

# CHILDHOOD OBESITY PREVALENCE AMONG PRIMARY SCHOOLBOYS AT AL-ISKAN SECTOR, HOLLY MAKKAH, SAUDI ARABIA

Jassir Abdullah Al-Shehri

Public Health Directorate, Primary Health Care Department, Ministry of Health, Makkah, Saudi Arabia

Correspondence to: Jassir Abdullah Al-Shehri (jassiralshehri17@gmail.com)

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## ABSTRACT

**Background:** Obesity is one of the most common disorders encountered in clinical practice and has major public health implications. The high prevalence of overweight and obesity among Saudi school children is a cause of concern, as obesity is associated with several complications that increase both morbidity and mortality.

**Aims & Objective:** To determine the prevalence of overweight and obesity among school children between 6-12 years as well as to identify the associated unhealthy dietary habits for overweight and obesity.

**Material and Methods:** A cross sectional study was conducted including representative sample of primary schoolboys in Al-Iskan sector in Makkah Almukarramah. The sample size was distributed among the three primary school in Al-Iskan sector and determined as a percentage proportionally related to the total number of the student in each school. Self-administered questionnaire (with family help) including socio-demographic characteristic and detailed dietary history, was used for data collection. Trained staff collected anthropometric measurements of weight and height.

**Results:** The study included 258 male primary school children. Their age ranged between 6 and 12 years. The prevalence of overweight was 12.4% and that of obesity was 20.2%. Among studied socio-demographic variables associated with overweight and obesity, birth weight above normal was significantly associated with them ( $p < 0.05$ ) while among studied dietary factors, eating fried potatoes and chocolate at a rate more than normal was significantly associated with overweight and obesity among male school children. The habit of eating fast foods frequently (at least three times/week) was accompanied with higher prevalence of obesity (30.4%) compared to only 8% among school children who did not eat fast foods. This association between BMI and habit of eating fast foods was statistically significant ( $p < 0.05$ ).

**Conclusion:** The results of the current study provide alarming evidence-based data on the considerable prevalence of childhood overweight and obesity among primary school children in Al-Iskan sector, Holly Makkah, Saudi Arabia. It highlights the significant association between some unhealthy dietary habits and increase prevalence of childhood obesity such as excessive eating of fried potatoes, chocolate and frequent fast meals.

**Key-Words:** Prevalence; Obesity; Body Mass Index; Schoolboys; Saudi Arabia

## Introduction

Obesity is one of the most common disorders encountered in clinical practice and has major public health implications. Unfortunately, it is also one of the most difficult and frustrating disorders to manage successfully.<sup>[1]</sup> Obesity is defined as the presence of excess adipose tissue.<sup>[1]</sup> It is a complex condition, with serious social and psychological dimensions<sup>[2,3]</sup> that affect virtually all age and socioeconomic groups and threatens to overwhelm both developed and developing countries.<sup>[4]</sup> Mortality rises exponentially with increasing bodyweight. The risk of coronary heart disease is doubled if the body mass index (BMI) is  $>25$  and nearly quadrupled if the index is  $>29$ .<sup>[5,6]</sup> The risk of developing diabetes increases with increasing weight and people with a body mass index  $>35$  have a 40 fold higher risk of developing the disease than non-obese people.<sup>[5,7]</sup> Osteoarthritis and respiratory diseases, particularly sleep apnoea are more common in obese people.<sup>[5]</sup>

Obesity was significantly associated with an increase in both systolic and diastolic blood pressure,<sup>[8,9]</sup> stroke, and certain forms of cancer.<sup>[4]</sup> The prevalence of overweight and obesity has increased in the last few years.<sup>[10]</sup> Between 1980 and 1995, the prevalence of obesity in Britain doubled from 8-15%.<sup>[5]</sup> In 1995, there were an estimated 200 million obese adults worldwide and another 18 million children under-5-years classified as overweight. By the year 2000, the number of obese adults had increased to over 300 million.<sup>[4]</sup> Children and adolescents are also involved in those changes.

