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Haidy Mohamed Sobeeh
Department of Public Health and Community Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Safynaz Elsaid Shalaby
Department of Public Health and Community Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Walaa Mohamed Shehata
Department of Public Health and Community Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Moeness Moustafa Alshishtawy
Department of Public Health and Community Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Dr. Jignesh Singh
Department of Public Health and Community Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Corresponding Author:
Haidy Mohamed Sobeeh
Department of Public Health and Community Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Weight gain-associated behaviours among pre-school children in Tanta City Egypt

Haidy Mohamed Sobeeh, Safynaz Elsaid Shalaby, Walaa Mohamed Shehata and Moeness Moustafa Alshishtawy

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Abstract
Background: Obesity is a complex disease characterized by excess stored body fat compared with height, with adipose tissue dysfunction contributing to many of the metabolic consequences. The aim of this work was to study behaviors of pre-school children that affect weight gain and to study determinants of children's behaviors as regard encouraging or inhibiting healthy behaviors among pre-school Children.
Methods: This cross-sectional descriptive comparative study was carried out on 8 schools chosen by using "Simple Random Sampling": (Toosing method): four were located in urban areas and the other four were located in rural areas target population were children under 6 years old at the time of beginning the study registered in the selected 8 school nurseries.
Results: Children were divided into four groups: 112 were underweight, 411 were normal, 449 were overweight, and 198 were obese. (25.8%) of children delivered by Cesarean section, (35.4%) of children weaned at 1 year old, (10%) of children eating at the fixed time were obese, (52.8%) of children eating while watching TV, (92.6%) of children eating fast foods, (55.9%) of children sleeping less than 6 hours at night were overweight. There was a highly significant difference regarding playing exercise.
Conclusions: Behaviors that lead to increased risk of overweight and obesity in preschool children include preferring caesarean section, early weaning, escaping breakfast, eating while watching television, eating fast foods, sleep restriction or sleeping less than six hours at night, and presence of sleeping problems. Exercising has a great effect on controlling weight.

Keywords: Weight gain, pre-school children, Tanta, Egypt

Introduction
Childhood obesity, along with adult obesity, are two of the most important public health threats worldwide. It is noticed that obesity in preschool children is a growing problem and currently is receiving increasing attention being a predictor of adulthood obesity [1, 2].
The prevalence of childhood overweight and obesity increased from 4.2% in 1990 to 9.1% in 2020, affecting more than 1.5 billion and accounting for 0.7% to 2.8% of healthcare expenditures. However, the relative percentage change was higher in developing countries as it increased from 8.5% in 2010 to 12.7% in 2020. Similarly in Asia, the prevalence increased to 4.9% from 3.2% [2].
In 2015, excess body weight accounted for about four million deaths worldwide, and almost 70% of these deaths were due to cardiovascular diseases. Other chronic sequelae of obesity "in addition to cardiovascular disease "include diabetes mellitus, increased risk of malignancy or Musculo-skeletal disorders, and others. The incidence of cardio–metabolic comorbidities is higher for obese than for normal weight [3].
The World Health Organization (WHO) developed growth standards through the WHO Multi center Growth Reference Study to describe normal child growth from birth to 5 years under optimal environmental conditions. Obesity in children in not defined by an absolute number, but by a percentile. To establish a comparison of a set of anthropometric measurements with a reference standard, several scales can be used, the most common being the percentile and the Z score [4].
Childhood obesity is associated with multiple complications such as lipid metabolism disorders, hypertension, hyper insulinemia, hepatic steatosis, obstructive sleep apnea syndrome, chronic inflammation and psychological problems [5].

Egypt is one of the lower middles – income countries in which overweight and obesity among children constitutes an emerging concern and has increased from 6% to 15% between 1990 to 2010 [6].

In Egypt, several studies have examined the prevalence of childhood overweight and obesity in some region such as Cairo, Sohaj, Assiut, Menofia, Sharkia and Portsaid. However none of these studies have investigated the prevalence of overweight and obesity at different period of childhood [7].

Although The Egyptian Government invests 110 million dollars per year on The National School Feeding Program which reaches 12.5 million primary school pupils, yet thesis meals are calorie dense and are not in line with the recent recommendations of healthy foods. Foods being consumed from the school canteens are usually unhealthy, fast and packed foods with high saturated fat, sugar and salt. Such unhealthy dietary practices predispose to the rising pandemic of overweight and obesity [8].

