

Prevalence of Obesity in Preschool Children at Hilla/Babylon/Iraq 2020

Bahaa Mufeed Kadhim

Department of Health, Hilla, Babylon, Iraq

Abstract

Background: More and more preschool children in Iraq and elsewhere are becoming overweight or obese. Many countries are now reporting a similar trend among preschool children. However, little information is available on the prevalence of overweight and obesity among preschool children in Iraq. In addition, available data are based on reported rather than measured height, weight, and body mass index (BMI). **Aims:** The aim of the study was to determine the prevalence of obesity/overweight among preschool children in private and governmental kindergartens (KGs) at Hilla 2020. **Settings and Design:** This study was a cross-sectional study. **Materials and Methods:** In order to determine the prevalence of obesity in preschool children 2-5 year old children who are attending kindergartens are selected as a sample in a cross sectional manner, the researcher measured the height and weight and calculated the BMI for each child to compare it with the WHO growth charts. The study was conducted for a period extended from January 2020 to December 2020. The total participants were 2148 parents and their 2–5-year-old children selected from all KGs available. The data were collected using an adapted questionnaire and were analyzed electronically. **Statistical Analysis:** Analysis of data was carried out using the available statistical package of SPSS-27 (Statistical Package for the Social Sciences, version 27). Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range (minimum–maximum values). The significance of difference of different percentages (qualitative data) was tested using the Pearson Chi-square test. Statistical significance was considered whenever $P \leq 0.05$. **Results:** The prevalence of overweight and obesity in preschool KG children was 14.8% and 5.9%, respectively; the main factors that affect childhood obesity are family income and the presence of obesity in other family members. **Conclusions:** There is a high prevalence of obesity/overweight among 2–5-year-old children with a significant difference regarding obesity/overweight prevalence between governmental and private KGs.

Keywords: Child nutrition, obesity, overweight, pediatric obesity

INTRODUCTION

Obesity has become a pandemic, with more than a billion people affected worldwide.^[1] The prevalence of overweight in children defined as: (BMI) greater than the 85th percentile for age and sex” has tripled Over the past 30 years.^[2]

More than 30% of children in the United States are overweight or obese (BMI >95th percentile);^[3] data from the International Obesity Task Force indicate that 22 million of the world’s children under 5 years of age are overweight or obese.^[4]

Obesity has replaced malnutrition as the major nutritional problem in some parts of Africa, with overweight/obesity being as much as four times more common than malnutrition;^[5] childhood obesity has reached epidemic levels in developed countries. Twenty-five percent of children in the US are overweight and 11% are obese.^[6] About 70% of obese adolescents grow up to

become obese adults.^[7] The prevalence of childhood obesity is in increasing since 1971 in developed countries.^[8] In Iraq, a recent study about childhood overweight and obesity showed a prevalence of 26% among primary school children.^[9] Another study at an obesity outpatient clinic showed that 7.3% of the samples were overweight and 92.7% were obese.^[10]

The Centers for Disease Control and Prevention defined overweight as at or above the 95th percentile of BMI for age and “at risk for overweight” as between 85th and 95th percentile of BMI for age.^[11,12]

Address for correspondence: Dr. Bahaa Mufeed Kadhim,
Department of Health, Hilla, Babylon, Iraq.
E-mail: batchony1990@gmail.com

Submitted: 04-Mar-2023 Revised: 12-Jun-2023 Accepted: 18-Jun-2023 Published: 30-May-2024

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Kadhim BM. Prevalence of obesity in preschool children at Hilla/Babylon/Iraq 2020. Mustansiriya Med J 2023;22:190-4.

Access this article online

Quick Response Code:



Website:
<http://www.mmjonweb.org>

DOI:
10.4103/mj.mj_18_23

The aim of this study is to determine the prevalence of obesity and overweight among preschool children in Iraq/Babylon using multiple indicators and to study the possible correlation of obesity/overweight with socioeconomic status and family history.

