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Extent of Overweight and Obesity among Children Aged (6-60) months in Al-Nasiriya at 2015-2016

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Abstract

Background: The problem of obesity and overweight in children has been increased globally. Recently, the obesity prevalence rate reached an alarming level in both developed and developing countries.

Objectives: This study aims to determine the extent of overweight and obesity among infants and children aged 6-60 months in the center of AL-Nasiriya governorate and their relationship with different socio-demographic and lifestyle factors.

Methods:
A cross-sectional study was carried out on 225 infants and children aged 6-60 months selected from children who have consulting primary health centers that randomly selected in AL-Nasiriya city during the period from October 2015 till the end of February 2016. BMI and Z-score was measured and compared to standard tables. Data on socio-demographic factors and dietary pattern was obtained by questionnaire.

Results: The proportion of overweight was 11.1% and for obesity 7.6% according to weight for height Z-score for all children. For children >24months, we found that 10.8% were overweight and 8.8% were obese by using BMI. In this study, there is a significant positive association between father's education and dairy products intake with overweight and obesity.

Conclusion: The prevalence of overweight and obesity among infants and children aged 6-60 months in Al- Nasiriya was high. It is positively associated with dairy products intake and father education had a positive relationship with obesity.

Key wards: Extent, Overweight, Obesity, children.

Introduction

The problem of obesity and overweight in children has been increased globally. Recently, the prevalence rate reached an alarming level in both developed and developing countries[1,2]. According to the

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"World Health Organization" reports, 41 million children under the age of 5 were overweight or obese in 2016. Over 340 million children and adolescents aged 5-19 were overweight or obese in 2016. Around the world, the prevalence of obesity nearly tripled between 1975 and 2016 [2].

In the United States, in 2007-2008, 9.5% of infants and toddlers were obese[3]. Increased extent of overweight has been also noticed in some other countries such as Brazil, China, Egypt, Syria, and Kuwait [4,5]. In Saudi Arabia, among preschool children, 15% were overweight and 6% were obese [6]. 6% were overweight and 1.3% were obese among primary school children in central Iraq [7]. According to WHO, obesity is defined simply as a "condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired" [1].

The mechanism of excess body weight development is not so clear. In children, obesity development can be attributed to the high calories intake with low energy loss[8,9]. Environmental factors like lifestyle changes, economic growth, and urbanization are play a major role in this global increment in the proportion of obesity [8,10]. Dietary habit such as eating unhealthy fast food rich in fat and salt with less fibers, and more consumption of sweetened drinks along with increase sedentary behaviors and decreased activities are the most convincing factors to be associated with excessive body weight in children [5,11,12]. Genetic determinants influence the susceptibility of individual to obesity [13]. Childhood obesity is associated with many health problems not only in children, but also later on in adulthood such as cardiovascular diseases, hypertension, and type 2 diabetes mellitus. Obese children are more likely to have psychological consequences like decreased self-esteem and depression [8,14].

The aims of this study are:

To determine the extent of overweight and obesity, and their relationship with different socio-demographic and life style factors among infants and children aged 6-60 months in the center of AL-Nasiriya governorate.

Subjects and Methods

Subjects

In this study data were obtained from primary health centers (AL-Bashaer, AL-Thawra, AL-Iscan , AL-Sader) that randomly selected in AL-Nasiriya city during the period from October 2015 till the end of February 2016. The study was cross-sectional study and carried out on 225 infants and children aged 6-60 months selected from children who have consulted these primary health centers for routine vaccination or minor illnesses. Children who had chronic disease, acute or chronic diarrhea, children whose parents refuse the study, and children who took certain drugs

