



CLINICAL AND BIOCHEMICAL PROFILE OF OBESE AND OVERWEIGHT CHILDREN AT A TERTIARY CARE HOSPITAL.

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Article received on:

18/07/2019

Accepted for publication:

10/10/2019

ABSTRACT... Objectives: Childhood and adolescent obesity is increasing especially in developing countries like Pakistan. It seem to affect most socio-economic classes as well as all ethnicities and geographies. We planned this study to analyze the clinical and biochemical profile of obese as well as overweight children at a tertiary care hospital for the existence of metabolic syndrome. **Study Design:** Cross sectional study. **Setting:** Department of Pediatrics Medicine, Children Hospital Chandka Medical College / Shaheed Mohtarma Benazir Bhutto Medical University, Larkana. **Period:** 1st July 2018 to 31st December 2018. **Material & Methods:** Children, aged 5 to 16 years, both gender, having BMI > 85th percentile regarding age and gender were enrolled. Demographic characteristics along with history, lifestyle parameters and physical examination were noted for all the study participants. Metabolic syndrome (Met S) was evaluated while overall results were presented in terms of proportions, mean and standard deviations. **Results:** A total of 78 cases were enrolled during the study period. There were 46 (58.9%) male and 32 (41.1%) female, with a male to female ratio of 1.4:1. Mean age amongst study participants was 10.8 years. We had 56 (71.8%) children as overweight whereas 22 (28.2%) obese. Acanthosis nigricans was the most common entity seen in 55 (70.1%) children during clinical examination. Metabolic syndrome was found to be present in 31 (39.7%) participants. **Conclusion:** Met S is not only limited to obese children as it can also affect children who are overweight.

Key words: BMI, Metabolic Syndrome, Obesity, Overweight.

Article Citation: Khuhro AA, Fazal Ur Rehman, Ali W, Usman N, Rajper SB. Clinical and biochemical profile of obese and overweight children at a Tertiary Care Hospital. Professional Med J 2020; 27(6):1119-1123.
DOI: 10.29309/TPMJ/2020.27.06.3508

INTRODUCTION

Childhood and adolescent obesity is increasing especially in developing countries like Pakistan. It seem to affect most socio-economic classes as well as all ethnicities and geographies.^{1,2}

Obesity is described as an abnormal growth of adipose tissue because of extension of fat cells size and / or an enlargement in their numbers.³ In 1998, obesity was labeled to be a global epidemic by WHO.⁴ The worldwide prevalence of childhood obesity marks a big difference amongst various regions of the world such as in US it affects about 30% childhood population to as low as 2% in African countries.⁵⁻⁷ In Pakistan, the prevalence of childhood and adolescents with BMI > 25 are estimated to be around 3-6% which is quite alarming.⁸ This age groups is most important

considering that if not taken care these will go on to develop many chronic diseases in the later years of life. Many endocrine abnormalities, metabolic disorders as well as cardiovascular diseases are related to obesity.⁹ We planned to analyze the clinical and biochemical profile of obese as well as overweight children at a tertiary care hospital for the existence of metabolic syndrome (Met S).

MATERIAL & METHODS

This cross sectional study was conducted at Department of Pediatrics Medicine, Children Hospital Chandka Medical College / Shaheed Mohtarma Benazir Bhutto Medical University, Larkana, from 1st July 2018 to 31st December 2018. Approval was granted from institutional ethical committee.

All the children, aged 5 to 16 years, both gender, having BMI > 85th percentile regarding age and gender were enrolled. Consent was taken from parents/guardians of all the children taking part in this study. Convenient sampling technique was used for children attending Pediatric Outpatient Department of the institute. Children having genetic disorders, with diabetes, using medications for hypertension or lipid disorders were not included in the study.