MATERIALS AND METHODS

Study design

This study was a cross-sectional study with analytic elements.

Study setting

The study was conducted from January 2020 to December 2020, in Al-Hillah/Babylon/Iraq, at governmental and private kindergartens (KGs). A total of 16 governmental and 24 private KGs were included; the estimated number of children attending these KGs was supposed to be almost 4000 students according to the annual lists of Babylon Education Directorate at the early 2020. Due to the health restrictions related to COVID-19 infection, the number of attendants has dramatically declined, especially at the governmental sector.

Data were collected from all the children available at the time of visit the study included (1064) child from the private and (1084) child from the governmental sector, including all 2–5-year-old children of both genders who attended those KGs who agreed (and their parents' consents were taken before enrolling the children in measurements) to participate in the study.

Child's demographic data included age, gender, history of family obesity and weight, and height. BMI was calculated and linked to the WHO-related growth charts.

The socioeconomic statuses were estimated through the parent's education, occupation, family members and mainly through the family income.

Ethical consideration

Agreement from the department of preparation and training/branch of studies and educational research in the Babylon Education Directorate was taken, and informal verbal consent from each child–parent was also taken.

Data analysis

Analysis of data was carried out using IBM Statistical Package for the Social Sciences (SPSS version 27).

The significance of difference of different percentages (qualitative data) was tested using the Pearson Chi-square test. Statistical significance was considered whenever $P \leq 0.05$.

Limitation of the study

1. The selected population may not represent the actual under 5-year populations, and a large number of children under 5 never attend preschool facilities
2. Poor cooperation of some parents: some questionnaire papers sent through the KG administration to the parents to fill were never returned
3. Limitations related to COVID-19 infection with limited attendance to schools and KGs.

Table 1: The distribution of the study samples according to age and gender ($n=2148$)

	<i>n</i> (%)
Age (years)	
2	39 (1.8)
3	113 (5.3)
4	660 (30.7)
5	1335 (62.2)
Gender	
Male	1076 (50.1)
Female	1072 (49.9)

Table 2: The distribution of the study samples according to body mass index ($n=2148$)

BMI categories	<i>n</i> (%)
Underweight	52 (2.4)
Normal	1651 (77.0)
Overweight	318 (14.7)
Obese	127 (5.9)

BMI: Body mass index

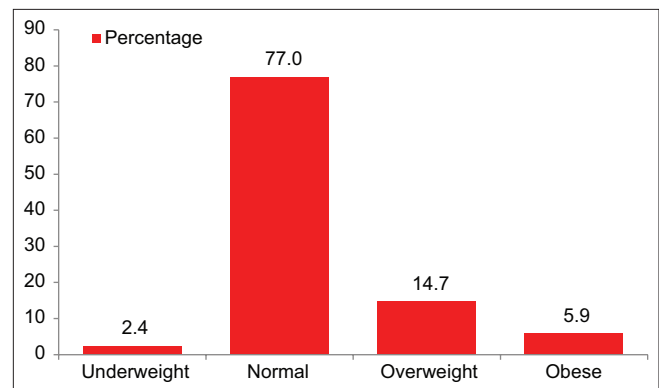


Figure 1: The body mass index distribution of the study sample according to growth charts

RESULTS

Nearly 62.2% of the study sample children were 5 years old, and 38.8% were 2–4 years old; gender distribution is almost equal with slightly more males than females (1076 males vs. 1072 females) [Table 1].

Most of the study samples (77%) (1651 children) are with normal BMI for age according to the WHO growth charts, 2.4% (52 children) of them were underweight, 14.7% were overweight (318 children), and only 5.9% were obese (127 children) [Table 2 and Figure 1].