In the United States of America (USA), the percentage of children and adolescents who are overweight has more than doubled in the past 30 years.<sup>[11]</sup> Although obesity in children is rarely associated with morbidity or mortality, it is rapidly emerging as a global epidemic that will have profound public health consequences as overweight children become overweight adults particularly if obesity is present in adolescence.<sup>[12]</sup> For example, the risk of developing adult obesity in children aged  $>9$  years who are

obese is up to 80% at age 35 years.<sup>[13]</sup> Unfortunately, it is evident that obesity is a common health problem among Saudis.<sup>[14]</sup>

Overweight and obesity in the adult Saudi population were reported in different studies with a range of males overweight 26-34%, obesity 12-23% and females overweight 24-29%, obesity 19-41%.<sup>[14-19]</sup> This high prevalence of overweight and obesity is a cause of concern, as obesity is associated with several complications that increase both morbidity and mortality. This study aimed at determining the prevalence and associated dietary risk factors of overweight and obesity among school children between 6-12 years.

## Materials and Methods

A cross sectional study was conducted among primary schoolboys in Al-Iskan sector in Makkah Almukarramah, Saudi Arabia. Makkah is the holy capital of kingdom of Saudi Arabia. It is located in western region of Saudi Arabia. Makkah is divided into five educational sector west of Makkah is one of them where Al-Iskan sector is belonged. In Al-Iskan sector, there are three governmental primary school with total number of 1581 students. The sample size was calculated by Raosoft. It was 258 students (based on 20% expected prevalence). The worst accepted prevalence was 25%.

The sample size was distributed among the three primary schools and determined as a percentage proportionally related to the total number of the student in each school. The total number of students in the three schools is 1581 students and the sample size is 258 (16%). Ataa bin Abi Rabah has 324 students and the sample size was 40 students, Albaraa bin Malik has 737 students and the sample size was 138 students and Al-Ebdaa has 520 students and the sample size was 80 students. At each school, the researcher selected students randomly by using alphabetical order in each class.

Data was collected by self-administered questionnaire (with family help) including socio-demographic characteristic and detailed dietary history. Trained staff collected anthropometric measurements of weight and height. Height was measured without shoes to the nearest "0.5cm" and weight to the nearest "100g with the subject in light clothes and without shoes. The weighing scale used was "Health o meter" lever type (made in USA) which could read to the nearest 100g placed on a hard uncarpeted floor. A single scale was used for weighing all the students. This scale was calibrated daily, and zero is

assured before weighing any student. Body mass index which is the weight in kilogram divided by the height in meters squared ( $\text{kg}/\text{m}^2$ ), was calculated for all the study participants. It was classified as follows; Underweight; when  $\text{BMI} < 5^{\text{th}}$  percentile, Overweight; when  $\text{BMI} >$  or =  $85^{\text{th}}$  percentile and  $< 95^{\text{th}}$  percentile and Obesity; when  $\text{BMI} >$  or =  $95^{\text{th}}$  percentile.

A pilot study was conducted on 50 students in one school and excluded from final analysis. Its aim was to evaluate the validity of the questionnaire and the ability of participants and their family to answer it. The deficits were identified and modified accordingly. Statistical Package for Social Sciences (SPSS) software version 18.0 was used for data entry and analysis. Descriptive statistics (e.g. number, percentage) and analytic statistics using Chi Square tests ( $\chi^2$ ) to test for the association and/or the difference between two categorical variables were applied. P-value equal or less than 0.05 was considered statistically significant. Permission from Joint Program of Family & Community Medicine in Jeddah was obtained. In addition, permission of the education director was obtained. All information was kept confidential and results were submitted to the department as feedback. We tried to follow the obese boys and refer them to primary care center.

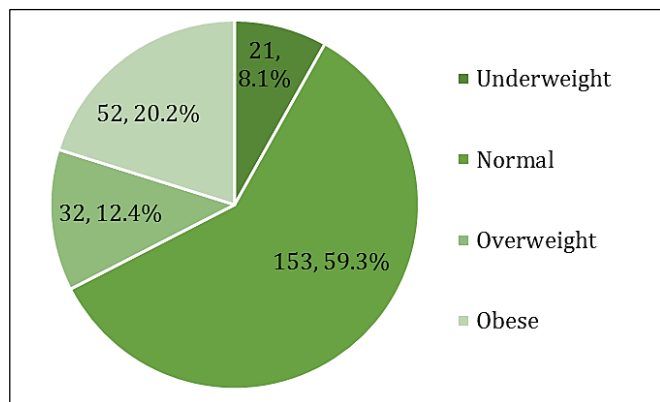
## Results

The study included 258 male primary school children. Their age ranged between 6 and 12 years. As illustrated from figure 1, More than half of the studied school children were normal regarding their BMI (59.3%). Thirty-two students lie in the category of overweight and fifty-two in the category of obesity with a prevalence of 12.4% and 20.2% respectively.

