Pediatrics

A STUDY OF PREVALENCE AND RISK FACTORS OF OVERWEIGHT AND OBESITY IN URBAN SCHOOL CHILDREN

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ABSTRACT

Objective :
    1.To determine the prevalence of overweight and obesity in urban school children, including boys and girls aged between 9 to 15 years.
2.   To determine the relationship between BMI and waist circumference.
3.   To study the interrelation between overweight and obesity
•   Eating habits
•   Physical activity
•   Psychological performance
•   Scholastic performance

Design : Survey of equal no. of students from a well reputed private school and a government school in Hyderabad, India.

Setting : Ravindra Bharati English Medium School, A.S. Rao Nagar, Hyderabad.
Zilla parishad Elementary and High School, Kushaiguda,ECIL, Hyderabad.

Subjects : 440 boys and 460 girls, all aged between 9-15 years.

Main Outcome Measures : Body Mass Index and Waist Circumference.

Conclusions :
1.   Overall prevalence of overweight in urban school children was 16%.
2.   Overall prevalence of obesity in urban school children was 7%.
3.   The variables of study namely eating habits, physical exercise, depression and scholastic performance showed similar distribution with overweight in terms of BMI and waist circumference.

STRENGHTS AND LIMITATIONS OF THE STUDY:
1.   The study focuses on the extra calorie consumption by both boys and girls which is leading to obesity and overweight.
2.   It also gives a detailed study on the effect of regular exercise by both girls and boys.
3.   It gives a glance on issues which are dependent on obesity, like depression and pass percentage of obese school children.
4.   It uses comparative study method between obese and non-obese children in order to give better insight to the issue of obesity.
5.   The study sample was not intended to be representative of the whole population of urban areas, but only of 9-15 y old boys and girls. Thus, these findings cannot be generalized.

KEYWORDS : Overweight, Physical exercise, School, Wellness, Obesity intervention,Exta Calories, Depression,Body Mass Index.

INTRODUCTION

Obesity is defined as a condition of excessive fat accumulation in adipose tissue, to the extent that health may be impaired. (WHO consultation on obesity, 2000). International classification of obesity ICD – obesity, obesity due to excess calories, drug induced obesity, extreme obesity with alveolar hypoventilation, other obesity, obesity unspecified, overeating associated with other physical disturbances, abnormal weight gain. CDC classification of overweight and obesity in children :The National Centre For Health Statistics(NCHS)/ Centers for Disease Control (CDC) Body Mass Index(BMI) charts from USA & International Obesity Taskforce(IOTF) cut off points.Other markers of obesity include Skin Fold Thickness(SFT), Waist to Hip Ratio, Bio-electrical Impedance Analysis, Dual X-Ray Absorptiometry(DEXA) and Air Displacement Plethysmogarphy(BOD-POD).
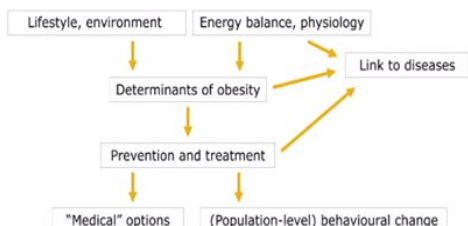
Category	BMI range – kg/m^2
Very severely underweight	less than 15
Severely underweight	from 15.0 to 16.0
Underweight	from 16.0 to 18.5
Normal (healthy weight)	from 18.5 to 25
Overweight	from 25 to 30
Obese Class I (Moderately obese)	from 30 to 35
Obese Class II (Severely obese)	from 35 to 40
Obese Class III (Very severely obese)	over 40

Problem Statement – Obesity is a global epidemic (WHO, 2005). Immediate complications of obesity include psychological stress, respiratory embarrassment, Hepatic steatosis, Psuedomotor Cerebri, Cholelithiasis, Orthopedic emergencies. Comorbities include Dyslipidemias, Hypertension, Insulin resistance syndromes (syndrome x), childhood type II DM, Ovarian hyperandrogenism, reduced bone density. Future risks include adult obesity, Congenital Heart Disease (CHD), Cardiovascular Disease(CVD), Type II DM(Diabetes Mellitus), Osteoporosis.

