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Evaluation of the prevalence of obesity and overweight among children in casablanca according to different references

Abstract

Introduction: From 1975 to 2016, childhood obesity in children aged 5 to 19 years increased from 1% to 6% and 8% in girls and boys respectively (WHO).

Epidemiological studies and research indicate that juvenile obesity will surpass the underweight rate by 2022, due in particular to the strong association between eating disorders and obesity.

Objective: Pilot study to assess the prevalence of childhood obesity and overweight in children aged 8-12 years according to the three references of WHO, IOTF and CDC.

Materials and methods: The sampling involved 180 children aged 8 to 12 years from the city of Casablanca, Morocco. Measurements of height were taken with a stadiometer equipped with a vertical measuring rod, weight and BMI with an impedence meter (krada scan). Body status was assessed by comparing BMI to the standards of the references cited above.

Results: The results of our sample showed that the average age was 9.6 ±1.4, the sex ratio girls/boys was 0.93 and the prevalence of overweight and obesity were respectively 11.7% (95% CI [19.43-20.50]) and 8.9% (95% CI [22.00-24.68]) according to the WHO reference (2007), 15% (95% CI [20.49-21.75]) and 2.2% (95% CI [26.07-28.17]) according to the international reference "IOTF" and 13.3% (95% CI [19.99-21.16]) and 5% (95% CI [22.75-26.53]) according to the American CDC references.

Conclusion and perspectives: In Morocco overweight and obesity are variable, with prevalences of 8% and 3% respectively according to WHO standards in children aged 8 to 15 years (M. Sebbani et all 2013), however our results show an increase in these prevalences 11.7% and 8.9% respectively. Hence the interest in setting up a preventive strategy in order to slow down the progression of this problem and identify which of the three references would be the most adapted to the Moroccan context.

Keywords: obesity, overweight, prevalence, children

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Introduction

Childhood obesity is a major public health problem in both developed and developing countries. It also represents one of the consequences of the nutritional transition and sedentary lifestyle that has emerged in many countries, particularly in urban areas.[1] According to WHO (2017), the number of obese children and adolescents aged 5-19 has increased tenfold, from 11 million in 1975 to 124 million in 2016. In addition, 213 million were considered overweight in 2016 but remained below the obesity threshold (WHO2017). Epidemiological studies and research have indicated an accelerated increase in the prevalence of overweight and obesity, with prevalence increasing again (WHO 2017). This alarming number reflects the seriousness of the problem, which has become an epidemic,[2] in addition to the physical consequences, it causes psychological and social problems,[3,4] plus this problem often persists into adulthood.[5] The control and prevention of this scourge requires, first of all, a monitoring of the nutritional status of children and adolescents and an early diagnosis of the cases suffering from overweight.[6] Morocco is not spared from this problem; studies of children and adolescents[2] show that overweight and obesity reach 8% and 3% respectively, which would be due in principle to a change in lifestyle marked by a change in eating habits and a sedentary lifestyle. The aim of our study is to evaluate, according to WHO, IOTF, CDC references, the prevalence of obesity and overweight in a sample of children aged 8 to 12 years belonging to the city of Casablanca Morocco.

Participants recruitment and methods

Recruitment was carried out through invitations to nutrition education sessions for the benefit of the mother-child couple. Four hundred invitations were sent to households in the city of Casablanca. We were able to collect 213 positive responses, of which 180 mother-child couples attended our workshops. The latter were divided into five groups. Each participant filled in a questionnaire and was given a blood pressure test, anthropometric measurements of their body composition and a nutrition education workshop.

The intervention was carried out after obtaining the approval of the delegation of the Minister of Health and all participants were informed about the objectives and the course of our study and their consent was obtained verbally.