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like steroid were excluded from the study. A questionnaire (answered by a family member) was designed and include: age, sex, parental education that considered as low (primary school or less) and high (secondary schooling or higher) [15], and parental work status. In addition, type of feeding, duration of breastfeeding and formula feeding, age of weaning (< 4, 4-6, and > 6 months), number of meals per day (1, 2, 3), number of snacks per day (none, 1, = 2) were recorded. Other questions assessed current dietary pattern including number of meals rich in fat per week inform of saturated fats (meat, coconut, dairy products), unsaturated fats (olive, peanut) and polyunsaturated fats (sunflower, corn, soybean). Grains, fruits, vegetables, dairy products (including cheese, ice cream, milk, butter, and yogurt), and juice intake were recorded as number of servings per day. More than 1 serving of juice per day considered as excess juice (one serving was quantified as 8 oz of 100% fruit juices) [16]. Physical activity was assessed by the number of hours spent playing with computer games and watching TV, screen time for >2 hours per day was considered a risk factor for overweight and obesity [8,14].

Methods

Weights were measured in kilograms and children wearing light clothes and without shoes. Height was measured in centimeters with a standard measuring tape for children aged two years and above and length measured using stadiometer for children younger than two years with an accepted error of 0.1 cm. For all children anthropometric measurements were calculated relative to the "National Center for Health Statistics" (NCHS) reference population. According to weight for height Z-scores, obesity and overweight in children was defined as follows: > 2SD obese, >1SD overweight, =1SD to = -2SD normal, < -2SD wasted as recommended by WHO/NCHS reference curves [17]. Weight status for children > 24 months old age was defined with body mass index. The body mass index (BMI) was estimated from the equation: [weight(kg)/height(m2)]. According to BMI, overweight and obesity was defined as follows: = 95th percentile obese, = 85th percentile but < 95th percentile overweight, 84th-5th percentile normal, <5th percentile underweight. Body mass index (BMI) percentile, was determined using the 2000 "Centers for Disease Control and Prevention" (CDC) Growth Charts for the United States[6,18]. Data entry and analysis were done using the SPSS program, version 23. P-value of less than 0.05 was considered as significant. In addition, all variables in the study were subjected to logistic regression analysis to detect any association with child's overweight and obesity.

Results

In this study, a total of 225 children aged 6-60 months were included. One hundred-

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twenty three (54.7%) were =24 months old and 102 (45.3%) were >24 months of age. One hundred-seventeen (52%) were females and 108 (48%) were males. The anthropometric measurements of children including in the study were evaluated. Out of 225 children, 25 (11.1%) were overweight, 17 (7.6%) were obese, and 12 (5.3%) were wasted as calculated by weight for height Z-scores for all children. Among children = 24 months old, 14(11.4%) were overweight, 8(6.5%) were obese, and 7(5.7%) were wasted**, (Figure.1).**

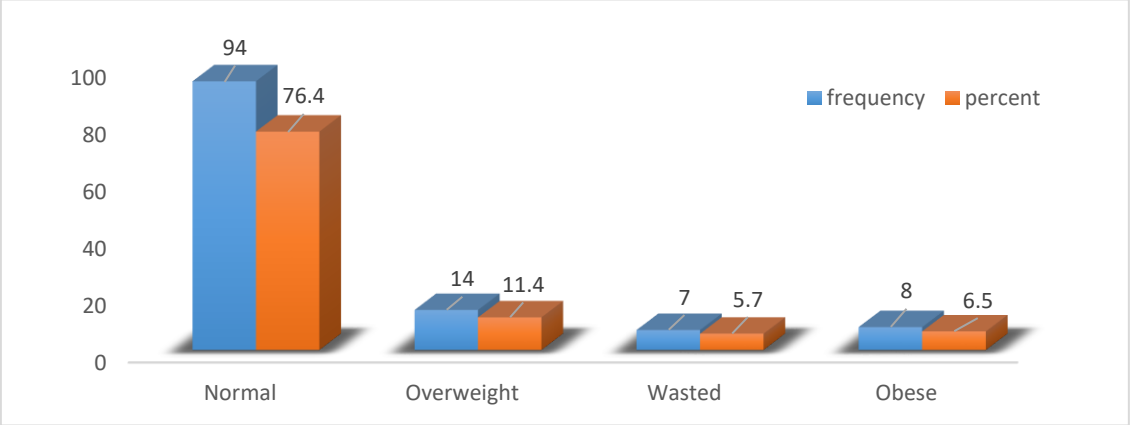

Figure 1. Frequency and percentage of overweight and obesity according to weight for height Z-score for children ≤24 months old.