The Gustatory Reward System - Four heavily interconnected structures namely Amygdala, Insula, Orbito Frontal Cortex & Striatum are the central elements in control of appetite behavior. As a group, these are involved in learning about food rewards, allocating attention and effort towards food reward, setting the incentive value of stimuli in environment, integrating homeostatic information about energy stores, gut contents and information about availability of food. Alterations in reward system leading to overeating are : Reward deficiency syndrome, hypersensitivity to reward, endogenous opioid system, increased drive for eating added to increased availability.

SUBJECTS AND METHODOLOGY

Subjects :
Total number of students – 900
450 students from a private school – Ravindra Bharati English Medium School
450 students from a government school – Zilla parishad Elemntary and High School
Number of girls in the study group - 460 (both private and government schools)
Number of boys in the study group – 440 (both private and government schools)

Selection Criteria :

Inclusion criteria - All children aged between 9 to 15 years irrespective of their family history, religion and socioeconomic history.

Exclusion criteria – Children suffering from chronic illness were excluded.

Method Of Study
Study period - March 2012-2013, i.e; for the duration of one year.

Type of study – Cross-sectional

Selection of subjects – Random sampling with their roll numbers.

Before starting the study, consent was taken in written form from the children's parents.

Electronic weighing scale was used to measure the weights of the subjects. With an error of +/- 100gms.

Portable anthropometric rod was used to measure the height of the subjects. With an error of +/- 0.1cm.

OBSERVATIONS
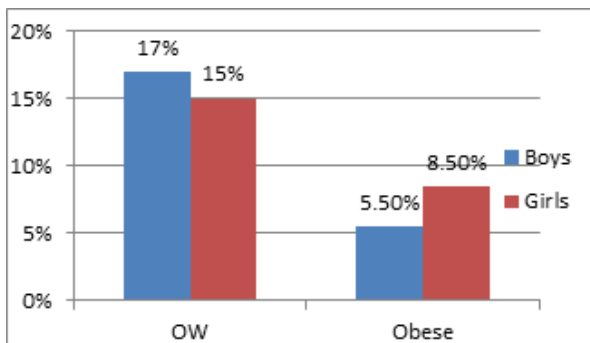**Prevalence of overweight and obesity in children (BMI)**

Total	Underweight	Normal weight	Overweight	Obese
900	396(44%)	297(33%)	144(16%)	63(7%)
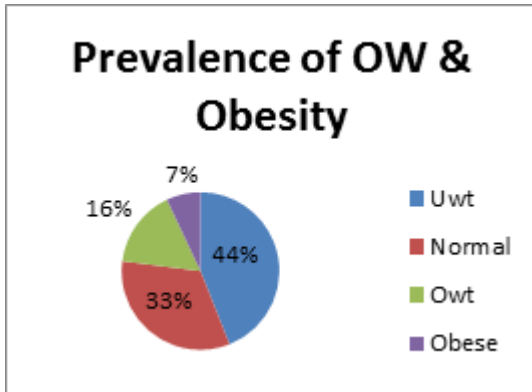
Under weight-44%
Normal weight-33%
Over weight-16%
Obese-7%

Sex distribution of overweight and obesity

Gender	Under weight	Normal weight	Over weight	Obesity	Total
Boys	189 (43%)	152 (34.5%)	75 (17%)	24 (5.5%)	440
Girls	207 (45%)	145 (31.5%)	69 (15%)	39 (8.5%)	460

Factor	Boys	Girls
Over weight	17%	5.50%
Obese	15%	8.50%

| Age group in years	Total number	No overweight	Overweight	Obese
9 – 11	160	127	23(!4%)	10(6.5%)
11 – 13	152	113	24(16%)	15(9.5%)
13 – 15	148	112	22(15%)	14(9%)
Total	460	352	69(15%)	39(8.5%)