So, in Egypt there is a need to develop strategies, from successful interventions, that can be used to develop national plans to control the problem of obesity. Dietary habits are also influenced by urbanized lifestyle, where marketing of fast foods and sugary beverage prevail [9].

The aim of this work was to study behaviors of pre-school children that affect weight gain and to study determinant of children behaviors as regard encouraging or inhibiting healthy behaviors among pre-school Children.

Patients and Methods

This cross sectional descriptive comparative study was carried out on 8 schools chosen by using "Simple Random Sampling": (Toosing method): four were located in urban areas and the other four located in rural areas target population were children under 6 years old at the time of beginning the study registered in the selected 8 school nurseries.

The study was done after approval from the Ethical Committee Tanta University Hospitals. An informed written consent was obtained from the relatives of the patients. From December 2021 to December 2022

Exclusion criteria were preschool children above 6 years old in the selected 8 schools, chronic diseases and receive medications that can affect weight, any genetic disorder, children whose mothers\caregivers refused to be interviewed in the study.

Methodology

Pre-test study: the questionnaire was tested before stating data collection on 40 preschool child and their home caregivers and school supervisor from two schools rural and urban that were not included in the study with the purpose of : testing and evaluating the adequacy of the designed questionnaire, to test clarity, reliability and acceptance of the questionnaire, estimating the time needed for filling the questionnaire and assessment of each study subject, determining the obstacles that might be met with during the execution of the study.

The study tools were tested for its content and face validity by jury test of three experts from Public Health and Community Medicine Department of Tanta Faculty of Medicine to evaluate the individual items as well as the entire tool as being relevant and appropriate to test what they wanted to measure.

Method of implementation

Data were collected through direct interviews with selected preschool children in the 8 schools and with their parents and the school supervisor to explain the study objectives, collect data and take measurements of the children.

The questionnaire was divided in to three parts

The First part: collecting data from the parent of the child mainly mothers about the child personal information, health, nutritional history and his eating, sleeping and activity behaviors,

Second part: Collecting data from the school supervisor about the school environment, school canteen and children nutrition, third part: Collecting data from the child about his food performance and assessment of the child nutritional status by measuring the child weight and height.

Children nutritional status assessment

Body mass index for age (BMI-for-age) was used to evaluate the children's nutritional status. BMI-for-age is calculated as the child's weight in kilograms divided by the square of height in meters. It is a specific, inexpensive, and easy-to-perform method of screening for weight categories that may lead to health problems.

Children's heights were measured accurately (according to Centers for Disease Control and Prevention (CDC) instructions) [10] at school to calculate BMI-for-age, as follows: taking off the child's shoes, heavy clothes, hair accessories, and unbraided hair to make the measuring easier, measuring the height against a level surface, such as a wall devoid of moulding, and on a surface that is not carpeted, having the child stand with feet flat, together, and against the wall. Making sure legs are straight, arms are at sides, and shoulders are level, verify that the youngster is gazing straight ahead and that their line of sight is parallel to the ground, measuring the kid when they are standing with their heels, buttocks, and head on a level surface (wall). All points may not contact the wall depending on the child's general body form, forming a right angle with the wall using a flat headpiece, then lowering the headpiece until it firmly hits the top of the head, ensuring the measurer's eyes are level with the headpiece, lightly outlining the wall's edge where the headpiece's bottom touches it. The height measurement is then obtained by measuring with a metal tape from the base on the floor to the stated distance on the wall, height was measured to within 0.1 centimeters.

Children's weights were measured accurately [according to Centers for Disease Control and Prevention (CDC) instructions] at school to calculate BMI-for-age, as follows: digital scale will be used and placed on firm flooring (such as tile or wood), the kid takes off their shoes and any bulky apparel, including sweaters, then stand with both feet in the centre of the scale, weight was recorded to the nearest decimal fraction (for example, 25.1 kilograms).

Children's BMIs were determined for them and represented as a percentile using growth charts for BMI-for-age were underweight: Less than the 5th percentile, healthy weight=5^{th} percentile to less than the 85^{th} percentile, overweight=85^{th} to less than the 95th percentile, obesity = or greater than the 95^{th} percentile.

Through the CDC Multicenter Growth Reference Study, the World Health Organization (WHO) created development criteria to characterize typical child growth.