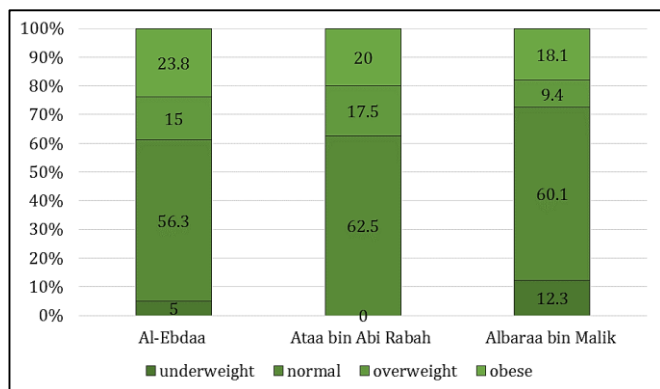
As obvious in figure 2 that the prevalence of overweight was 15%, 17.5% and 9.4% among male school children of Al-Ebdaa, Ataa bin Abi Rabah and Albaraa bin Malik schools respectively. On the other hand, the prevalence of obesity was 23.8%, 20% and 18.1% among male school children of Al-Ebdaa, Ataa bin Abi Rabah and Albaraa bin Malik schools respectively. These differences were statistically significant ( $\chi^2 = 13.41$ ,  $p = 0.037$ )

Figure 3 displayed that overall; there is increase in the prevalence of obesity with age. It was 18.2% among school children age 6 to 7 years while it became 23.4% among school children in the age group 11-12 years. The highest prevalence of overweight was reported in the age group 8 to 9 years (19.4%) while the lowest prevalence was

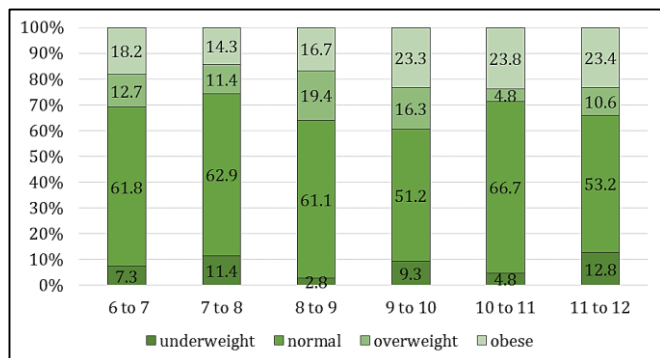
observed in the age group 10 to 11 years (4.8%). However, the association between age of school children and their BMI was not statistically significant ( $p>0.05$ ).



**Figure-1:** Distribution of Body Mass Index among male school children, Iskan sector, Makkah, 2011



**Figure-2:** Distribution of Body Mass Index among male school children according to participated schools, Iskan sector, Makkah, 2011



**Figure-3:** Distribution of Body Mass Index among male school children according to their age, Iskan sector, Makkah, 2011

### Factors associated with Overweight and Obesity

**Socio-demographic characteristics:** Table 1 presents the distribution of body mass index of male primary school children according to their socio-demographic characteristics. The prevalence of overweight and obesity among school children, whose birth weight was less than normal, were 8.3% and 12.5% respectively while they were 16.7% and 66.7% for overweight and obesity respectively for those, whose birth weight was more than

normal. The association between birth weight and BMI was statistically significant ( $p<0.05$ ). There were no statistically significant association between BMI from one side and other studied socio-demographic characteristics such as living status, family size, birth order, maternal and paternal education) from the other side.

