Obesity and Its Related Risk Factors among Primary School Children in Baghdad, Iraq, 2019

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ABSTRACT

Background: Prevalence of obesity in children has risen greatly during the past two decades and school-aged children (6-11 years) have the highest prevalence of overweight. It is a progressing phenomenon that increase with time.

Objectives: To assess the prevalence and obesity-related factors in school-aged children in a sample of children in Baghdad, Iraq.

Methods: A cross-sectional study conducted in three primary healthcare centers in Baghdad during a period of eight months from Sep. 2018 – Apr. 2019 and included all male and female children aged between 6-12 years who attended the selected primary health care centers for any complaint. Any child with chronic diseases (cardiac or renal diseases, asthma, diabetes mellitus), or physically or mentally handicapped was excluded from this study. A questionnaire which was predesigned and pretested was used to collect various information. Children's height (cm), weight (Kg), and BMI-for-age were measured. Overweight is defined as BMI > 85th percentile and < 95th percentile. Normal weight is defined as BMI ≥ 5th and < 85th percentile. Underweight is < 5th percentile. The total number of children enrolled was 515.

Results: The prevalence of BMI level (> 85th percentile) was 47.3%. Five factors were found to be significant independent risk factors. These factors were: increasing in age (increasing one year of age will increase the risk of children obesity by 1.9), decreasing in hours of nighttime child sleep (OR=1.56), increasing in hours of daily using electronic devices (OR=3.65), using electronic devices before sleep (OR= 4.75), and daily eating fast foods and/or beverages (OR=8.72).

Conclusion: About half of primary school children were either overweight or obese and the greatest modifiable risk factor is the daily eating of fast foods and/or beverages. Another important risk factors were using electronic device before sleep, increase duration of using electronic devices, and decreasing hours of nighttime child sleep.

Keywords: Obesity, Primary school children, Overweight, Iraq.

Iraqi Medical Journal Vol. 66, No. 1, Jan-July 2020; p.42-48.

The prevalence of obesity has increased dramatically all over the world, it is one of the most serious health problem of the 21st century[1]. Meanwhile, childhood obesity is a multi-system disease with potentially devastating results. It can develop serious medical and psychosocial complications and greatly increase the risk of morbidity and mortality in adults[2]. In addition, it significantly contributes to related adverse health problems, such as dyslipidemia, hypertension, cardiovascular disease, insulin resistance or diabetes, fatty liver, and psychosocial complications[3].

The overweight and obesity have becoming an increasingly prevalent problem in both developed and developing world[4]. During the past two decades, the prevalence of obesity in children has risen greatly and school-aged children (6-11 years) have the highest prevalence of overweight (18.8%)[5].

In an Iraqi study, the prevalence of obesity was (1.3%) and prevalence of overweight was 6%. The proportion of overweight and obesity increased from 5% and 0.9% at age seven reaching 6.5 and 1.8%, respectively, at the age of 12 years, which may give the impression that obesity is a progressing phenomenon that increase with time[6]. There are controversial results

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regarding obesity risk factors in which different studies revealed, genetic history, birth rank (whether being first or last child in birth order), physical activity (playing outside the house more than two hours/day), high birth weight, type of milk consumed during infancy (breast-feeding or bottle-feeding), more than two hours television watching per day, number of regular meals, eating outside the house, eating between meals, the educational levels of the parents and parental overweight, as the risk factors of obesity[6-11]. In addition, some studies which revealed no related factor to obesity in normal and obese groups[12]. Education, interventions, and evaluations of the effectiveness and outcomes of new initiatives aiming to reduce childhood overweight and obesity are needed to recommend future programs with the greatest success. Although a lot of studies showed pediatric obesity-related factors, but due to its ongoing hazardous effects, this study aimed to assess the prevalence and obesity-related factors in school-aged children in Baghdad, Iraq.

Methods

This is a cross-sectional study that was conducted in three primary health care centers (PHCCs) of Al-Risafa Health Directorate in Baghdad province during a period of eight months from Sep. 2018 to Apr. 2019. A simple random technique had been used to collect the sample. Three PHCCs from Al-Risafa Directorate had been randomly selected.

The study population included all male and female children aged between 6-12 years who attended the selected PHCCs for any complaint. Their parents (father or mother) were informed about the purpose of the study and those who agreed to participate were enrolled in the study. The data collection was done through daily visits, and spending four hours/day, five days/week, for the allocated time for each PHCC. The time required for completing the interview with each participant was considered as the system to include the next patient. In general, each interview needed about 10 minutes. Any child with chronic diseases (cardiac or renal diseases, asthma, diabetes mellitus), or physically or mentally handicapped were excluded from this study. The total number of children included in this study was 515.

