Body Mass Index Percentile and Prevalence of Overweight and Obesity In a group of Preschool Children Attending Child Central Teaching Hospital

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ABSTRACT

Background: Assessing growth is a beneficial way for defining the status of health and nutrition in children.

Objective: To construct growth references curves of healthy infants and children (0-6years) ,and compare them with previous and international references , and estimating prevalence of overweight and obesity among those infants and children, and to study some of the risk factors for the development of overweight and obesity.

*Patient and methods:*A Cross-sectional study of Healthy preschool children aged from birth to 6 years visiting the out-patients clinic of central teaching hospital of pediatric hospital for regular growth monitoring and who were having simple illness from the period of the first of February to the first of July 2014, the present study have excluded; children with chronic diseases, and/or those on any type of drugs e.g[thyroxine ,growth hormone ,androgens , prolonged use of steroid], and preterm infants had been excluded.

Result: Of the participant children; 707 (76.3%) were younger than two years old, while 219 of those aged between (2 – 6 years) which constitute (23.7%) of the study sample , an overweight constitute about 79(11.2%) of children below 2 years with male to female ratio(1.1:1) and obesity constitute 22(3.1%) of them with male to female ratio(0.6:1) while in those 2-6 years the overweight children constitute 33(15.1%) with male to female ratio(0.5:1) while obesity was prevalent in 21 (9.6%) of them with male to female ratio(0.5:1).The prevalence of obesity and overweight for children below 2 years were 2.5% and 11.7% for boys, with3.7%, 10.6% for girls, and for those aged 2-6 years, 6.3% and 10.8% for boys and 13%, 19.4% for girls.

***Conclusion*:** Percentile curves presented for body mass index represent a normal healthy and well-nourished child population are not different from WHO curves. It can be used to evaluate the status of adiposity especially in those who have positive family history of obesity and significantly less in exclusive breast fed babies and significantly more where there is less activity and more time for watching T.V. infants and children of both sexes which were evidenced in all age group and in both sexes.

1. Introduction

Since 1971 prevalence of obesity in childhood is increasing in advanced countries. In Scandinavian countries one of European countries in comparison with Mediterranean countries childhood obesity prevalence is lower [1].

2. Definition of obesity

WHO standards of growth (from birth till the age 5)

Obese: BMI more than 3 standard deviation higher than the median of WHO growth standard.
Overweight: BMI more than 2 standard deviation higher than the median of WHO growth standard.

WHO reference 2007 (from the age of 5 till 19 years)

Obese: BMI more than 2 standard deviation higher than the median of WHO growth standard. .
Overweight: BMI more than 1 standard deviation higher than the median of WHO growth standard.[2, 3].

Obese children proportion is increasing in both developed and developing countries. Its prevalence rates is highest in developed countries. Its prevalence is high in Middle East, central and eastern Europe [4]. For example , in1988, the WHO project of cardiovascular disease monitoring mentioned Iran as one of the several countries with highest childhood obesity prevalence .the prevalence of BMI between 85th and 95th percentile in girls was significantly higher than in boys... In Saudi Arabia, one in every six children aged 6_18 yrs. old is obese. Furthermore, in both developed and developing countries there are proportionally more overweight girls than boys especially among adolescent [5-7].

Among American, Indian and Alaska native (AI\AN) children rates of overweight override these high national averages. Within children of American Indian from the age two to five, rates of overweight and obesity reported at 12 to 39 percent(s).

Reports mention that more than 22 million children all over the world under the age of 5 years are obese or overweight, and more than 17 million of them are

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assumed to live in developing countries. 94 developing countries study display that nations with the highest prevalence of overweight were lying mainly in the Middle East, North Africa and Latin America [8, 9].

3. Patients and methods

A Cross-sectional study has been done in the Central teaching hospital of pediatrics, which is a major tertiary pediatrics hospital in Al-Karkh district of Baghdad Governorate. Healthy preschool children aged from birth to 6 years visiting the out-patients clinic of the hospital for regular growth monitoring and for vaccination and those with simple flue were considered eligible.Children with chronic diseases, and/or those on any type of drugs e.g [growth hormone, thyroxine, androgens, prolonged use of steroid] and preterm infants all were excluded.

4. Data analysis:

Calculation of the body mass index (BMI) as following:

[Weight / (Length by meter) 2] for recumbent and for standing adding 0.005m for height in formula.