Age distribution of overweight and obesity in boys

| Age group in years	Total number	No overweight	Overweight	Obese
9 – 11	155	124	24(15%)	7(4.5%)
11 - 13	140	103	28(19%)	9(6.5%)
13 - 15	145	114	23(16%)	8(5.5%)
Total	440	341	75(17%)	24(5.5%)

Age distribution of overweight and obesity in girls
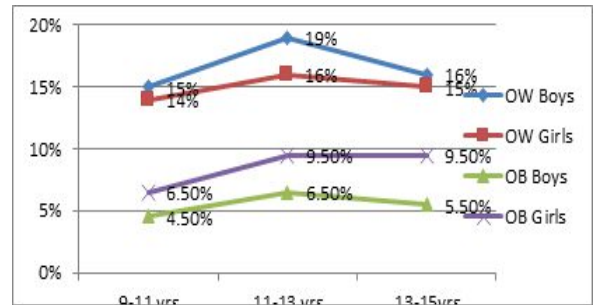
COMPARITIVE GRAPH OF DIFFERENT AGE GROUPS FOR OBESITY AND OVERWEIGHT BOTH IN GIRLS AND BOYS
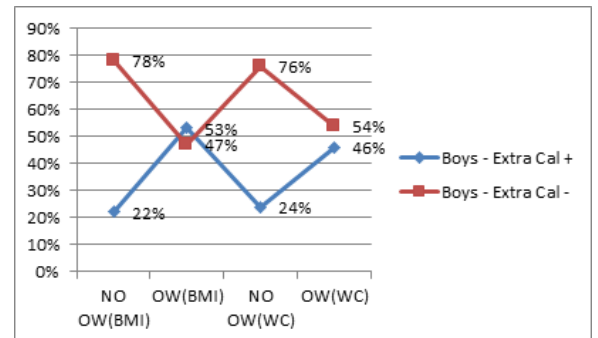
STUDY OVER EXTRA CALORIE CONSUMPTION IN BOYS.
22% of no overweight boys(underweight and normal)(BMI) consume extra calories where as 53% of overweight boys(overweight and obesity) (BMI) consume extra calories and only 24%of no overweight boys (WC) consume extra calories where as 53% of overweight boys consume extra calories.
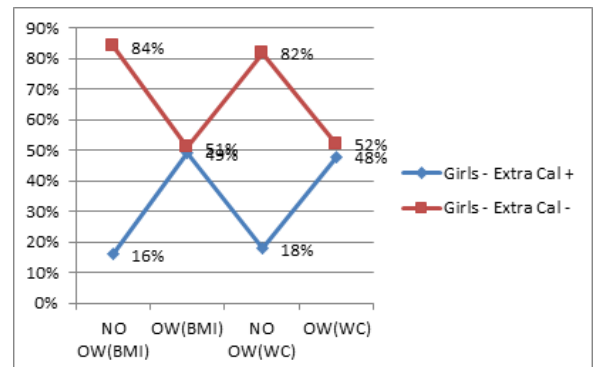

STUDY OVER EXTRA CALORIE CONSUMPTION IN GIRLS.
16% of no overweight girls (underweight and normal)(BMI) consume extra calories where as 49% of overweight girls(overweight and obesity) (BMI) consume extra calories and only 18%of no overweight girls (WC) consume extra calories where as 48% of overweight girls consume
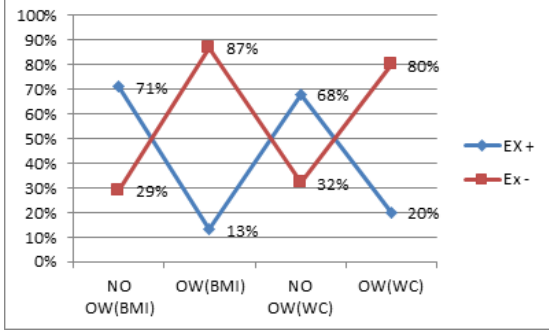
EFFECT OF REGULAR EXERCISE IN BOYS.