An interviewer administered a questionnaire that included specific questions (answered by a family member) was used to collect information including socio-demographic (age, gender, residence, and family information), medical and surgical history, information about their parents (availability, age, educational level, occupation, and obesity), duration of daily watching TV, nighttime child sleep hours, duration and type of child and parents social media using, frequency of eating fast food and beverages and frequency of being away from daily activities. Weight and height were measured after children had put off shoes and clothes using standard procedure[13]. Height (measured to nearest 0.1 cm) was measured with a measuring tape in a vertical erect position, with parallel feet, and with the shoulders and bottom touching the wall. Weight (measured to the nearest 0.1 kg) was measured with an electronic scale that was calibrated daily at the beginning of each working day. BMI was calculated as weight (kg) / height^2 (m^2). Obesity is defined as BMI ≥ 95th percentile for children and teens of the same age and sex. Overweight is defined as BMI > 85th percentile and < 95th percentile. Normal weight is defined as BMI ≥ 5th and < 85th percentile. Underweight is < 5th percentile[14].

The data analyzed using Statistical Package for Social Sciences (SPSS) version 25. The data presented as mean, standard deviation and ranges. Categorical data presented by frequencies and percentages. Independent t-test (two tailed) was used to compare the continuous variables accordingly. Chi square test was used to assess the association between prevalence of obesity and certain information. Logistic regression analysis applied, using children obesity as the dependent variable and the variables that were found significant in the binary analysis

were included in the model as the independent variables. A level of P – value less than 0.05 was considered significant.

Results

In this study, the highest proportion of study participants had normal BMI level (46.2%), while 25.6% of them were obese as shown in figure 1.

In table 1, children obesity was significantly associated with older children (P= 0.001), male children (P= 0.001), obese parents (P= 0.001), children living with one of parents, and in low-income families (P=0.001).

No statistical significant difference in means of fathers' and mothers' age between obese and normal children (P ≥ 0.05) and no statistical significant association observed (P ≥ 0.05) between prevalence of obesity in children with father and mother availability, and educational level, (Table 2).

In table 3, we noticed that the mean hours of daily nighttime child sleep were significantly higher in children with normal BMI percentiles compared to obese children (7.6 versus 7.13 hrs., P= 0.002) and the mean duration of daily using electronic devices was significantly higher in obese children compared to children with normal BMI percentiles (4.15 versus 2.99 hrs., P= 0.001).

Prevalence of children obesity was significantly associated with using electronic device before sleep (P= 0.008), eating fast foods and/or beverages (P= 0.001), and with increasing frequency of eating fast foods and/or beverages (P= 0.001).

Logistic regression analysis was applied, (Table 4), using obesity outcome as the dependent variable and the variables that showed significant association in the binary analysis as the independent variables. Five factors were found to be significant independent risk factors. These factors were: increasing in age (increasing one year of age will increase the risk of children obesity by 1.9), decreasing in hours of nighttime child sleep (OR=1.56), increasing in hours of daily using electronic devices (OR=3.65), using electronic devices before sleep (OR= 4.75), and daily eating fast foods and/or beverages (OR=8.72).