The data collected for each child concerned age, sex and level of education, anthropometric measurements, weight, height and BMI

expressed in kg/m², were carried out using an impedance meter (krada scan) and a stadiometer equipped with a vertical height meter (Seca 213) according to the standard WHO norm (1995), and the weighing and height measurements of the children were carried out in underwear and barefoot. The statistical analysis was carried out using the SPSS 25 software. It is based on the study of BMI distributions. These values were compared with the values given by the curves of different references. Quantitative values were expressed as means and standard deviations and qualitative variables were presented as frequencies and percentages. The children were classified into 4 categories according to the reference standards established by WHO 2007, including underweight (Z Score < -2 standard deviations, SD), normal weight, overweight (> +1SD and ≤ 2SD) and obese (> +2SD).[7] Further analysis was done with the International Obesity Task Force (IOTF) references also classifying children into 4 categories: underweight (BMI < IOTF cut-off -17); normal weight; overweight (IOTF cut-off -25 < BMI ≤ IOTF cut-off -30) and obese (BMI ≥ IOTF cut-off -30).[8,9] And according to the Centers for Disease Control and Prevention 2000 (CDC 2000), children were considered overweight when their BMI was above the 85th percentile (Q85), and obese with a BMI at or above the 95th percentile (Q95).

Results

Characteristics of the sample

The sample included 180 children aged 8 to 12 years. Their average age was 9.6 ±1.4. The sex ratio of girls to boys was 0.93. the distribution of the sample by ages 8, 9, 10, 11 and 12 was 33.3%, 15.6%, 20.0%, 18.9% and 12.2% respectively. The weight and height data are shown in Table 1. The average BMI of the surveyed children was 17.0±2.8.

Table 1 Characteristics of the sample

	Overall (N=180) Average±SD	Girls (N=87) Average±SD	Boys (N=93) Average±SD
Age	9,6±1,4	9,7±1,4	9,6±1,4
Weight	31,5±7,8	32,5±8,5	30,6±7,0
Height	1,4±0,1	1,4±0,2	1,3±0,3
BMI	17±2,8	17,3±3,3	16,8±2,3

SD, standard deviation; BMI, body mass index

BMI distribution in our sample

The prevalences of overweight and obesity are 11.7% (95% CI [19.43-20.50]) and 8.9% (95% CI [22.00-24.68]) respectively according to WHO, 15% (95% CI [20.49-21.75]) and 2. 2% (95% CI [26.07-28.17]) according to the IOTF, and 13.3% (95% CI [19.99-21.16]) and 5% (95% CI [22.75-26.53]) according to CDC. The results for underweight frequencies are 6.1% (95% CI [12.96-13.70]) according to WHO, 6.1% (95% CI [12.96-13.70]) according to IOTF and 6.7% (95% CI [12.98-13.66]) according to CDC guidelines.

The distribution of different BMI classes by sex according to the three references showed that the prevalence of obesity and overweight is high among girls compared to boys (Table 2). While the age distribution according to WHO standards shows a very high prevalence of overweight in children aged 9 years (Table 3), using the IOTF standards the prevalence of overweight is high in children aged 10 years, while the prevalence of obesity is 7% in children aged 8 years and zero in the other age groups (Table 4).

Table 2 Distribution of BMI category by gender

BMI categories	WHO		IOTF		CDC	
	Girl (N=87) (%)	Boy (N=93) (%)	Girl (N=87) (%)	Boy (N=93) (%)	Girl (N=87) (%)	Boy (N=93) (%)
Underweight	8	4	8	4	9	4
Normal weight	68	78	70	83	69	81
Overweight	14	10	18	12	16	11
Obesity	10	8	3	1	6	4

WHO, World health organization; IOTF, International obesity task force; CDC, centers for disease control and prevention

Table 3 Distribution of BMI categories by age and by WHO references

Age in years	Headcount (N)	Underweight % (n)	Normal weight % (n)	Overweight % (n)	Obesity % (n)
8 years	60	3 (2)	75 (45)	8 (5)	13 (8)
9 years	28	4 (1)	71 (20)	21 (6)	4 (1)
10 years	36	8 (3)	67 (24)	17 (6)	8 (3)
11 years	34	6 (2)	79 (27)	3 (1)	12 (4)
12 years	22	14 (3)	73 (16)	14 (3)	0 (0)

WHO, World health organization; BMI, body mass index

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Table 4 Distribution of BMI categories according to age and by IOTF references