**Dietary factors:** As shown in table 2, having always breakfast was associated with a prevalence of 23.7% of obesity compared to 26.3% among those not having breakfast at all while the prevalence of obesity among school children who having breakfast often was 6.7%. However, the association between history of having breakfast and obesity was not statistically significant ( $p>0.05$ ). Also, table 2 showed no statistically significant association between history of having food at schools among male primary school children and obesity ( $p>0.05$ ). Among studied food stuffs consumed by school children at schools, only intake of chocolates and fried potatoes were significantly associated with higher prevalence of obesity. Having abnormal large amounts of chocolates at schools was associated with an obesity prevalence of 22.8% compared to 19.4% among those having usual amounts of chocolates at schools ( $p=0.034$ ). Similarly, having abnormal large amounts of fried potatoes at schools was associated with an obesity prevalence of 22.4% compared to 5.7% among those having usual amounts of fried potatoes at schools ( $p=0.011$ ). The association between intake of other food stuffs (milk, strawberry juice, beverages, cheeps potatoes, cake, biscuits and fruits) and obesity was not statistically significant, table 3. As shown in table 3, among school children who have one frequent meal (either breakfast or lunch or dinner), the prevalence of overweight and obesity were 8.9% and 22.2% respectively. School children, who reported lunch and dinner as frequent meals, showed a prevalence of 13.6% for overweight and 25.4% for obesity. However, the association between BMI of male school children and their frequent meal was not statistically significant ( $p>0.05$ ).

As obvious from table 4, school children who had a habit of eating between meals always showed obesity prevalence of 24.2% while those with no habit of eating between meals showed obesity prevalence of 10%. This difference was not statistically significant ( $p>0.05$ ). As displayed from table 5, the lower the frequency of eating vegetables or fruits, the higher in the prevalence of obesity 21.3% and 20.9% respectively compared to 13.5% and 17.0% among those who eat vegetables and fruits more frequently. However, the difference was not statistically significant ( $p>0.05$ ). Table 6 shows that the habit of eating fast foods frequently (at least three times/week) was accompanied

with higher prevalence of obesity (30.4%) compared to only 8% among school children who did not eat fast foods. This association between BMI and habit of eating fast foods was statistically significant ( $p < 0.05$ ).

**Table-1:** Body mass index of male primary school children according to their socio-demographic characteristics

Variables	Body Mass Index				$\chi^2$ -value (p-value)	
	Under-Weight N (%)	Normal N (%)	Over-Weight N (%)	Obese N (%)		
Birth Weight	< Normal (24)	5 (20.8)	14 (58.3)	2 (8.3)	3 (12.5)	15.08 (0.020)
	Normal (228)	16 (7.0)	138 (60.5)	29 (12.7)	45 (19.7)	
	> Normal (6)	0 (0.0)	1 (16.7)	1 (16.7)	4 (66.7)	
Living Status	With both parents (248)	20 (8.1)	148 (59.7)	30 (12.1)	50 (20.2)	0.68 (0.88)
	Father or mother (10)	1 (10.0)	5 (50.0)	2 (20.0)	2 (20.0)	
Family Size	3-6 (125)	12 (9.6)	77 (61.6)	15 (12.0)	21 (16.8)	2.24 (0.525)
	$\geq 7$ (133)	9 (6.8)	76 (57.1)	17 (12.8)	31 (23.3)	
Birth Order	First (47)	6 (12.8)	28 (59.6)	4 (8.5)	9 (19.1)	6.28 (0.393)
	2-3 (97)	8 (8.2)	61 (62.9)	14 (14.4)	14 (14.4)	
	$\geq 4$ (114)	7 (6.1)	64 (56.1)	14 (12.3)	29 (25.4)	
Paternal Education	Illiterate (9)	3 (33.3)	2 (22.2)	2 (22.2)	2 (22.2)	14.0 (0.301)
	Primary (11)	0 (0.0)	6 (54.5)	2 (18.2)	3 (27.3)	
	Intermediate (43)	4 (9.3)	25 (58.1)	6 (14.0)	8 (18.6)	
	Secondary (71)	5 (7.0)	42 (59.2)	11 (15.5)	13 (18.3)	
Maternal Education	University & above (124)	9 (7.3)	78 (62.9)	11 (8.9)	26 (21.0)	15.04 (0.239)
	Illiterate (13)	2 (15.4)	5 (38.5)	3 (23.1)	3 (23.1)	
	Primary (18)	4 (22.2)	10 (55.6)	1 (5.6)	3 (16.7)	
Maternal Education	Intermediate (31)	3 (9.7)	15 (48.4)	3 (9.7)	10 (32.3)	15.04 (0.239)
	Secondary (78)	5 (6.4)	53 (67.9)	9 (11.5)	11 (14.1)	
	University & above (118)	7 (5.9)	70 (59.3)	16 (13.6)	25 (21.2)	

**Table-2:** Association between body mass index of male primary school children and their history of having breakfast and taking food at school