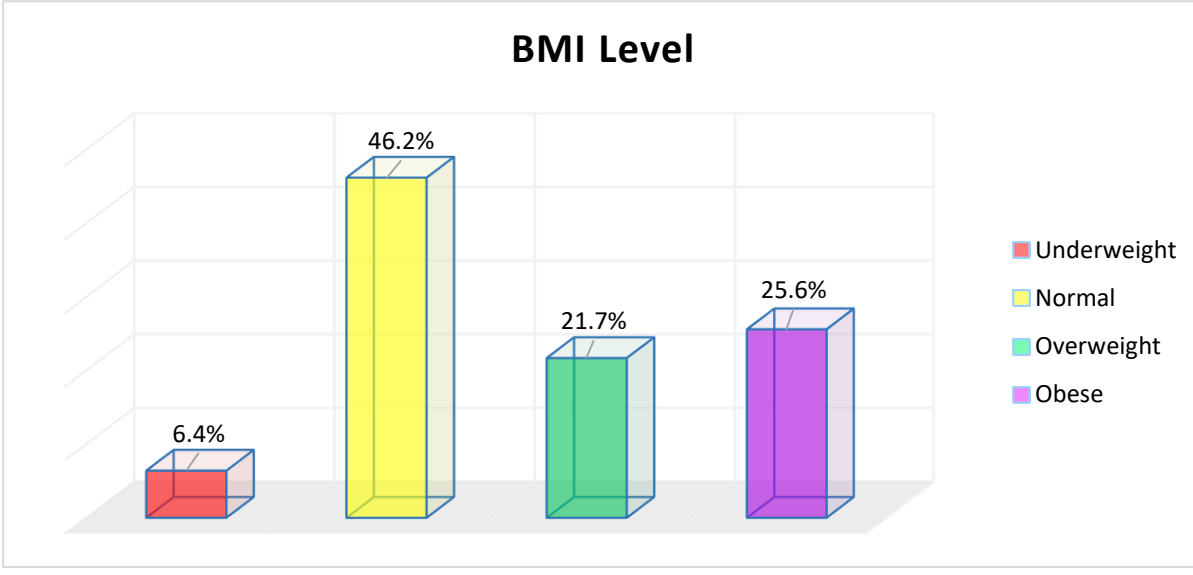

Figure 1: Distribution of study patients by BMI level.

Table 1: Association between obesity and socio-demographic characteristics.

Variable	BMI level		Total (%) n= 515	P - Value
	Obese & overweighed (%) n= 244	Normal & underweighted (%) n= 271		
Age group (Years)				
< 8	55 (35.5)	100 (64.5)	155 (30.1)	**0.001**
8 – 10	107 (44.8)	132 (55.2)	239 (46.4)	
> 10	82 (67.8)	39 (32.2)	121 (23.5)	
Gender				
Male	147 (60.0)	98 (40.0)	245 (47.6)	**0.001**
Female	97 (35.9)	173 (64.1)	270 (52.4)	
Living with parents				
With both	210 (45.7)	250 (54.3)	460 (89.3)	**0.029**
With one of parents	18 (72.0)	7 (28.0)	25 (4.9)	
With others	16 (53.3)	14 (46.7)	30 (5.8)	
Obesity of parents	**n= 239**	**n= 266**	**n= 505**	
No	32 (17.8)	148 (82.2)	180 (35.6)	**0.001**
One of them	95 (61.3)	60 (38.7)	155 (30.7)	
Both of them	112 (65.9)	58 (34.1)	170 (33.7)	

Table 2: Association between obesity and parents' characteristics.

Parents' Characteristics	BMI level		Total (%) n= 515	P - Value
	Obese & overweighed n= 244	Normal & underweighted n= 271		
Age of parents	**in years mean (±SD)**			
Age of father	42.9 ± 7.4	43.8 ± 7.2	**0.17**	
Age of mother	36.4 ± 7.5	36.4 ± 6.3	**0.97**	
Father availability	**No. (%)**			
Present	233 (48.0)	252 (52.0)	485 (94.2)	**0.226**
Not Present	11 (36.7)	19 (63.3)	30 (5.8)	
Mother availability	**No. (%)**			
Present	240 (47.2)	268 (52.8)	508 (98.6)	**0.602**
Not Present	4 (57.1)	3 (42.9)	7 (1.4)	
Father educational level	**No. (%)**			
Illiterate	4 (80.0)	1 (20.0)	5 (1.0)	**0.057**
Primary or secondary school	187 (45.1)	228 (54.9)	415 (80.6)	
Higher education	53 (55.8)	42 (44.2)	95 (18.4)	
Mother educational level	**No. (%)**			
Illiterate	19 (63.3)	11 (36.7)	30 (5.8)	**0.093**
Primary or secondary school	178 (45.1)	217 (54.9)	395 (76.7)	
Higher education	47 (52.2)	43 (47.8)	90 (17.5)	

Table 3: Association between obesity and social information.