Regarding the relation between BMI and age, there was a significant statistical association between the children age group and their BMI with $P = 0.0001$, in which obesity was less at the age of 4 years (1.5%) and overweight is mostly found within 2-year-old children (20.3%). While gender did not show a significant statistical association with BMI, males

Table 3: The distribution of the study sample according to the association between the children age/sex and their body mass index ($n=2148$)

	Underweight, n (%)	Normal, n (%)	Overweight, n (%)	Obese, n (%)	P
Age (years)					
2	-	28 (71.8)	8 (20.5)	3 (7.7)	0.0001*
3	2 (1.8)	88 (77.9)	18 (15.9)	5 (4.4)	
4	20 (3.0)	538 (81.5)	92 (13.9)	10 (1.5)	
5	30 (2.2)	999 (74.8)	197 (14.8)	109 (8.2)	
Gender					
Male	23 (2.1)	827 (76.9)	164 (15.2)	62 (5.8)	0.731
Female	29 (2.7)	827 (77.1)	151 (14.1)	65 (6.1)	

*Significant difference between percentages using Pearson's Chi-square test at 0.05 level

Table 4: The distribution of the study sample according to private and governmental sectors, number of family members, child's sequence in family, and obesity among other family members ($n=2148$)

	n (%)
Type of KGs	
Governmental	1084 (50.5)
Private	1064 (49.5)
Family members	
3	881 (41.0)
4	895 (41.7)
5	351 (16.3)
6	21 (1.0)
Child's sequence in family	
1	1195 (55.6)
2	709 (33.0)
3	230 (10.7)
4	14 (0.7)
Presence of obesity in other family members	
Yes	633 (29.5)
No	1515 (70.5)

KG: Kindergarten

and females tend to show similar patterns of weight distribution [Table 3].

A highly significant statistical correlation was found between the presence of overweight/ obesity in the family and the likelihood of a child to be obese/overweight ($P < 0.0001$), children whose parents answered that they have another family member with obesity tend to show higher prevalence of overweight/obesity compared to those who don't have a family member with obesity/overweight (87.5% of their children are within the normal range of BMI) [Tables 4 and 5].

The results obtained in the study showed that there is a highly significant positive association between family income and the likelihood to develop obesity and overweight among their children.

DISCUSSION

Childhood obesity is a serious public health problem with a rapidly increasing trend worldwide.^[13] In recent decades, the

prevalence of obesity in children has increased dramatically. This worldwide epidemic has important consequences, including psychiatric, psychological, and psychosocial disorders in childhood and increased risk of developing noncommunicable diseases later in life that led member states of the WHO to endorse a target of no increase in obesity in childhood by 2025.^[14]

The prevalence of overweight in the study sample was 14.8%, and the prevalence of obesity was 5.9% (obesity and overweight are not put together). This prevalence is high but still lower than Saudi Arabia and Iran where one in every six children were overweight.^[15,16] The results are close to Sulaiman and AlAni study in Erbil/Iraq.^[9]

The prevalence of overweight significantly decreases with age, but there is a slight increment in the prevalence between the age group of 4 years (13.9%) and the age group of 5 years (14.8%). Other studies had found that obesity significantly increases with age, but the age group was different, and they also have found that the proportion of overweight and obesity increased from 5% to 0.9% at age 7 reaching 6.5% and 1.8%, respectively, at the age of 12 years and that overweight is being almost double in the oldest age quarter, compared with the youngest age quarter.^[17] However, obesity appears to have more rapid increment in 5–19-year-old children compared to younger children who do not show predictable patterns of increment with age.^[18]

Parents who choose to send their children to governmental kindergartens do that because of their financial situation (since governmental kindergartens are free) as the researched have estimated during data collection that most of the parents of the children at the governmental kindergartens don't have sufficient income to pay for private kindergartens and that they have lower economic status compared to parents of children at the private sector, higher economic status is associated with higher prevalence of obesity and overweight.^[19]

Overweight was slightly greater in boys than girls, but for obesity, girls were more than boys. Sex did not appear to affect the distribution of overweight/obesity. There are clear regional differences in the relationship between obesity level and sex; in 2016, the prevalence of obesity was higher in girls than boys in