For children > 24months old, BMI was calculated for 102 children, 11(10.8%) were overweight, 9(8.8%) were obese, and 5(4.9%) were wasted, **(Figure.2)**.

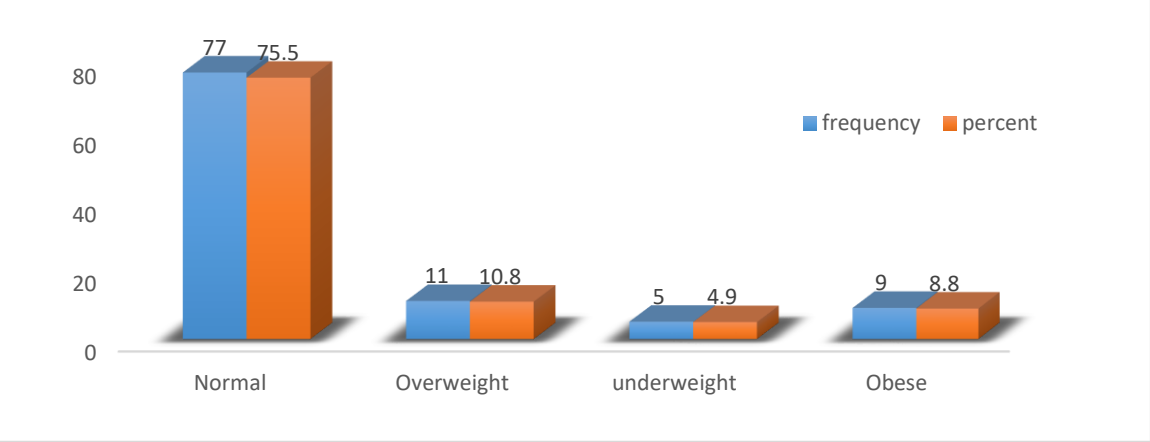

Figure 2. Frequency and percentage of overweight and obesity according to BMI for children >24 months old.

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Table 1. Association of different socio-demographic characteristics of the studied children with overweight and obesity.

Variable	Nutritional status					
Age (in months)	**Normal**	**Overweight**	**Wasted**	**Obese**	**Total**	**X^2, P-value**
6-12	58 (76.3%)	11 (14.5%)	3 (3.9%)	4 (5.3%)	76 (33.8%)	11.129 0.482
13-24	36 (78.3%)	3 (6.5%)	4 (8.7%)	3 (6.5%)	46 (20.4)	
25-36	33 (75%)	7 (15.9%)	2 (4.5%)	2 (4.5%)	44 (19.5%)	
37-48	25 (78.1%)	1 (3.1%)	3 (9.4%)	3 (9.4%)	32 (14.2%)	
49-60	19 (73.1%)	3 (11.5%)	1 (3.7%)	4 (15.4%)	27 (12%)	
Sex						
Male	83 (76.9%)	12 (11.1%)	5 (4.6%)	8 (7.4%)	108 (48%)	.219 .972
Female	88 (75.2%)	13 (11.1%)	7 (6%)	9 (7.7%)	117 (52%)	
Mother education						
Low	135 (76.3%)	20 (11.3%)	10 (5.6%)	12 (6.8%)	177 (78.7%)	0.851 .837
High	36 (75%)	5 (10.4%)	2 (4.2%)	5 (10.4%)	48 (21.3%)	
Mother occupation						
Employed	16 (72.7%)	3 (13.6%)	1 (4.5%)	2 (9.1%)	22 (9.8%)	0.279 0.964
Un-employed	155 (76.4%)	22 (10.8%)	11 (5.4%)	15 (7.4%)	203 (90.2%)	
Father education						
Low	116 (77.9%)	12 (8.1%)	11 (7.4%)	10 (6.7%)	149 (66.2%)	F.E 7.7 0.043
High	55 (72.4%)	13 (17.1%)	1 (1.3%)	7 (9.2%)	76 (33.8%)	
Father occupation						
Employed	163 (76.2%)	23 (10.7%)	11 (5.1%)	17 (7.9%)	214 (95.1%)	1.979 0.482
Un-employed	8 (72.7%)	2 (18.2%)	1 (9.1%)	0 (0.0%)	11 (4.9%)	
Total					225(100%)	