Statistical analysis

Statistical analysis was done by SPSS v22 (IBM Corporation., Armonk, NY, USA). Quantitative variables were presented as mean and standard deviation (SD). Qualitative variables were presented as frequency and percentage (%), the Chi-square test (X2) was employed to compare two groups and more. When the predicted count is fewer than 5, the Fischer exact test was performed rather than the chi-square test. A two-tailed *p*-value < 0.05 was considered significant.

Results

There was a high significant difference regarding weight, height as boys weighted less and with more hight than girls, urban were shorter with more weight than rural. Table 1

Table 1: Distribution of the studied children as regards their anthropometric measures by grade and sex and by residence and sex.

				T test	P value
Weight (Per KG)	Boys (584)	Kg1	20.7±1.5	19.452	*p*< 0.001*
	Girls (622)	Kg1	22.5±1.7		
	Boys (584)	Kg2	22.6±1.6	37.801	*p*< 0.001*
	Girls (622)	Kg2	26.4±1.87		
Height (Per CM)	Boys (584)	Kg1	102.03±2.7	3.458	*p*< 0.001*
	Girls (622)	Kg1	102.5±1.98		
	Boys (584)	Kg2	109.9±3.1	3.042	*p*< 0.05*
	Girls (622)	Kg2	109.4±2.6		
Weight KG	Boys	Rural (246)	17.1±1.7	18.052	0.001*
		Urban (960)	19.5±1.9		0.001*
	Girls	Rural (246)	22.1±2.3	7.579	0.001*
		Urban (960)	23.7±3.1		
Height CM	Boys	Rural (246)	105.8±1.9	8.162	0.001*
		Urban (960)	105±1.2		0.001*
	Girls	Rural (246)	106.7±2.6	9.851	0.001*
		Urban (960)	105.3±1.8		

Data are presented as mean ± SD

There was high significant difference regarding residence and sex, mode of delivery, feeding type during early childhood, time of complete weaning, and almost all children were regularly vaccinated with no significant difference to their weight status. Table 2

Table 2: Distribution of the studied children as regards residence and grade, residence & sex, mode of delivery, feeding type during early childhood, time of complete weaning, vaccination history.

		Underweight (112)	Normal (411)	Over weight(449)	Obese (198)	test	P value
Kg1	Rural	7(5.9%)	82(68.3%)	12(10%)	19(15.8%)	100.012	0.001*
	Urban	46(10.7%)	93(21.7%)	199(46.4%)	91(21.2%)		
	Total	53(9.7%)	175(31.9%)	211(38.4%)	110(20%)		
Kg2	Rural	7(5.7%)	84(68.9%)	16(13.1%)	15(12.3%)	65.837	0.001*
	Urban	52(10.4%)	152(30.5%)	222(44.5%)	73(14.6%)		
	Total	59(9.5%)	236(38%)	238(38.3%)	88(14.2%)		
Grand total		112(9.6%	411(35.1%	449(38.4%	198(16.9%)	5.103	0.165
Boys	Rural	4(3.7%)	73(67%)	14(12.8%)	18(16.5%)	75.563	0.001*
	Urban	43(9.5%)	114(25%)	213(46.8%)	85(18.7%)		
	Total	47(8.3%)	187(33.2%)	227(40.2%)	103(18.3%)		
Girls	Rural	10(7.5%)	93(70%)	14(10.5%)	16(12%)	84.869	0.001*
	Urban	55(11.6%)	131(27.7%)	208(44%)	79(16.7%)		
	Total	65(10.7%)	224(37%)	222(36.6%)	95(15.7%)		
Grand total		112(9.6%)	411(35.1%)	449(38.4%)	198(16.9%)	5.103	0.165
Mode of delivery	Normal vaginal	39(7.2%)	328(60.9%)	137(25.4%)	35(6.5%)	301.958	0.001*
	C. S	73(11.6%)	83(13.2%)	312(49.4%)	163(25.8%)		
	Total	112(9.6%)	411(35.1%)	449(38.4%)	198(16.9%)		
Feeding type	Exclusive breast feeding	24(5.3%)	336(74.5%)	68(15.1%)	23(5.1%)	516.858	0.001*
	Artificial feeding	55(13.3%)	64(15.5%)	203(49%)	92(22.2%)		
	Mixed feeding	33(10.8%)	11(3.6%)	178(58.4%)	83(27.2%)		
Weaning time	At 1 year	41(20%)	13(6.3%)	79(38.3%)	73(35.4%)	707.50	0.001*
	At 1 to 1.5 year	28(9.7%)	12(4.2%)	209(72.6%)	39(13.5%)		
	At 1.5	11(2.6%)	281(65.5%)	104(24.2%)	33(7.7%)		
	At 1.5 to 2 year	32(13%)	105(42.5%)	57(23%)	53(21.5%)		
vaccination history	Regular	112(100%)	411(100%)	449(100%)	198(100%)		
	Not vaccinated	0	0	0	0		