Table 5: The association between body mass index and the type of the kindergarten, number of family members, child's sequence in family, and family history of obesity (n=2148)

	Underweight, n (%)	Normal, n (%)	Overweight, n (%)	Obese, n (%)	P
Type of KGs					
Governmental	32 (3.0)	838 (77.3)	155 (14.3)	59 (5.4)	0.309
Private	20 (1.9)	816 (76.7)	160 (15.0)	68 (6.4)	
Family members					
3	27 (3.1)	677 (76.8)	124 (14.1)	53 (6.0)	0.142
4	15 (1.7)	688 (76.9)	139 (15.5)	53 (5.9)	
5	8 (2.3)	270 (76.9)	52 (14.8)	21 (6.0)	
6	2 (9.5)	19 (90.5)	-	-	
Child's sequence in family					
1	32 (2.7)	910 (76.2)	180 (15.1)	73 (6.1)	0.666
2	13 (1.8)	552 (77.9)	104 (14.7)	40 (5.6)	
3	6 (2.6)	179 (77.8)	31 (13.5)	14 (6.1)	
4	1 (7.1)	13 (92.9)	-	-	
Obesity in other family members					
Yes	8 (1.3)	329 (52.0)	207 (32.7)	89 (14.1)	0.0001*
No	44 (2.9)	1325 (87.5)	108 (7.1)	38 (2.5)	

*Significant difference between percentages using Pearson's Chi-square test at 0.05 level. KG: Kindergarten

most countries in sub-Saharan Africa and Oceania, as well as in some other middle-income countries. In contrast, obesity was more common in boys than girls in all high-income countries and all countries in East and Southeast Asia. Substantial differences in the boy/girl ratio in the general populations of some countries can partly explain this finding. For example, in both China and India in 2016, there were 19 million more 5–19-year-old boys than girls.^[20]

Most of the children included in the study were of 5 years of age; this could be due to the fact that governmental KGs which resemble almost half of the study sample do not accept children <4 of their age in their facilities, and that the parents in Iraq think of KG as a preparatory stage before starting school at the age of 6 years, so unless they have to keep their child in a KG because they do not have time/person to look after their child while they are out for work they do not choose to send him/her into a preschool facility.

There was a significant positive correlation between the presence of obesity in other family members and the child liability to become overweight or obese, other previous studies have discussed this finding.^[21]

CONCLUSIONS

1. One of five children (20%) is overweight/obese and this is more than what's recommended in guidelines for a healthy community by the WHO and AAP for this age group
2. Gender distribution of overweight/obesity was similar
3. No significant difference in the distribution of obesity/overweight between both private and governmental sectors
4. There is a significant association between the presence of obesity in the family and the likelihood of a preschooler to develop it

5. The family income and financial situation is a great influence for the children BMI.

Recommendations

1. Development educational programs by governmental institutions such as the ministry of high education and scientific researches, and the ministry of health with the association of the governmental education department for parents and teachers about the consequences of overweight and obesity and their future risks
2. Constructing a national guideline for families based on the WHO and AAP recommendation guidelines to direct, monitor, and help children to obtain a normal weight and follow a healthy active lifestyle with proper food habits
3. Discouraging parents from providing their children with fast food or food that shows high sugar content, food derivative, or unnecessary extra calories
4. Build a safe environment at KGs for children to participate in different physical activities and sports
5. Encourage the need to implement effective policies in multiple sectors to address overnutrition, undernutrition, mobility, and physical activity.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Han JC, Lawlor DA, Kimm SY. Childhood obesity. Lancet 2010;375:1737-48.
2. Reilly JJ, El-Hamdouchi A, Diouf A, Monyeke A, Somda SA. Determining the worldwide prevalence of obesity. Lancet