Then, nine distance percentile (3rd, 5th, 15th, 25th, 50th, 75th, 85th, 95th and 97th) were computed from the basic data generated for BMI by using the formulae given by Tanner et al. [10].The percentile curves were fitted using quadrantic splines by non-linear regression.

Children aged from birth to 6 years old between the 85th and 95th percentiles of BMI for age are labeled "Overweight", and children at or above the 95th percentile are labeled "Obese".

5. Statistical analysis

- The data presented as mean, standard deviation, frequency and percentages tables.
- Line graphs and bar charts (constructed by Microsoft office Excel 2010) were used also.
- Two sample dependent student t-test used to compare BMI between boys and girls of the sameage.
- Chi–square test was performed to assess statistical relations between defined BMI categories and socio-demographic and nutrition variables.
- A level of p – value less than 0.05 was considered significant.

6. Results

Of the participant children; 707 (76.3%) were younger than two years old, while 219(23.7%) aged between (2 – 6 years).

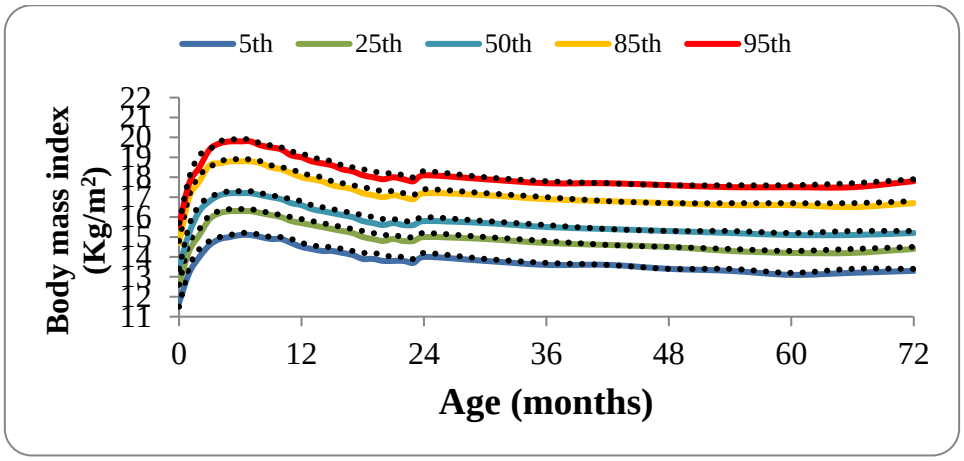

Figure 1: 5th, 25th, 50th, 85th and 95th smoothed BMI curved for participant boys aged (0–6 years).

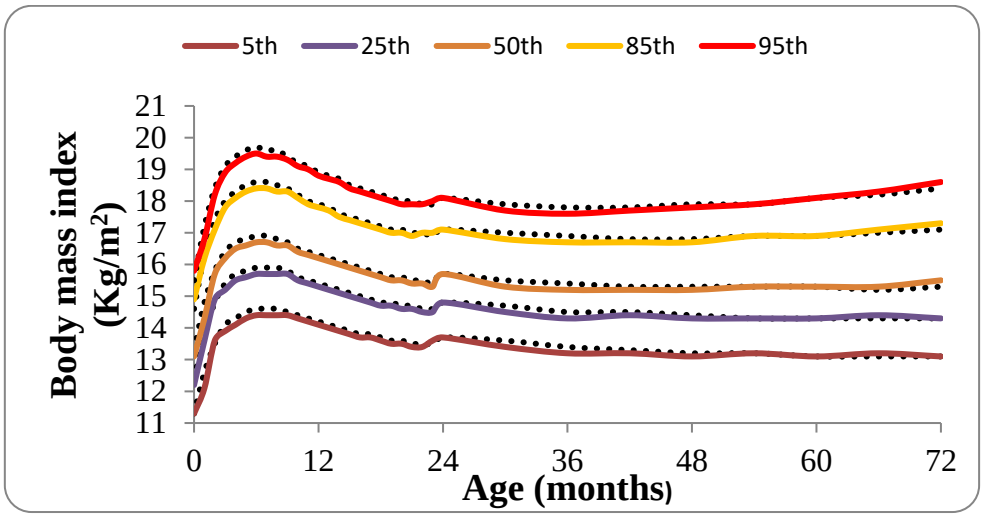

Figure 2: 5th, 25th, 50th, 85th and 95th smoothed BMI curved for participant girls aged (0 – 6 years).