Data are presented frequency (%).

There was high significant difference regarding, type of feeding, eating time, eating the three main meals throughout the day, place of eating breakfast, eating behaviours, eating while watching T.V, eating fast foods, Opinion of mothers about the foods eaten by their children. Table 3

Table 3: Distribution of the studied children as regards, type of feeding, eating time, eating the three main meals throughout the day, regards place of eating breakfast, eating behaviors, eating while watching T.V, eating fast foods, Opinion of mothers about the foods eaten by their children.

		Underweight	Normal	Overweight	Obese	Test	P value
type of feeding	Dependent	39(8.5%)	197(43.1%)	132(28.9%)	89(19.5%)	34.928	0.001*
	Independent	73(10.2%)	214(30%)	317(44.5%)	109(15.3%)		
eating time	Fixed	47(8.9%)	287(54.1%)	143(27%)	53(10%)	160.541	0.001*
	Not fixed	65(10.1%)	124(19.4%)	306(47.8%)	145(22.7%)		
	Total	112(9.6%)	411(35.1%)	449(38.4%)	198(16.9%)		
eating the three main meals	Eating three main meals\day	23(3.7%)	311(49.6%)	163(26%)	130(20.7%)	195.301	0.001*
	Not eating three main meals\day	89(16.4%)	100(18.4%)	286(52.7%)	68(12.5%)		
place of eating	At home	31(6.2%)	279(55.8%)	109(21.8%)	81(16.2%)	179.368	0.001*
	Outside	81(12.1%)	132(19.7%)	340(50.7%)	117(17.5%)		
behavior	Eating healthy snacks between meals	42(4.9%)	396(46%)	253(29.4%)	169(19.7%)	266.831	0.001*
	Eating unhealthy snacks between meals	70(22.6%)	15(4.8%)	196(63.2%)	29(9.4%)		
eating while watching T.V	Eating while watching T.V.	79(11.2%)	104(14.7%)	373(52.8%)	150(21.3%)	332.321	0.001*
	Not eating while watching T.V.	33(7.1%)	307(66.2%)	76(16.4%)	48(10.3%)		
	Total	112(9.6%)	411(35.1%)	449(38.4%)	198(16.9%)		
eating fast foods	Not eating fast foods	22(19.6%)	343(83.5%)	33(7.4%)	20(10.1%)	634.42	0.001*
	Eating fast foods	90(80.4%)	68(16.5%)	416(92.6%)	178(89.9%)		
	Eating fast foods one time per week	28(25%)	11(2.6%)	246(54.7%)	13(6.6%)		
	Eating fast foods two times per week	47(42%)	41(10%)	93(20.7%)	69(34.8%)		
	Eating fast foods three times/week	12(10.7%)	10(2.4%)	56(12.5%)	73(36.9%)		
	Eating fast foods four times /week	3(2.7%)	6(1.5%)	21(4.7%)	23(11.6%)		
Opinion of mothers about the foods eaten by their children							
their children eating healthy foods		30(26.8%)	272(66.2%)	147(32.7%)	27(13.6%)	191.439	0.001*
Easy to change food kinds		74(66.1%)	277(67.4%)	367(81.7%)	172(86.9%)	43.742	0.001*

Data are presented as frequency (%).

There was high significant difference regarding sleeping hours at night, sleeping problems, sleeping habits. Table 4

Table 4: Distribution of the studied children according to their sleeping behaviors, sleeping hours at night, sleeping problems, sleeping habits.