71% of no overweight boys(underweight and normal)(BMI) have regular exercise where as 13% of overweight boys(overweight and obesity)(BMI) have regular exercise and only 68%of no overweight boys (WC) have regular exercise where as 20% of overweight boys have regular exercise.
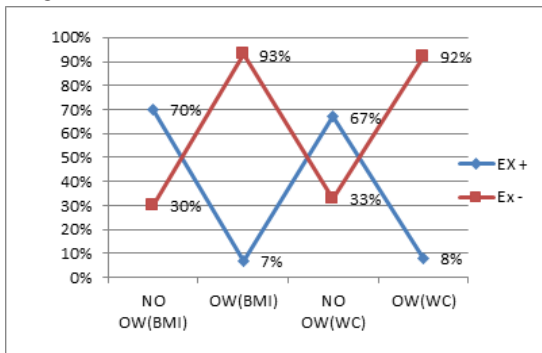

EFFECT OF REGULAR EXERCISE IN GIRLS.

70% of no overweight girls (underweight and normal)(BMI) have regular exercise where as 7% of overweight girls (overweight and obesity) (BMI) have regular exercise and only 67%of no overweight girls (WC) have regular exercise where as 8% of overweight girls have regular exercise.
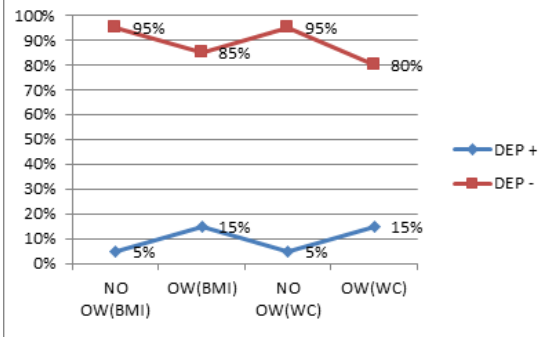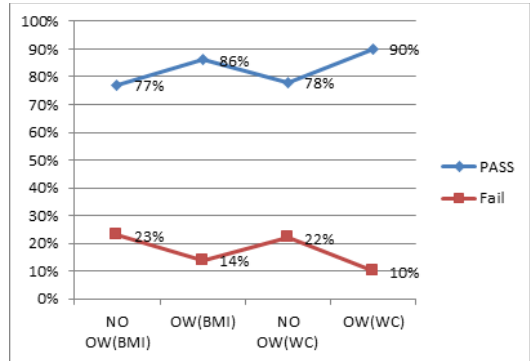

DEPRESSION PERCENTAGE IN OVERWEIGHT AND UNDERWEIGHT BOYS.

5% of no overweight boys (underweight and normal)(BMI) show depression where as 15% of overweight boys(overweight and obesity)(BMI) show depression and only 5% of no overweight boys(WC) show depression where as 15% of overweight boys show depression.
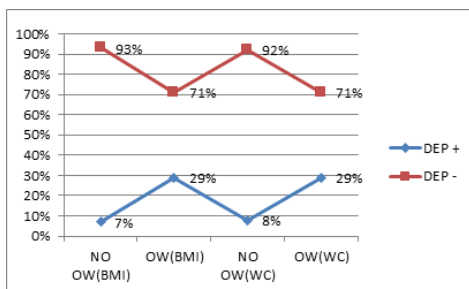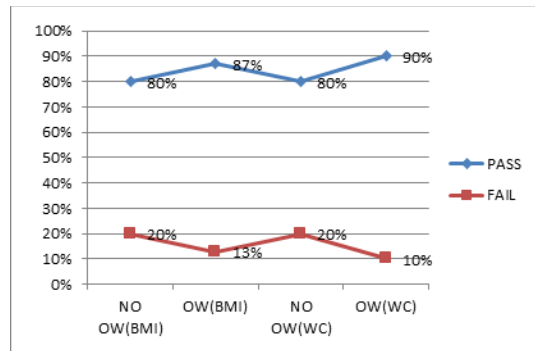

DEPRESSION PERCENTAGE IN OVERWEIGHT AND UNDERWEIGHT GIRLS.