Variables	Body Mass Index				$\chi^2$ -value (p-value)	
	Under-Weight N (%)	Normal N (%)	Over-Weight N (%)	Obese N (%)		
Taking Breakfast	Always (97)	11 (11.3)	56 (57.7)	7 (7.2)	23 (23.7)	12.85 (0.170)
	Often (30)	1 (3.3)	23 (76.7)	4 (13.3)	2 (6.7)	
	Sometimes (93)	6 (6.5)	56 (60.2)	14 (15.1)	17 (18.3)	
	No (38)	3 (7.9)	18 (47.4)	7 (18.4)	10 (26.3)	
Food at Schools	Always (168)	14 (8.3)	99 (58.9)	19 (11.3)	36 (21.4)	3.11 (0.795)
	Often (30)	2 (6.7)	21 (70.0)	4 (13.3)	3 (10.0)	
	Sometimes (60)	5 (8.3)	33 (55.0)	9 (15.0)	13 (21.7)	
Milk	Normal (174)	13 (7.5)	101 (58.0)	23 (13.2)	37 (21.3)	1.05 (0.790)
	Abnormal (84)	8 (9.5)	52 (61.9)	9 (10.7)	15 (17.9)	
Strawberry Juice	Normal (144)	10 (6.9)	89 (61.8)	18 (12.5)	27 (18.8)	1.24 (0.744)
	Abnormal (114)	11 (9.6)	64 (56.1)	14 (12.3)	25 (21.9)	
Beverages	Normal (136)	13 (9.6)	75 (55.1)	18 (13.2)	30 (22.1)	2.23 (0.527)
	Abnormal (122)	8 (6.6)	78 (63.9)	14 (11.5)	22 (18.0)	
Cheeps	Normal (225)	19 (8.4)	132 (58.7)	30 (13.3)	44 (19.6)	1.86 (0.602)
Potatoes	Abnormal (33)	2 (6.1)	21 (63.6)	2 (6.1)	8 (24.2)	0.602 (0.602)
Chocolate	Normal (201)	20 (10.0)	112 (55.7)	30 (14.9)	39 (19.4)	8.67 (0.034)
	Abnormal (57)	1 (1.8)	41 (71.9)	2 (3.5)	13 (22.8)	
Cake	Normal (177)	14 (7.9)	105 (59.3)	23 (13.0)	35 (19.8)	0.24 (0.972)
	Abnormal (81)	7 (8.6)	48 (59.3)	9 (11.1)	17 (21.0)	
Biscuits	Normal (169)	16 (9.5)	102 (60.4)	19 (11.2)	32 (18.9)	2.05 (0.563)
	Abnormal (89)	5 (5.6)	51 (57.3)	13 (14.6)	20 (22.5)	
Fried Potatoes	Normal (35)	5 (14.3)	24 (68.6)	4 (11.4)	2 (5.7)	6.43 (0.011)
	Abnormal (223)	16 (7.2)	129 (57.8)	28 (12.6)	50 (22.4)	
Fruits	Normal (91)	12 (7.2)	55 (60.4)	8 (8.8)	19 (20.9)	2.08 (0.557)
	Abnormal (167)	9 (9.9)	98 (58.7)	24 (14.4)	33 (19.8)	

**Table-3:** Association between body mass index of male primary schoolchildren and their most frequent meal

Variables	Body Mass Index				$\chi^2$ -value (p-value)
	Under-Weight N (%)	Normal N (%)	Over-Weight N (%)	Obese N (%)	
All meals (116)	8 (6.9)	74 (63.8)	12 (10.3)	22 (19.0)	8.48 (0.486)
One meal (45)	5 (11.1)	26 (57.8)	4 (8.9)	10 (22.2)	
Two Meals	Breakfast & another (38)	5 (13.2)	20 (52.6)	8 (21.1)	
	Lunch & dinner (59)	3 (5.1)	33 (55.9)	8 (13.6)	15 (25.4)

**Table-4:** Association between body mass index of male primary school children and habit of eating between meals

Variables	Body Mass Index				$\chi^2$ -value (p-value)
	Under-Weight N (%)	Normal N (%)	Over-Weight N (%)	Obese N (%)	
Always (33)	4 (12.1)	17 (51.5)	4 (12.1)	8 (24.2)	5.22 (0.815)
Often (34)	1 (2.9)	22 (64.7)	4 (11.8)	7 (20.6)	
Sometimes (181)	15 (8.3)	106 (58.6)	24 (13.3)	36 (19.9)	
No (10)	1 (10.0)	8 (80.0)	0 (0.0)	1 (10.0)	