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Table 2. Association of feeding pattern among studied children with overweight and obesity

Variable	Nutritional status					
Feeding pattern	**Normal**	**Overweight**	**Wasted**	**Obese**	**Total**	**X^2, P-value**
Breast feeding	94 (77.7%)	16 (13.2%)	5 (4.1%)	6 (5%)	121 (53.8)	6.793 0.240
Formula feeding	24 (72.7%)	3 (9.1%)	1 (3%)	5 (15.2)	33 (14.7)	
Mixed feeding	53 (74.6%)	6 (8.5%)	6 (8.5%)	6 (8.5%)	71 (31.5%)	
Duration of breast feeding (in months)						
1-6	16 (80%)	2 (10%)	0 (0.0%)	2 (10%)	20 (10.1%)	4.004 0.627
>6	137 (76%)	20 (11.2%)	11 (6.1%)	11 (6.1%)	179 (89.9)	
Duration of formula feeding (in months)						
1-6	13 (76.5%)	1 (5.9%)	1(5.9%)	2 (11.8%)	17 (17.7%)	6.508 0.315
>6	57 (72.2%)	7 (8.9%)	6(7.6%)	9 (11.4%)	79 (82.3%)	
Age of introduction of weaning food						
None	9 (75%)	2 (16.7%)	0 (0.0%)	1 (8.3%)	12 (5.3%)	5.868 0.663
<4	3 (60%)	1 (20%)	1 (20%)	0 (0.0%)	5 (2.3%)	
4-6	94 (79%)	12 (10.1%)	5 (4.2%)	8 (6.7%)	119(52.8%)	
>6	65 (73%)	10 (11.2%)	6 (6.7%)	8 (9%)	89 (39.6%)	
Number of meals per day						
None	8 (72.7%)	2 (18.2%)	0 (0.0%)	1 (9.1%)	11 (4.9%)	7.985 0.429
1	13 (72.2%)	1 (5.6%)	3 (16.7%)	1 (5.6%)	18 (8%)	
2	26 (74.3%)	6 (17.1%)	2 (5.7%)	1 (2.9%)	35 (15.5%)	
3	124 (77%)	16 (9.9%)	7 (4.3%)	14 (8.7%)	161(71.6%)	
Number of snacks per day						
None	59 (80.8%)	8 (11%)	5 (6.8%)	1 (1.4%)	73 (32.4%)	12.071 0.262
1	80 (75.5%)	12 (11.3%)	5 (4.7%)	9 (8.5%)	106(47.1%)	
≥ 2	31 (68.9%)	5 (11.1%)	2 (4.4%)	7 (15.6%)	46 (20.5%)	
Total					225 (100%)	

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Table 3. Association of dietary habits and physical activities among studied children with overweight and obesity.