Social information	BMI level		Total (%) n= 515	P - Value
	Obese & overweighed n= 244	Normal & underweighted n= 271		
	Mean ±SD	Mean ±SD		
Watching TV (hrs./day)	2.37 ± 1.9	2.51 ± 1.7		**0.382**
Nighttime child sleep (hrs.)	7.13 ± 1.7	7.6 ± 1.5		**0.002**
Using electronic devices (hrs./day)	4.15 ± 2.4	2.99 ± 2.2		**0.001**
Using electronic device before sleep No. (%)				
Yes	102 (55.1)	83 (44.9)	185 (35.9)	**0.008**
No	142 (43.0)	188 (57.0)	330 (64.1)	
Eating fast foods and / or beverages No. (%)				
No	10 (12.5)	70 (87.5)	80 (15.5)	**0.001**
Yes	234 (53.8)	201 (46.2)	435 (84.5)	
Frequency of eating fast foods and/or beverages No. (%) n= 435				
Daily	202 (66.2)	103 (33.8)	305 (70.1)	**0.001**
Weekly	20 (33.3)	40 (66.7)	60 (13.8)	
Sporadically	12 (17.1)	58 (82.9)	70 (16.1)	

Table 4: Logistic regression analysis for association of various risk factors with prevalence of children obesity

Variables	Odd's ratio	95% C.I for odd's ratio	P - Value
Age (Year)			
Increasing one year	1.9	1.18 – 3.07	**0.008**
Nighttime child sleep			
decreasing one hr.	1.56	1.06 – 2.29	**0.024**
Using electronic devices (hrs./day)			
Increasing one hr.	3.65	2.06 – 6.45	**0.001**
Using electronic device before sleep			
Yes	4.75	1.6 – 14.15	**0.005**
Eating fast foods and / or beverages			
Daily	8.72	3.21 – 17.81	**0.001**

Discussion

Worldwide, the rate of obesity has doubled since 1980[15]. Recent systematic reviews investigating prevention and treatment programs, focusing on preventing normal-weight children from becoming overweight or obese[16]. In the current study, prevalence of obesity was 25.6%. Similar results observed in Alredainy et al study (2016), in which prevalence of obesity was 30.3%[17]. Differently, Lafta et al study (2007) found that prevalence of obesity was 4.1% and of overweight was 12.4%[18]. The prevalence of overweight and obesity in Fawzi et al study (2008) were 11.3% and 9.8%, respectively[19]. Factors determined these differences include, the availability of more western foods, snacking, a decline in physical activity.

Prevalence of obesity was increased significantly with increased age, in line to Lafta et al study (2007)[18]. This may give the impression that obesity is a progressing phenomenon, which may be related to the pre and puberty stage which has a significant influence on weight gain[20].

Furthermopre, prevalence increase significantly in male children, in contrary to Fawzi et al study (2008)[19] and Alredainy et al study (2016)[17], in which females showed

a higher prevalence of overweight/obesity than males. This might be attributed to boys engaging in sport more than girls who tend towards a sedentary lifestyle[21].

In the current study, daily nighttime child sleep was significantly lower in obese children, while duration of daily using electronic devices was significantly higher in obese children. Furthermore, obesity was significantly associated with using electronic device before sleep, eating fast foods and / or beverages (P<0.05). An agreement observed in Alredainy et al study (2016)[17], Wandia et al study (2014)[22], Hassan et al study (2010)[23] and Hajian et al study (2013)[24], in which they found that preschool children who watch television more than two hours per day had four times more likely chance of being overweight/obese as compared to those who watch less than two hours per day. This might have attributed to reduced physical activity at the time of watching television, high chance of consuming large portion of foods, soft drink and processed food marketing on television encourage children to eat more foods and even may interrupt with sleeping. Another agreement found in Taveras et al study (2008)[25] and Tikotzky et al study (2010)[26], as found that shorter sleep duration in preschool children is associated with overweight and obesity in childhood. Sleep duration in children may have long-term consequences on BMI and other health behaviors, such as regular exercise, stress management, and adopting healthy diets[27].

In current study and by logistic regression analysis, significant independent risk factors were: increasing in age, decreasing in nighttime sleep, increasing in hours of using electronic devices, using electronic devices before sleep, and daily eating fast foods and/or beverages. Different results observed in Alredainy et al study (2016)[17] and Sorrie et al study (2017)[28]. This changes might due to an important factor affect change in obesity, as urbanization. Urbanization involved a shift from traditional foods to fast and convenience foods, more reliance on cars and other types of transportation, higher income, more television viewing, more use of computers and the Internet, a more sedentary lifestyle and less physical activity, and ultimately a more stressful life. Therefore, urbanization will intensify the burden of obesity rate[29].

In conclusion, about half of primary school children were either overweight or obese and the greatest modifiable risk factor is the daily eating of fast foods and/or beverages. Another important risk factors were using electronic device before sleep, increase duration of using electronic devices, and decreasing hours of nighttime child sleep.

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