**Table-5:** Association between body mass index of male primary school children and frequency of eating fruits and vegetables

Variables	Body Mass Index				$\chi^2$ -value (p-value)	
	Under-Weight N (%)	Normal N (%)	Over-Weight N (%)	Obese N (%)		
Vegetables	$\leq 2$ / day (221)	16 (7.2)	133 (60.2)	25 (11.3)	47 (21.3)	4.16 (0.245)
	$\geq 3$ / day (37)	5 (13.5)	20 (54.1)	7 (18.9)	5 (13.5)	
Fruits	$\leq 2$ / day (211)	16 (7.6)	127 (60.2)	24 (11.4)	44 (20.9)	1.86 (0.601)
	$\geq 3$ / day (47)	5 (10.6)	26 (55.3)	8 (17.0)	8 (17.0)	

**Table-6:** Association between body mass index of male primary school children and their habit of eating fast foods

Variables	Body Mass Index				$\chi^2$ -value (p-value)
	Under-Weight N (%)	Normal N (%)	Over-Weight N (%)	Obese N (%)	
No (25)	3 (12.0)	14 (56.0)	6 (24.0)	2 (8.0)	12.27 (0.038)
Once or twice/week (187)	14 (7.5)	119 (63.6)	18 (9.6)	36 (19.3)	
At least three/week (46)	4 (8.7)	20 (43.5)	8 (17.4)	14 (30.4)	

## Discussion

In developing countries, the rapid progress of urbanization and demographic trends is associated with a cluster of non-communicable diseases and unhealthy lifestyles described as the “lifestyle syndrome” or the “New World syndrome.” This is suggested as the most important etiology for the very high rates of obesity and its consequent morbidity and mortality in developing nations. In addition, in such communities, childhood obesity is still considered a sign of healthiness and high social class.<sup>[20]</sup>

A recent review by Wang and Lobstein confirmed that children in lower- and middle-income countries, especially those growing up in urban environments and following a Western lifestyle, are facing a significant and rapidly growing epidemic of childhood obesity.<sup>[21]</sup> In the last few decades, an “epidemic” of obesity has been reported in many developed countries of the world.<sup>[22]</sup> The term “epidemic” of obesity implies that obesity is a

characteristic of the populations not only of individuals. A recent paper reviewed the increase in the population prevalence of overweight and obesity in several countries. Finland, New Zealand, the United Kingdom, the United States and Western Samoa showed a large increase in prevalence, whereas some other countries showed only a slight increase.<sup>[23]</sup> Several studies have reported prevalence of overweight or/and obesity in school children with ages ranging from 7-14 years, applying the 85<sup>th</sup> percentile and 95<sup>th</sup> percentile as cut-off points for overweight and obesity, respectively, with rates generally ranging from 6%-30%.<sup>[22-25]</sup> The results of the current study goes with these previous findings as the prevalence of overweight among male school children 6-12 years was 12.4% while that of obesity was 20.2%. This prevalence rate is higher than that reported previously in Saudi Arabia since more than 10 years by El-Hazmi and Warsy,<sup>[26]</sup> who conducted a cross-sectional national epidemiological household survey in different areas of Saudi Arabia from 1994 to 1998. Their study group included 12071 children (boys 6281; girls 6420), with ages ranging from 1-18 years. The prevalence of overweight among boys aged 6-12 years was 8.65% while prevalence of obesity was 4.96%. This apparent increase in the prevalence of overweight and obesity could reflect more deterioration in the situation in Saudi Arabia regarding childhood obesity which necessitate a need for rapid and effective action to decrease this problem burden.

Eating a healthful breakfast can help prevent childhood obesity. It can also help teens that need to lose a few pounds. Younger children are more likely to eat breakfast than teens. Teens are often in a hurry to leave for school and are often drowsier in the morning and simply do not feel like eating. Providing an appetizing breakfast may encourage them to eat. Something with protein is a good choice but oatmeal is also filling. Some schools now serve breakfast in the mornings but school breakfasts are often high in sugar and not particularly healthful.<sup>[27]</sup> Current study failed to prove a significant association between having breakfast and prevalence of obesity among studied male school children.