Demographic characteristics along with history, lifestyle parameters and physical examination were noted for all the study participants. Height of all the participants was noted to the closest 0.1cm with stadiometer. Weight was recorded to the closest 0.1 kg, measured with electronic weighing scale. Waist circumference was taken as closest 0.1cm at the midway level in between the lower rib margin and iliac crest while the study participant exhaling, using a measuring tape that was non-stretchable. Weight as kilograms divided by square of height in meters was taken as BMI whereas BMI more than 95th centile regarding age and gender was noted obese while BMI between 85th and 95th centile regarding age and gender was noted overweight.¹⁰ Blood sample was taken in the morning at a fasting state of 8 hours using venipuncture for biochemical parameters like fasting blood glucose, high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), very low density cholesterol (VLDL-C) and triglycerides (TG). Abdominal ultrasound for the assessment of fatty liver was also done.

Metabolic syndrome (Met S) as described by the International Diabetes Federation (IDF)¹¹ in children was evaluated if abdominal obesity (waist circumference more than or equal to 90th percentile for age and sex) having 2 or more of these: 1) fasting TG more than or equal to 110 mg/dl, 2) HDL -C less than or equal to 40 mg/dl, 3) blood Pressure more than or equal to 90th percentile for age, gender and height centile, and 4) FBG more than or equal to 100 mg/dl were present. SPSS version 20 was used for data entry and analysis. Results were presented in terms of proportions, mean and standard deviations

RESULTS

A total of 78 cases were enrolled during the study period. There were 46 (58.9%) male and 32 (41.1%) female, with a male to female ratio of 1.4:1. Mean age amongst study participants was 10.8 years. We had 56 (71.8%) children as overweight whereas 22 (28.2%) obese.

Use of carbonated beverages (minimum 3 times a week) was noted in 50 (64.1%). Bakery items usage (minimum 3 times a week) was noted in 68 (87.2%). There were 18 (23.1%) subjects who used to do exercise (>3 times a week). There were 65 (83.3%) participants who used to watch regular Television (minimum 1 hour daily) and 52 (66.7%) with computer or mobile phone usage (minimum 1 hour per day). There were 44 (56.4%) and 47 (60.2%) participants who had a positive family history of diabetes mellitus and hypertension respectively.

Acanthosis nigricans was the most common entity seen in 55 (70.1%) children during clinical examination, followed by hypertension 35 (44.9%).

As far as laboratory findings of the study participants are concerned, mean \pm SD of total cholesterol (mg/dl), TG (mg/dl), HDL-C (mg/dl), LDL-C (mg/dl), VLDL-C (mg/dl) and FBG were found to be 179.4 ± 61.8 , 128.1 ± 42.5 , 37.1 ± 6.2 , 92.3 ± 4.2 , 27.2 ± 2.3 and 87.8 ± 3.2 respectively.

It was noted that 30 (38.4%) participants were having features of fatty liver and hepatomegaly as seen on abnormal abdominal ultrasound.

We noted 57 (73.1%) subjects with hypercholesterolaemia, 31 (39.7%) hypertriglyceridaemia, 54 (69.2%) with raised LDL-C, low HDL-C in 41 (52.6%) whereas 11 (14.1%) children were observed with raised fasting blood glucose levels.

Metabolic syndrome was found to be present in 31 (39.7%) participants amongst which 18 were male and 13 female. Met S was noted in 22 (70.9%) children who were obese and 9 (29.1%)

overweight.

Parameters	No. of Children (%)
Gender	
Male	46 (58.9%)
Female	32 (41.1%)
Age (years)	
5-10	34 (43.66%)
11-16	44 (56.4%)
Obese / Overweight	
Obese	22 (28.2%)
Overweight	56 (71.8%)
Carbonated Beverages	
Yes	50 (64.1%)
No	28 (35.9%)
Bakery Items	
Yes	68 (87.2%)
No	10 (12.8%)
Exercise	
Yes	18 (23.1%)
No	60 (76.9%)
Television Watching	
Yes	65 (83.3%)
No	13 (16.7%)
Computer / Mobile Phone Usage	
Yes	52 (66.7%)
No	26 (33.3%)
Family History of Diabetes Mellitus	
Yes	44 (56.4%)
No	34 (53.6%)
Family History of Hypertension	
Yes	47 (60.2%)
No	31 (39.8%)