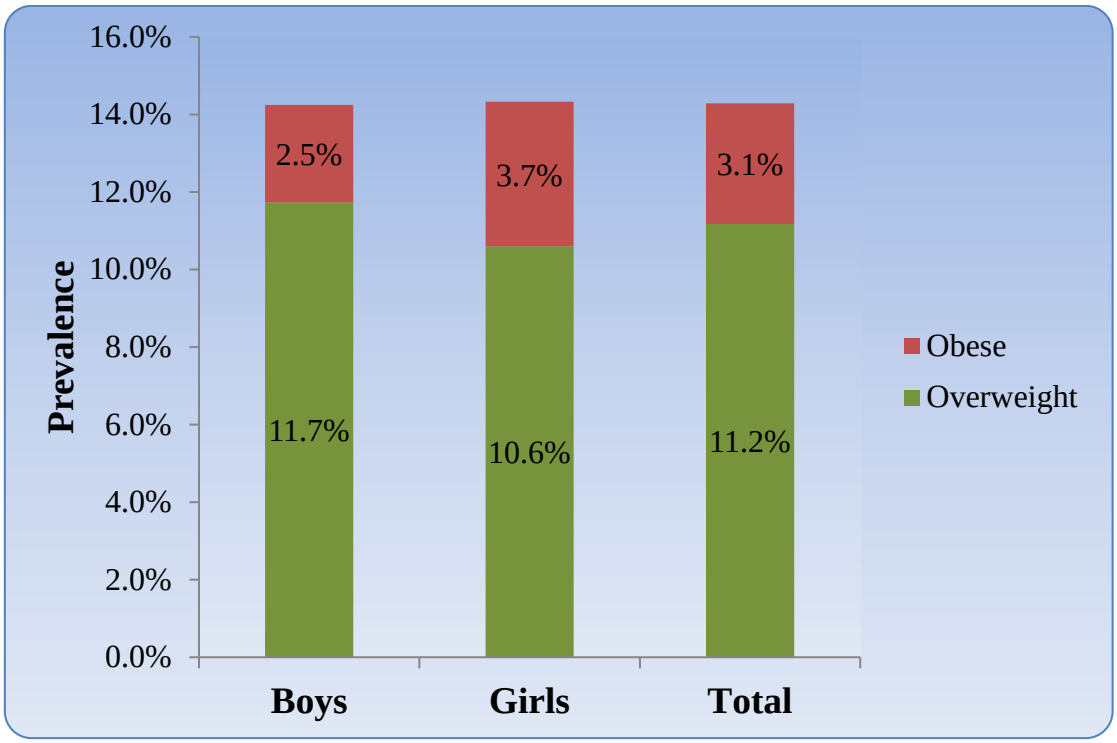

Figure 3: Prevalence of overweight and obesity among 707 children aged <2years.