In the present study, the prevalence of childhood obesity among those who consume fast food meals more than three times/week was 30.4%. Nowadays, teenage and childhood fast food obesity epidemic is growing around the world. Part of the reason is advertising, which has positioned fast food as an 'in' thing and this has appeal to the teenage and childhood group. Look at the Breakfast, what you have just order? It might be a sausage and biscuit with an order of soft drink and hash brown potatoes. The

fast food biscuit is usually come with margarine, or even worse, lard.

Fast food obesity is a problem because fast food meal contains low quality carbohydrates; high levels of saturated fat, white bread, and a sugary soda and also has relatively low fiber content. This kind of eating pattern is entirely gives negative effect, which resulted cardiovascular disease and diabetes. This alarming teenage and childhood fast food obesity epidemic is rapidly rising during the past few years. Fast food and obesity is interrelated with each other. For a person who takes fast food meal twice a week, obesity ratio will be raised about 50%. In this juncture most of our people are taking fast food many times a week. You can now imagine what ratio is this kind of people will get. Though fast food is very cheap and tastier, these products are restrained with high levels of sodium, oil, refined sugar, and refined flour. You may all aware that these combination are how much harmful to our health.<sup>[28]</sup>

Fast food obesity is one of the main causes for Type II diabetes. The content of the fast food leads much strain to the body to produce insulin. If a person is having fast food very often, body needs to take much strain to produce insulin and thereby one day the body will loses the ability of producing insulin which resulted type II diabetes. Now in the modern life style, most of the people are not getting any physical activities and getting fast food and pre-packed food products, beverages etc. This leads us to believe that teenage and childhood fast food obesity epidemic has just begun and the problem doesn't seem to end soon.

Teenagers and children have forgotten the ways of reducing the calories they intake and thereby obesity is inevitable. This leads to increased body sugar levels and possible blocked arteries. Medical professionals say that fast food obesity along with the sedentary life style is becoming one of the top causes for type II diabetes and coronary artery disease. Most of the people are spending more time on watching TV, riding cars etc., without getting any physical activity and also having fast food products more than that of their body need thereby they can't isolate fast food and obesity.<sup>[29]</sup>

Among limitations of the current study, ignoring some important risk factors for overweight and obesity such as physical activity and family history of obesity and concentrating only on dietary factors. However, the main objective of the present study is estimation of the prevalence of obesity among primary school children.

## Conclusion

In conclusion, the results of the current study provide alarming evidence-based data on the considerable prevalence of childhood overweight and obesity among primary school children in Al-Iskan sector, Holly Makkah, Saudi Arabia. It highlights the significant association between some unhealthy dietary habits and increase prevalence of childhood obesity such as excessive eating of fried potatoes, chocolate and frequent fast meals. We recommended strategies at schools aimed at encouraging physical activity and healthy dietary habits, such as increasing fiber intake, reducing the consumption of junk foods and saturated fat, and increasing levels of physical activity starting in childhood, may have important effects on public health.