7% of no overweight girls(underweight and normal)(BMI) show depression where as 29% of overweight girls (overweight and obesity)(BMI) show depression and only 8%of no overweight girls (WC) show depression where as 29% of overweight girls show depression.


PASS PERCENTAGE IN OVERWEIGHT AND UNDERWEIGHT BOYS.

77% of no overweight boys(underweight and normal)(BMI) passed (A+B) in their academic examinations where as 86% of overweight boys (overweight and obesity)(BMI) passed(A+B) in their academic examinations and only 78%of no overweight boys(WC) passed(A+B) in their academic examinations where as 90% of overweight boys passed (A+B) in their academic examinations.

PASS PERCENTAGE IN OVERWEIGHT AND UNDERWEIGHT GIRLS.

80% of no overweight girls(underweight and normal)(BMI) passed (A+B) in their academic examinations where as 87% of overweight girls (overweight and obesity)(BMI) passed(A+B) in their academic examinations and only 80%of no overweight girls (WC) passed(A+B) in their academic examinations where as 90% of overweight girls passed (A+B) in their academic examinations.
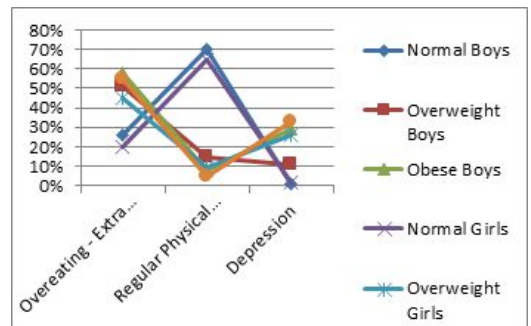
CONCLUSIONS

1. Prevalence of overweight in urban school children according to the study was 16%.
2. Prevalence of obesity in urban school children according to the study was 7%.
3. Prevalence of overweight in boys17% was slightly higher than that of girls which was 15%.
4. Prevalence of obesity in boys was 5.5% where as that of girls was

higher with 8.5%.

5. The children including boys and girls of age group 11-13 years showed relatively higher prevalence of overweight and obesity.

6. Prevalence of overweight and obesity together n boys was 22% with BMI and 21% with Waist Circumference. Prevalence of overweight and obesity together in girls was 22.5% with BMI and 20.5% with Waist Circumference.

7. There was significantly higher rate of indulgence of overeating of high calorie snacks among the overweight(45%) and obese boys(58%) compared to the normal boys(26%).

8. There was significantly higher rate of indulgence of overeating of high calorie snacks among the overweight(45%) and obese girls(55%) compared to the normal girls(20%).

9. A regular physical exercise regimen is significantly low among the overweight(15%) and obese boys(8%) as compared to the normal boys(70%).

10. A regular physical exercise regimen is significantly low among the overweight(9%) and obese girls(5%) as compared to the normal girls(65%).

11. Evidence of depression was higher among the overweight(11%) and obese boys(29%) as compared to the normal boys(1%).

12. Evidence of depression was higher among the overweight(26%) and obese girls(33%) as compared to the normal girls(2%).

13. There was no significant difference in the scholastic performance between groups of the normal weight and the overweight – obese children.

14. The variables of study namely eating habits, physical exercise, depression and scholastic performance showed similar distribution with overweight(overweight and obesity) in terms of BMI and Waist Circumference.

No Competing Interests.

"We have read and understood IJP's policy on declaration of interests and declare that we have no competing interests."

Data sharing statement:

Data in particular being shared: All of the individual collected data during the trail after deidentification.

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