Variable	Nutritional status					
Fat intake/week	**Normal**	**Overweight**	**Wasted**	**Obese**	**Total**	**X^2, P-value**
None	56 (73.8%)	12 (15%)	3 (3.8%)	6 (7.5%)	80 (35.6%)	11.697 0.052
1	62 (77.5%)	8 (10%)	6 (7.5%)	4 (5%)	80 (35.5%)	
2	39 (81.3%)	4 (8.3%)	3 (6.3%)	2 (4.2%)	48 (21.3%)	
3	11 (64.7%)	1 (5.9%)	0 (0.0%)	5 (29.4%)	17 (7.6%)	
Juice intake per day						
None	35 (79.5%)	6 (13.6%)	2 (4.5%)	1 (2.3%)	44 (19.6%)	5.520 o.461
≤ 1 serving	114 (75.5%)	15 (9.9%)	10 (6.6%)	12 (7.9%)	151 (67.1%)	
>1 serving	22 (73.3%)	4 (13.3%)	0 (0.0%)	4 (13.3%)	30 (13.3%)	
Dairy products intake per day						
None	58 (77.3%)	12 (16%)	3 (4%)	2 (2.7%)	75 (33.3%)	11.990 0.046
1 serving	112 (76.2%)	12 (8.2%)	9 (6.1%)	14 (9.5%)	147 (65.3%)	
2 serving	1 (33.3%)	1 (33.3%)	0 (0.0%)	1 (33.3%)	3 (1.4%)	
Fruits and vegetables intake per day						
None	39 (81.3%)	5 (10.4%)	3 (6.3%)	1 (2.1%)	48 (21.3)	0.727
1 serving	124 (74.3%)	19 (11.4%)	9 (5.4%)	15 (9%)	167 (74.2%)	
2 serving	8 (80%)	1 (10%)	0 (0.0%)	1 (10%)	10 (4.5%)	
Grains intake per day						
None	132 (75.9%)	21 (12.1%)	8 (4.6%)	13 (7.5%)	174 (77.3%)	7.919 0.202
1-2 serving	38 (79.2%)	3 (6.3%)	4 (8.3%)	3 (6.3%)	48 (21.3%)	
3 serving	1 (33.3%)	1 (33.3%)	0 (0.0%)	1 (33.3%)	3 (1.4%)	
Number of hours watching T.V per day						
None	79 (74.5%)	13 (12.3%)	7 (6.6%)	7 (6.6%)	106 (47.1%)	1.781 0.944
≤ 2	56 (76.7%)	7 (9.6%)	4 (5.5%)	6 (8.2%)	73 (32.4%)	
>2	36 (78.3%)	5 (10.9%)	1 (2.2%)	4 (8.7%)	46 (20.5%)	
Number of hours play with computer games per day						
None	122 (75.8%)	17 (10.6%)	10 (6.2%)	12 (7.5%)	161 (71.5%)	9.070 0.125
≤ 2	23 (74.2%)	6 (19.4%)	2 (6.5%)	0 (0.0%)	31 (13.8%)	
>2	26 (78.8%)	2 (6.1%)	0 (0.0%)	5 (15.2%)	33 (14.7%)	
Total					225(100%)	

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Table 4. Logistic regression analysis of selected variables with overweight and obesity according to weight for height Z-score for children ≤24 months old.

The association analysis results have revealed that there was a significant positive association between overweight and obesity with no. of snacks/day (p-value <0.01), fat intake (p-value <0.05), and dairy products intake (p-value<0.01).

For children >24 months old, the association of selected variables with overweight and obesity calculated by BMI percentile using regression analysis has revealed that there was no significant association (p-value>0.05).