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## References

- Gidding SS, Leibel RL, Daniels S, Rosenbaum M, Horn LV. A Statement for Healthcare Professionals From the Committee on Atherosclerosis and Hypertension in the Young of the Council on Cardiovascular Disease in the Young and the Nutrition Committee, American Heart Association. *Circulation*. 1996;94:3383-3387
- Stunkard A, Mendelson M. Obesity and the body image. I: characteristics of disturbances in the body image of some obese persons. *Am J Psychiatry*. 1967; 123:1296-1300.
- Stunkard A, Burt V. Obesity and the body image. II: age at onset of disturbances in the body image. *Am J Psychiatry* 1967; 123:1443-1447.
- World health Organization (WHO). Obesity: preventing and managing the global epidemic. Report of a WHO consultation, Geneva, 3-5 June 1997, WHO. 1998.
- Wilding J. Science, medicine, and the future: obesity treatment. *BMJ*. 1997; 315: 997-1000.
- Willett WC, Manson JE, Stampfer MJ, Colditz GA, Rosner B, Speizer FE. Weight change and coronary heart disease in women: risk within the 'normal' weight range. *JAMA*. 1995; 273: 461-465.
- Al-Nuaim AR. Effect of overweight and obesity on glucose intolerance and dyslipidemia in Saudi Arabia, epidemiological study. *Diabetes Res Clin Pract*. 1997; 36: 181-191.
- Ashton W, Nanchahal K, Wood D. Body mass index and metabolic risk factors for coronary heart disease in women. *Eur Heart J*. 2001; 22: 46-55.
- Kordy MN, El-Gamal FM. A study of pattern of body mass index (BMI) and prevalence of obesity in a Saudi population. *Asia Pac J Public Health*. 1995; 8: 59-65.
- Al-Isa AN. Changes in Body Mass Index and Prevalence of Obesity Among Adult Kuwaiti Women Attending Health Clinics. *Ann Saudi Med*. 1997; 17: 307-311.
- Troiano RP, Flegal KM, Kuczmarski RJ, Campbell SM, Johnson CL. Overweight prevalence and trends for children and adolescents: the National Health Examination Surveys, 1963-1991. *Arch Pediatr Adolesc Med*. 1995; 149: 1085-1091.
- Guo SS, Roche AF, Chumlea WC, Gradner JC, Siervogel RM. The predictive value of childhood body mass index values for overweight at age 35 years. *Am J Clin Nutr*. 1994; 59: 810-819.
- Guo SS, Chumlea WC. Tracking of body mass index in children in relation to overweight adulthood. *Am J Clin Nutr*. 1999; 70:145-148.
- Al-Shammari SA, Khoja TA, Al-Maatouq MA. The prevalence of obesity among Saudi males in the Riyadh region. *Ann Saudi Med*. 1996; 16: 269-273.
- Al-Shammari SA, Khoja TA, Al-Maatouq MA, Al-Nuaim LA. High prevalence of clinical obesity among Saudi females: a prospective, cross-sectional study in the Riyadh region. *J Trop Med Hyg*. 1994; 97: 183-188.
- Al-Nuaim AR, Bamgboya EA, Al-Rubeaan KA, Al-Mazrou Y. Overweight and obesity in Saudi Arabian adult population; role of socio-demographic variables. *J Community Health*. 1997; 22:211-223.
- El-Hazmi MA, Warsy AS. Prevalence of obesity in the Saudi population. *Ann Saudi Med*. 1997; 17: 302-306.
- Al-Nuaim AR, Al-Rubeaan KA, Al-Mazrou Y, Al-Attas O, Al-Daghari N, Khoja TA. High prevalence of overweight and obesity in Saudi Arabia. *Int J Obes Relat Metab Disord*. 1996; 20: 547-552.
- Al-Nuaim AR. Population-based epidemiological study of the prevalence of overweight and obesity in Saudi Arabia, regional variation. *Ann Saudi Med*. 1997; 17(2):195-9.
- Kelishadi R. Childhood overweight, obesity, and the metabolic syndrome in developing countries. *Epidemiol Rev*. 2007; 29:62-76.
- Wang Y, Lobstein T. Worldwide trends in childhood overweight and obesity. *Intl J Pediatr Obes*. 2006; 1:11-25.
- Flegal KM. The obesity epidemic in children and adults: current evidence and research issues. *Med Sci Sports Exerc*. 1999; 31(11 Suppl):S509-14.
- Martorell R, Kettel Khan L, Hughes ML, Grummer Strawn LM. Overweight and obesity in preschool children from developing countries. *Int J Obes Relat Metab Disord*. 2000; 24:959-67.
- Gauthier BM, Hickner JM, Noel MM. High prevalence of overweight children in Michigan primary care practices. *J Fam Pract*. 2000; 49:73-6.
- Gauthier BM, Hickner JM, Ornstein S. High prevalence of overweight children and adolescents in the Practice Partner Research Network. *Arch Pediatr Adolesc Med*. 2000; 154:625-8.
- El-Hazmi MAF, Warsy AS. The prevalence of obesity and overweight in 1-18 years old Saudi children. *Ann Saudi Med*. 2002; 22(5-6):303-307.
- Morris K. Encouraging Children to Eat Breakfast, 2011. Available at: [http://www.consumeraffairs.com/news04/2008/03/obesity\\_breakfast.html](http://www.consumeraffairs.com/news04/2008/03/obesity_breakfast.html).
- Schierer T. Teenage And Childhood Fast Food Obesity Epidemic Is Affecting The World Now!!!, 2011. Available at: <http://fastfoodobesity.net/>
- Kuczmarski RJ, Ogden CL, Grummer-Strawn LM. CDC growth charts: United States. *Adv Data*. 2000;314:1-27.

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