		Underweight [112]	Normal [411]	Overweight [449]	Obese [198]	Test	P value
Sleeping behavior	Sleep early	89(79.5%)	389(94.6%)	271(60.4%)	62(31.3%)		
	Sleep alone in his room	78(69.6%)	259(63%)	247(55%)	181(91.4%)		
sleeping hours at night	Sleeping6 hours or Less at night	86(12.7%)	99(14.7%)	377(55.9%)	113(16.7%)	464.708	0.001*
	Sleeping more than 6 hours at night	26(5.3%)	312(63%)	72(14.6%)	85(17.1%)		
Sleeping problems	No problem	57(12.9%)	289(65.5%)	78(17.7%)	17(3.9%)	365.239	0.001*
	Difficulty falling asleep	0	0	0	0		
	Waking in middle night	33(8.9%)	81(21.9%)	159(43%)	97(26.2%)		
	Difficult in waking up	22(6.1%)	41(11.4%)	212(59.1%)	84(23.4%)		
Sleeping habits	Not sleeping during the day	93(13.2%)	210(29.9%)	236(33.5%)	165(23.4%)	277.902	0.001*
	Sleeping during the day	19(4.1%)	201(43.1%)	213(45.7%)	33(7.1%)		
	Sleeping half an hour during the day	8(7.6%)	63(60%)	24(22.9%)	10(9.5%)		
	Sleep one hour during the day	7(3.3%)	123(57.2%)	73(33.9%)	12(5.6%)		
	Sleep more than one hour during the day	4(2.7%)	15(10.3%)	116(79.5%)	11(7.5%)		
	Total	112(9.6%)	411(35.1%)	449(38.4%)	198(16.9%)		

Data are presented as frequency (%).

There was a high significant difference regarding Practicing exercise, favourite sports, Places of practicing sports. Table 5

Table 5: Distribution of the studied children as regards Practicing exercise, favorite sports, Places of practicing sports.

		Underweight	Normal weight	Overweight	Obese	Test	P value
Practicing exercise	Playing exercise	25(5.7%)	278(63%)	92(20.9%)	46(10.4%)	243.418	0.001*
	Not playing exercise	87(11.9%)	133(18.2%)	357(49%)	152(20.9%)		
	Total	112(9.6%)	411(35.1%)	449(38.4%)	198(16.9%)		
Favorite sports	Running	1(4.4%)	10(43.5%)	7(30.4%)	5(21.7%)	50.692	0.001*
	Swimming	5(3.7%)	108(81.2%)	17(12.8%)	3(2.3%)		
	Tennis	3(4.6%)	54(83.1%)	5(7.7%)	3(4.6%)		
	Football	16(7.3%)	106(48.2%)	63(28.6%)	35(15.9%)		
	Total	25(5.7%)	278(63%)	92(20.9%)	46(10.4%)		
Place of practicing sports	At home	9(11.6%)	11(14.3%)	26(33.8%)	31(40.3%)	128157	0.001*
	At club	16(4.4%)	267(73.4%)	66(18.1%)	15(4.1%)		
	Total	25(5.7%)	278(63%)	92(20.9%)	46(10.4%)		

Data are presented as frequency (%).

Almost all schools in the study have courtyard and there was specific sports offered by this schools to their children. There was canteen in all of them and offered one free meal at the middle of school day by supervision of the schools. All meals offered by studied schools were containing carbohydrates, there was 3 weekly classes of physical activity in almost all studied schools and also sports offered by schools in which children participate.

Table 6: characteristics of the school's environment, Types of foods available at the school canteen, Sorts of Physical activities at schools**.**

	Rural (4 schools)	Urban (4 schools)
Schools' environment		
Courtyard in school	All	All
Weekly classes of sport	3	3
Specific sports offered by schools	All	All
Participation of children in tournament	All	All
Canteen in schools	All	All
Free meals	All	All
Supervision of school	All	All
Number of meals available	1	1
Time of eat meal	Middle of day in all schools	Middle of day in all schools
Types of foods available at the school canteen		
Meals contain vegetables	No in all	No in all
Meals contain carbohydrates	Yes, in all	Yes, in all
Meals contain protein	No in all	No in all
Sorts of Physical activities at schools		
Weekly classes of physical activity	3	3
Practicing sports at schools	Yes, in all	Yes, in all
Participation in school tournaments	Yes, in all	Yes, in all

Discussion

Childhood obesity is a problem that affects every country on the planet. One of the biggest public health problems of the twenty-first century has been called a "ticking time bomb" [11].