SE*standard erroe

variable	Overweight & obesity	
	SE*	P-value
Mother education	1.084	0.710
Mother occupation	1.683	0.842
Father education	0.793	0.183
Father occupation	1.249	0.980
Duration of breast feeding	1.672	0.938
Duration of formula feeding	1.949	0.159
Age of introduction of weaning foods	4024.06	0.99
No .of meals /day	4024.06	0.99
No. of snacks /day	1.935	0.001
Fat intake	2.764	0.032
Juice intake	11.159	0.989
Dairy products	1.141	0.004
Grains	1.695	0.378
No. of hours watching T.V	11.138	0.848
No. of hours play with smart devices	1.749	0.256

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Discussion

In this study, the percentages of overweight and obesity among infants and children aged 6-60 months were 11.1% and 7.6% respectively, compared with another study done in Basrah governorate in 2007 in which 10.5% of children were overweight and 3.3% were obese[19]. Lafta et al in Babil governorate reported that the proportion of overweight was 6% and of obesity was 1.3% among primary school children[7]. In the present study, children aged from 49-60 months reported the higher percent of obesity 15.4%, similar result was reported by Hajian –Tilaki et al in Iran [11]. On the other hand, the percentage of overweight was higher (15.9%) among children aged 25-36 months, but this did not reach a statistical significance. In this study, the percentages of overweight and obesity were nearly equal for males and females, similar result was found in another study in Iran[11]. In contrast a study done by Martorell et al have reported that overweight is more common in female [15].

In the current study a significant positive association was found between excessive body weight and father education (p-value <0.05). This is in agreement with the results of another study conducted by Al Alawi et al in Bahrain[20], and study done by Musa et al in Basrah[19]. This association between overweight and paternal education can be explained partly by linking high father educational level with increase family income, more and different diet access, and increased sedentary life style. In comparison to other studies done in China [21] and Germany [22] revealed that obesity was more prevalent among children of parents with low education. No significant association was found in this study between mother education and parental occupation with prevalence of overweight and obesity among their children. Similar results were reported by Fuiano et al in Italy [23]. However, other studies have reported that overweight and obesity are more prevalent among children of mothers with high education [15,20]. Regarding the types of feeding in this study, the majority (53.8%) were breast fed, 14.7% were formula fed, and 31.5% were mixed fed (breastfeeding and formula feeding). Higher percent of obesity (15.2%) was found among children who received formula feeding compared to those received breast milk only (5%) or mixed feeding (8.5%), but this results were statistically insignificant, probably because of the small sample size. In the current study, the duration of breastfeeding was ≤6 months in 20 (10.1%), compared with 179(89.9%) where the duration of breast feeding has continued for more

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than 6 months. The present study didn't reveal a significant negative correlation between the duration of breastfeeding and excessive body weight. This is in agreement with another study done by Hediger et al [24]. However, other studies have reported that breastfeeding continues for > 6 months has a protective effect against development of obesity [19,25]. No association was found in this study between obesity prevalence and time of introducing solid diet. Similar result was reported in another study[19]. In the current study a significant association between overweight and obesity with dairy products intake was found (p-value <0.05). This is in agreement with the results of other studies done by Scharf et al and Nezami et al reported that dairy products intake significantly associated with overweight/obesity among children [26,27]. Dairy products which represent a major component of our diet, contain a significant amount of, fat, saturated fat, milk proteins, and milk sugar that encourage the development of obesity. This could explain why consumption of dairy products increased risk of excess weight in children. However, another study done by Wang W et al showed that dairy products consumption associated with a decreased risk of obesity in children[28]. The present study didn't reveal a significant association for overweight and obesity with frequency and amount of consumption of fat, fruits and vegetables, grains and excess juice. Also no association was found with the number of meals or snacks consumed per day. This is in agreement with another study done by Newby et al[29]. No significant association was founded in the current study between overweight/obesity and watching TV and play with computer games >2 hours per day. In comparison to other studies in which highly significant association was reported [7,11,19]. Sedentary behavior and reduced physical activity are known causes of excessive weight gain in children. Lack of correlation in the current study may be attributed to cross sectional nature of this study or small sample size.

Conclusion:

From this study, it can be concluded that:

- The prevalence of overweight and obesity among infants and children aged 6-60 months in Al- Nasiriya city was higher in comparison to Basrah governorate, but comparable to other countries such as Saudi Arabia and Bahrain.
- Obesity was more prevalent among children aged 49-60 months, while overweight was higher among children aged 25-36 months.