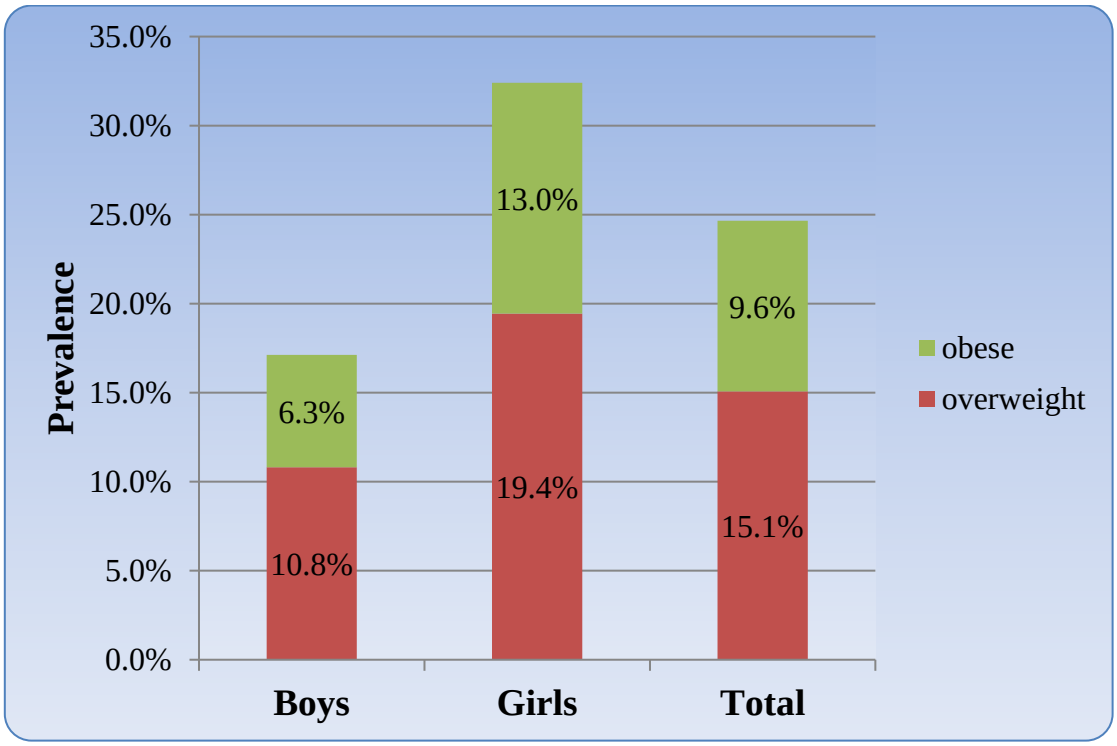

Figure 4: Prevalence of overweight and obesity among 219 children aged 2-6 years.

Table 1: Linear regression of selected variables with overweight and obesity according to BMI percentiles for 707 participant children aged < 2 years.

Parameter	B[a]	*p*-value
Feeding type	1.616	0.047*
Positive family history of obesity	1.338	NS

[a]=regression coefficient, *significant at α ≤0.05.

Table 2: Linear regression of selected variables with overweight and obesity according to BMI percentiles for 219 participant children aged 2 - 6 years.

Parameter		B[a]	*p*-value
Age		0.921	NS
Gender		1.798	NS
Family history		2.870	<0.001
Snacks		1.930	NS
TV		2.655	0.002
Physical activity		-3.619	<0.001

[a]=regression coefficient, *significant at α ≤0.05.

7. Discussion:

The current study display that no differences in BMI had been found between boys and girls detected in all age groups. This agree with the study done by Mazicioglo MM et.al. in Turkey who found that there is no significant difference between the genders in the final change of WLH(weight for length/height) [11].

As shown in our study in fig.1 and 2 there is a rapid increase in BMI in the 1st 6 month, which is the fastest growth period in infantile life, this agree with Halisdemir et al. [12] which encounter that the inclination of the curve increased steadily between age of 1-7 months in boys and 1-8 months in girls then a stationary decline noticed between 8-24 months.

The study also showed that prevalence of overweight in children less than 2 years was found to be more prevalent in those exclusively on bottle feeding as 33(13.7%) of them were overweight compared to 28(11.9%) of mixed feeding and 18(7.8%) of breast feeding children.

This result agrees with Waffa Ali Musa et.al. who confirm a considerable negative relationship between the duration of breast feeding and the overweight and obesity [13].

The study showed that overweight was prevalent among 33 (15.1%) of children aged 2-6 years and that 12(10.8%) of boys and 21(19.4%) of girls were overweight and for the obesity 13% for girls ,6.3% for boys are different from the result of study in Tehran during 2007-2008 which found that overweight and obesity prevalence in boys were 9.8% and 4.7% and 10.3%, 4.4% in girls as reported by Gaeini et al. [14].these might be explained by the presence of risk factors like T.V watching, family history.

Current study also shows significant association with TV watching and physical activity the risk of being heavier is shown to be increased by more than 2-5 times with each excess hour of watching TV which agree with Wafaa Ali Musa and Hassan K results done in Basrah who found that highly significant association between watching TV for more than 2 hours and overweight/obesity and this result is also agree with the result of other study reported by Tremblay et al. [15].

Family history of obesity also has significant association with the prevalence of overweight and obesity 20.8% for each, while it was 13.5% ,6.4% respectively in those with negative family history of obesity for children aged [2-6 years] , these results agree with Locard E et al who found that family obesity and obesity at birth are risk factors for obesity in 5 years of age [16]. Other study also shows that family history has significant association with obesity, Mo-Suwan L ,Greater AF study done in children aged 6 years and more were they found statistically significant associations with family history of obesity,the highest fraction attributable to population obesity was family history of obesity(34%) [17].

8. Conclusion:

Percentile curves presented for body mass index represent a normal healthy and well-nourished child population are not different from WHO curves. It can be used to evaluate the infants and children adiposity status of both sexes which were evidenced in all age group and in both sexes especially in those who have positive family history of obesity and significantly less in exclusive breast fed babies and significantly more where there is less activity and more time for watching T.V

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