- 2018;391:1773-4.
3. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *JAMA* 2012;307:483-90.
 4. Monasta L, Lobstein T, Cole TJ, Vignierová J, Cattaneo A. Defining overweight and obesity in pre-school children: IOTF reference or WHO standard? *Obes Rev* 2011;12:295-300.
 5. Popkin BM, Corvalan C, Grummer-Strawn LM. Dynamics of the double burden of malnutrition and the changing nutrition reality. *Lancet* 2020;395:65-74.
 6. Lakshman R, Elks CE, Ong KK. Childhood obesity. *Circulation* 2012;126:1770-9.
 7. Biro FM, Wien M. Childhood obesity and adult morbidities. *Am J Clin Nutr* 2010;91:1499S-505S.
 8. Gupta N, Goel K, Shah P, Misra A. Childhood obesity in developing countries: Epidemiology, determinants, and prevention. *Endocr Rev* 2012;33:48-70.
 9. Sulaiman SJ, AlAni MH. Prevalence of obesity and physical activity among primary school children in Erbil City/Iraq. *Mosul J Nurs* 2020;8:6-17.
 10. Al-Momen H, Nashter SB. Prevalence and risk factors of obesity in children: Attending Al-Kindy obesity unit in Baghdad. *Biomed Chem Sci* 2022;1:20-3.
 11. Flegal KM, Wei R, Ogden C. Weight-for-stature compared with body mass index-for-age growth charts for the United States from the centers for disease control and prevention. *Am J Clin Nutr* 2002;75:761-6.
 12. Vaccaro JA, Zarini GG, Huffman FG. Parental perceptions of child's medical care and neighborhood and child's behavioral risk factors for obesity in U.S. Children by body mass index classification. *J Environ Public Health* 2019;2019:3737194. Available from: <https://www.hindawi.com/journals/jeph/2019/3737194/>. [Last accessed on 2022 Jan 30].
 13. Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, *et al.* Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: A systematic analysis for the global burden of disease study 2013. *Lancet* 2014;384:766-81.
 14. Di Cesare M, Sorić M, Bovet P, Miranda JJ, Bhutta Z, Stevens GA, *et al.* The epidemiological burden of obesity in childhood: A worldwide epidemic requiring urgent action. *BMC Med* 2019;17:212.
 15. Kelishadi R, Haghdoost AA, Sadeghirad B, Khajehkazemi R. Trend in the prevalence of obesity and overweight among Iranian children and adolescents: A systematic review and meta-analysis. *Nutrition* 2014;30:393-400.
 16. Hammad SS, Berry DC. The child obesity epidemic in Saudi Arabia: A review of the literature. *J Transcult Nurs* 2017;28:505-15.
 17. Lafta RK, Kadhim MJ. Childhood obesity in Iraq: Prevalence and possible risk factors. *Ann Saudi Med* 2005;25:389-93.
 18. Moss A, Klenk J, Simon K, Thaiss H, Reinehr T, Wabitsch M. Declining prevalence rates for overweight and obesity in German children starting school. *Eur J Pediatr* 2012;171:289-99.
 19. Stone MR, Faulkner GE, Mitra R, Buliung R. Physical activity patterns of children in Toronto: The relative role of neighborhood type and socio-economic status. *Can J Public Health* 2012;103:S9-14.
 20. Bentham J, Di Cesare M, Bllano V, Boddy LM. Worldwide trends in children's and adolescents' body mass index, underweight and obesity, in comparison with adults, from 1975 to 2016: a pooled analysis of 2,416 population-based measurement studies with 128.9 million participants. *Lancet*. 2017. Available from: <http://researchonline.ljmu.ac.uk/id/eprint/7344/>. [Last accessed on 2023 Sep 04].
 21. Grube M, Bergmann S, Keitel A, Herfurth-Majstorovic K, Wendt V, von Klitzing K, *et al.* Obese parents – Obese children? Psychological-psychiatric risk factors of parental behavior and experience for the development of obesity in children aged 0-3: Study protocol. *BMC Public Health* 2013;13:1193.