Table-I. Characteristics of study participants

Parameter	Mean	Standard Deviation
Cholesterol (mg/dl)	179.4	61.8
TG (mg/dl)	128	42.5
HDL-C (mg/dl)	37.1	6.2
LDL-C (mg/dl)	92.3	4.2
VLDL-C (mg/dl)	27.2	2.3
FBG (mg/dl)	87.8	3.2

Table-II. Laboratory findings of the study participants

DISCUSSION

Big change in dietary patterns as well lifestyles are thought to be one of the main reasons for obesity that can further contribute to many diseases like insulin resistance, diabetes mellitus,

Met S, cardiovascular diseases in both adults and children.¹²⁻¹⁵ Recent data from around the world has clearly indicated a rising trend in childhood obesity especially in developing countries. Jafar TH et al⁸ found the prevalence of childhood obesity and overweight in Pakistan as 3% from 1990-1994 and 5.7% between 2004-2005 while studies from India noted that to be ranging between 2-12%.⁹ Unhealthy nutrition, physical inactivity, urbanization, socio-culture factors as well as traditional beliefs are contributing largely to this epidemic in our parts of the world.⁹

Prevalence of Met S varies amongst different age groups and populations. Cook S and colleagues¹⁶ found Met S to be present as 4% in age group of 12 to 19 years. The Bogalusa Heart Study¹⁷ conducted in age group of 8 to 17 years noted 3.6% participants to have Met S. High prevalence of Met S has been noted in obese children in comparison as to non-obese and it seem to increasing with the increase in obesity. Met S was found to be present in 39% of children with moderate obesity while this proportion went up to 50% in children who had severe obesity in a study comprising age group of 4-20 years.¹⁸ The findings of the present study were quite consistent with these studies and we found the prevalence of Met S as 39.7% in the studied cases. A recent study from India¹⁹ found the prevalence of Met S in obese and overweight children and adolescents as 32% which is also very close to what we noted. Cruz ML and coworkers²⁰ recorded 29% of children with obesity to have Met S while 7% of overweight children to have Met S.

In the current study, we noted 57 (73.1%) children to have hypercholesterolaemia which very close to another study done in India where they noted 72% obese and overweight children and adolescents to have hypercholesterolaemia.¹⁹ Other lipid profile findings were also very comparable to some other studies done similar study designs.^{18,21,22} In comparison to normal children, overweight children have been found to have raised TG and HDL-C but comparable blood glucose levels. We noted mean \pm SD of total cholesterol (mg/dl), TG (mg/dl), HDL-C (mg/dl), LDL-C (mg/dl), VLDL-C (mg/dl) and FBG

were found to be 179.4 ± 61.8 , 128.1 ± 42.5 , 37.1 ± 6.2 , 92.3 ± 4.2 , 27.2 ± 2.3 and 87.8 ± 3.2 respectively. Other researchers from India¹⁹ and Bangladesh²³ found very similar results.

Our study has few limitations as well as this was a cross sectional study where only overweight and children with obesity were considered. We did not evaluate any risk factors related to obesity.

Improving school based physical education, interventions involving large scale community based programs, encouraging parents to get more involved, safe routes of walking / bicycling to school, encouraging healthy eating, and regular health checkups as measures targeting childhood and adolescent population can certainly help bringing a change in pattern of obesity in the next few decades.

CONCLUSION

Met S is not only limited to obese children as it can also affect children who are overweight. More studies involving multiple centers with bigger sample size can further verify the results of our findings.

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


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2	Fazal Ur Rehman	Methodology, Literature review, Data analysis, Drafting.	
3	Waqas Ali	Methodology, Literature review, Discussion.	
4	Najmi Usman	Methodology, Literature review, Discussion.	
5	Sanam Bano Rajper	Methodology, Literature review, Discussion.	