for gender and age

(Table III)

Percentages and trends of overweight children in private and government schools

Dataset	Private schools	Government schools	Odds ratio, 95% CI, p value
2005	7.17	3.23	2.31, 1.87–2.86, p<0.0001
2003	5.17	3.83	1.37, 1.15–1.62, p<0.0003
Odds ratio	1.42*	0.84*	
95% CI	1.30–1.54	0.65–1.09	
p value	p<0.0001	p>0.05	

* Odds ratio adjusted for gender and age CI confidence interval

(Table1V)

Percentages and trends of overweight children in urban and rural schools

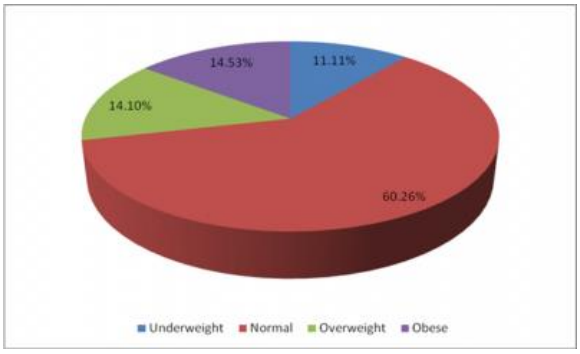
Dataset	Urban	Rural	Odds ratio, 95% CI, p value
2005	8.66	3.75	2.43, 2.13–2.77, p<0.0001
2003	6.43	2.91	2.29, 2.00–2.62, p<0.0001
Odds ratio	1.38*	1.30*	
95% CI	1.26–1.52	1.11–1.53	
p value	p<0.0001	p<0.005	

* Odds ratio adjusted for gender and age CI confidence interval

These factors may be to blame for the differences in blubber prevalence and trends between remote and urban institutions that the study showed. Nevertheless, it's intriguing to see that rural schools also showed an increased tendency.

In the middle Keralan district of Ernakulam, a continuous region with a population of around 1.36 million was chosen.

24 832 kids, aged 5 to 17, had their body measurements (height and weight) taken in 2003–2004. Body mass index (BMI) values larger than the 85th percentile of reference data were deemed overweight, while values greater than the 95th percentile were considered obese in children. The CDC dataset for BMI was utilized as the source of reference information to determine the cut-off marks. The Fourth Report on the detection, analysis, and management of high blood pressure in children and adolescents advised that blood pressure to be tested using established procedures. Hypertension was defined as diastolic blood pressure that exceeded the 95th percentile for the patient's race, maturity, and size. Average systolic blood pressure that was over the 90th percentile was deemed pre-hypertensive, although 130 mmHg systolic and 70 mmHg diastolic blood pressure were also regarded pre-hypertensive.



(Fig 2)

A total of 20 262 children (9752 males and 10 510 girls) were tested in 2005 compared to 24 841 children (11 321 boys and 13 520 girls) in 2003. In Tables I and II, the qualitative statistics from both surveys are displayed. 4.93% of all pupils were blubbery in 2003, and 6.56% were in 2005. This increase is statistically significant (OR: 1.35; 95% CI: 1.24–1.46; p<0.005). In both the 2003 and 2005 school years, more overweight students attended private schools than public ones. (5.16% v. 3.82%; OR: 1.36; 95% CI: 1.14–1.61; p0.05). In comparison to rural schools, a disproportionately high percentage of pupils attended urban schools in both 2003 and 2005. There was an upward tendency in schools in both urban and rural areas. In the survey conducted in 2005, 20 262 kids had their blood pressure checked.10.57% of all children (7.16% of males and 13.71% of girls) had incident hypertension. 5.83% of children (3.21% of males and 8.28% of girls) had systolic hypertension, while 6.60% of kids (4.88% of boys and 8.21% of girls) had diastolic hypertension10.64% of all children had acute pre-hypertension (9.32% of males, 11.88% of girls), and 14.74% had diastolic pre-hypertension (12.52% of boys, 16.81% of girls. Compared to the link between blood pressure and weight and height in both sexes, the correlation between blood pressure and Body mass index was less. With the exception of those who were 15 years old, boys' mean diastolic blood pressure in the obese group was higher than that in the average weight group at all ages.

5) Conclusion

Over course of just two years, there was a marked increase in the trend of childhood blubber. When compared with individuals who were neither overweight nor obese, infants with overweight and obesity had greater proportion of hypertension. These findings imply that the trend of rising coronary disease in humans seen in recent times would worsen unless effective interventions and precautionary changes are applied at the global and national level. These developments are alarming and necessitate coordinated initiatives aimed at enhancing children's and teenagers' lifestyles.

6) Consequences

Prevalence of obesity among children has serious consequences for their economic, psychological, and intellectual well-being. It may have an effect on vanity of kids. It's also connected to a student's low grades and lousy standard of living. Within the following sections, these possible implications are discussed in depth:

a) Medical consequences:

Childhood blubber is associated with many medical conditions. Fatty liver disease, diabetes, breathing issues, high cholesterol, skin issues, cardiovascular disease, and many other problems are all linked to these illnesses. Earlier, several of these health issues were seen solely in adults. They are becoming quite frequent among obese toddlers. Despite the fact that many of the physical health problems linked to childhood obesity may be avoided and may disappear once a child or teenager achieves a healthy weight. Some continue to have negative consequences throughout age. In some of the worst circumstances, many of these medical conditions might lead to death.

b) Social consequences:

Obesity epidemic has a severe influence on toddler's and adolescents' mental - interpersonal health, in contrast toward being connected to a multitude of health ailments. Obesity has been designated among the most demonized and morally repugnant juvenile concerns. Overweight or obesity in children and adolescents are commonly ridiculed due to their overweight. They also face a plethora of certain other obstacles, including negative stereotypes, persecution, and victimization. Discrimination against obese people has been found in kids under 2 years of age. Obese children are also more likely to be excluded from activities, particularly those that demand physical activity. Morbidly obese people strive to engage in cultural activities because they are sluggish than their peers and regularly feel out of breath. These unpalatable racial concerns contribute to young folk's negative self, which lead to aggressive self-image and affects the development. All of the foregoing harmful consequences of obesity and overweight in children and adolescents can be disastrous.

Obesity's social implications might lead to long-term weight control challenges. Obese children try to protect themselves from unfavorable comments and attitudes by staying in more secure environments, such as their homes, where they may seek solace in food. Furthermore, overweight children have fewer friends than youngsters of average weight. This results in less socialization and thus more time for less active motor activities. As noted above, physical activity is often more difficult for overweight and obese children because they tend to have difficulty breathing and keeping pace with their peers, hence it inevitably leads to weight gain as the calories consumed exceed the energy burned.

c) Outcomes:

Obesity in adolescents has been demonstrated to have a deleterious influence on academic achievement. An analysis found out that fat children have four times more peril to health complications in school than their normal weight peers. They were also more likely to be absent in educational institutions, particularly if they had fulminant illnesses like diabetes or asthma, which might result in poor academic performance.

If the causes of obesity are known then the problem of blubber can be slowed. Likewise, many blubber risks can be mitigated if caregivers pursue a balanced life at residence. What youngsters learn about healthy food, activity, and dietary choices will have a long-term impact on their lives. This will have the largest influence on how children choose meals to consume at school and at fast-food restaurants, as well as how active they are. By focusing on these issues, we can reduce childhood obesity and create a healthy society as a whole.

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