Age in years	Headcount (N)	Underweight % (n)	Normal weight % (n)	Overweight % (n)	Obesity % (n)
8 years	60	3 (2)	77 (46)	13 (8)	7(4)
9 years	28	4 (1)	82 (23)	14 (4)	0 (0)
10 years	36	8 (3)	67 (24)	25(9)	0 (0)
11 years	34	6 (2)	82 (28)	12(4)	0 (0)
12 years	22	14 (3)	77 (17)	9 (2)	0 (0)

IOTF, International obesity task force; BMI, body mass index

Referring to the CDC standards the prevalence of overweight is presented by 22%, this percentage is very striking in children aged 10 years while obesity is presented by 10% in children aged 8 years (Table 5). The results show that the prevalences of overweight according to the three references were close, and for the prevalences of obesity, there were differences between the WHO and CDC, while there was a significant difference between the prevalence of obesity of the WHO and the IOTF with a p=0.015 (Figure 1).

Table 5 Distribution of BMI categories by age and by CDC references

Age in years	Headcount (N)	Underweight % (n)	Normal weight % (n)	Overweight % (n)	Obesity % (n)
8 years	60	5 (3)	73 (44)	12 (7)	10 (6)
9 years	28	4 (1)	79 (22)	18 (5)	0 (0)
10 years	36	8 (3)	67 (24)	22 (8)	3 (1)
11 years	34	6 (2)	82 (28)	6 (2)	6 (2)
12 years	22	14 (3)	77 (17)	9 (2)	0 (0)

CDC, centers for desease control and prevention; BMI, body mass index

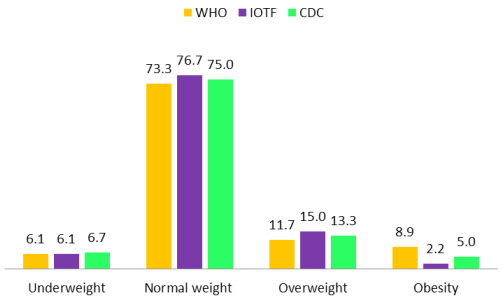

Figure 1 The distribution of BMI categories according to the three references.

WHO,World health organization; IOTF, International obesity task force; CDC, centers for disease control and prevention; BMI, body mass index.

Discussion

Obesity and overweight are of major concern to public health and the international community worldwide. Its rapid spread has been the subject of several publications worldwide by researchers. In our study the prevalence of overweight and obesity was estimated respectively by 11.7% and 8.9 according to WHO references, 15% and 2.2% according to IOTF references and 13.3% and 5% according to CDC references. Also our results showed very marked prevalences of overweight and obesity in girls more than boys. This finding may be explained by the dietary behaviour of children, who tend to consume more high-calorie, high-fat foods (WHO 2020), and by a sedentary lifestyle (WHO 2020). The prevalence of overweight and obesity varies in the literature according to local and regional studies and according to the reference curves used, 12.2% and 5.4% respectively of overweight and obesity according to a study conducted in Marrakech in 2012 (Sebbani et al 2012) with 1418 children aged between 8 and 15 years. In 2016 H.Oulamara et al showed that the prevalence of obesity and overweight in Constantine (Algeria) was 11.6% and 28.9% respectively.[10]

Arab countries are not spared. In Qatar, the prevalence of obesity and overweight is 40.4% and 44.8% respectively.[11] While the results closest to ours are from a study of children aged 7-12 years residing in Babol, "Iran" with a prevalence of obesity and overweight of 5.8% and 12.3% respectively by Hajian-Tilaki et al 2011.[12] The prevalence of childhood obesity has more than tripled in the last four decades in the US,[13] with a prevalence of up to 18.5% in children.[14]

In conclusion, studies conducted around the world have shown a revised upward trend in the prevalence of childhood obesity compared to the previous decade. In our study, all three references show high prevalences of overweight and obesity and due to the lack of uniformity in reference standards and reporting systems, comparisons will be difficult but the closest reference to the Moroccan context is the WHO. Therefore, a preventive strategy based on nutritional education and healthy lifestyle to slow down the progression of this problem as well as early medical care is necessary to reduce or stabilise the obesity rate in our region.

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Conflicts of interest

The authors declare that there is no conflict of interest.

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