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- The percentages of overweight and obesity were nearly equal for both males and females.

- High paternal education was associated with excessive body weight among their children.

- Dairy products consumption was a risk factor for overweight and obesity in children.

Recommendations:

Obesity can cause a serious impact on child health throughout his life. It is preventable, and can be decreased or prevented by simple dietary, behavioural, and environmental changes .

1) Obesity preventive programs should be developed in the health institution and schools to increase awareness of peoples regarding obesity effect on children health and it is medical complications.
2) Monitoring the growth of children and follow-up to identify overweight early during childhood period with early intervention and treatment to prevent long term complications of obesity.
3) Because high paternal education associated with increase prevalence of obesity in children, more research should be done to study the dietary habits and life styles among educated families in order to discover and modify habits and behaviours that lead to this association.
4) Avoiding intake of high-fat dairy products and highly sugared drinks and food.
5) Encourage breastfeeding at least for the first 12 months of age.
6) Parents should help their children to eat healthy food like vegetables, fresh fruit, diet rich in fibers and low-fat dairy products .
7) Avoid eating fast food outside the home.
8) Eating breakfast daily and advice family to eat meals together.
9) Encourage outdoor and indoor physical activity and reduce screen time.

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مدى زيادة الوزن والسمنة بين الأطفال الذين تتراوح أعمارهم بين (٦-٦٠) شهرا في الناصرية في ٢٠١٥-٢٠١٦

دكتورة غادة منصور عبود

الخلاصة

ان مشكلة السمنة وزيادة الوزن لدى الأطفال ازدادت على مستوى العالم. في الآونة الأخيرة، وصل معدل انتشار السمنة إلى مستوى يبعث على الانزعاج في البلدان المتقدمة والنامية على حد سواء.

الأهداف: تهدف هذه الدراسة إلى تحديد مدى زيادة الوزن والسمنة بين الرضع والأطفال الذين تتراوح أعمارهم بين ٦-٦٠ شهرا في وسط محافظة الناصرية وعلاقتها مع مختلف العوامل الاجتماعية والديموغرافية ونمط الحياة.

طريقة العمل: أجريت دراسة مقطعية على ٢٢٥ من الأطفال الرضع والأطفال الذين تتراوح أعمارهم بين ٦- ٦٠ شهرا تم اختيارهم من الأطفال الذين يستشيرون المراكز الصحية الأولية التي تم اختيارها عشوائيا في مدينة الناصرية خلال الفترة من أكتوبر ٢٠١٥ حتى نهاية فبراير ٢٠١٦. تم قياس مؤشرات كتلة الجسم ومعدلات الوزن الى االطول ومقارنتها مع الجداول القياسية. تم الحصول على بيانات عن العوامل الاجتماعية الديموغرافية والنمط الغذائي من خلال الاستبيان.

النتائج: كانت نسبة زيادة الوزن ١١,١٪ والبدانة ٧,٦٪ وفقا لمعدلات الوزن الى الارتفاع لجميع الأطفال. وبالنسبة للأطفال < ٢٤ شهرا، وجدنا أن ١٠,٨٪ يعانون من زيادة الوزن و ٨,٨٪ يعانون من السمنة المفرطة باستخدام مؤشر كتلة الجسم. في هذه الدراسة، هناك علاقة إيجابية كبيرة بين تعليم الأب وتناول منتجات الألبان مع زيادة الوزن والسمنة.

الاستنتاج: كان انتشار زيادة الوزن والبدانة بين الرضع والأطفال الذين تتراوح أعمارهم بين ٦-٦٠ شهرا في الناصرية عالي. ويرتبط ارتباطا إيجابيا مع تناول منتجات الألبان وتعليم الأب.

النقاط الرئيسية: مدى، زيادة الوزن، السمنة، الأطفال.