This study showed a high statistical difference in weight of boys and girls. In every continent, obesity prevalence is greater in women than in males and this came in agreement with the study of Hoe [12] who discovered that the body fat distribution and control of energy homeostasis between men and women differs.

Based on anthropometric measurements the mean weight of urban children was greater than that of rural children, according to the current study, which indicated a statistically significant difference between rural and urban children.

This result came in agreement with the study done by Ayse Ozcan [13] who found that children living in urban areas were more likely to be obese than those in rural ones.

In the present study, the findings indicated that the majority of overweight and obese children were delivered by cesarean section (CS) as caesarean section is associated with increased the risk of childhood overweight and obesity. This came in agreement with study done by Sitarik [14] who found that children born via Cesarean section have a higher risk of obesity. This came with agreement of a study done by Aneta Słabuszewska-Jóźwiak [15] who found As compared to infants born vaginally, those delivered through caesarean section were more likely to develop obesity and asthma symptoms.

The current study showed a significant difference between different types of child feeding as the numbers of overweight and obese children were higher in artificial feeding and mixed feeding than breast feeding also between groups as regard to time of complete weaning the number of overweight and obese children was higher on weaning at 1 year.

This result came in agreement with the study conducted by Cheshmeh [16] who found that Anthropometric measurements including birth and 24th -month head circumferences, 24th -month weight, and 24th -month height are all lower in breastfed newborns than in formula- and mix-fed infants. Also Kuhle and his collages [17] found that early weaning is related to rapid weight gain in infancy.

According to eating behaviors, there was a significant increase in overweight and obese children's numbers in non- fixed eating time than fixed eating time and increase in

number of obese children not eating breakfast at home. This came in similarity with Ana Kawalssec [18] who found that breakfast is often taken at home, and school-aged children's diets are mostly influenced by parental decisions.

This result also came in agreement with the study done by Diana and her collages who made a Cross-sectional study that suggested possible associations between food insecurity and overweight in children.

According to the present study most overweight and obese children eat while watching television. This came in agreement with Garmy and his collages [19] who found that preschool children with high screen time had fewer sleep hours than those with low screen time. They postulated that extended use of computers and television may result in less sleep and weight increase.

The current study showed that the number of obese and overweight children who eat fast foods was more than number of overweight and obese children not eating fast foods.

The result are similar to those of Cobiac and his collages [20] who showed that taxing unhealthy foods and providing them at higher prices could reduce the demand from most children and adolescent and it played a major role in preventing childhood and adolescent obesity.

In the current study there was a significant difference between the two groups as regards eating habits in which eating processed meat, sweets and carbonated water is more risky to overweight or obesity and this came in agreement with the study done by Emily Wolff and his collaged [21] who showed that sugar-sweetened soft drinks can cause weight gain. The same was noticed by Grimes [22] who found that children drinking SSB were more likely to be overweight.

The study done by Davis and his colleagues [23] showed that high intake of SSBs in children with obesity was linked to increases in obesity prevalence. On the contrary, no SSB intake was associated with a 28% reduction in obesity prevalence.

In the present study, the results showed a substantial reduction in the proportion of overweight and obese children who sleep early compared to those who don't, the balance of psychological, emotional, and physical health depends on the process of sleep.

This came in agreement with the study of Boege [24] who found that insufficient sleep is one of the stressors to metabolic health and is associated with adverse health outcomes, including an increased risk for the development of obesity.

The current study showed that most overweight and obese children sleep less than 6 hours at night. This came in agreement with the study done by Miller [25] who found that short sleep duration is associated with increased risk of obesity in children, And in agreement with Lian Li who found that short sleep duration increased the risk of childhood obesity.

The present study showed that most of obese and overweight children were having sleeping problems as poor quality of sleep is a substantial independent risk factor for childhood obesity. These results are similar to those shown in the study of Reynaud [26] who found that that higher quantity of sleep is associated with better behavioral and cognitive outcomes in preschool children.

The results of the present study showed a significant increase among obese and overweight children's numbers who were not doing exercises in comparison with others who were doing exercises. This came in agreement with the results of the study conducted by Calcaterra [27] who found that physical activity (PA) is a crucial factor in the fight against overweight and obesity and related complications.

The current study showed that the number of obese children was significantly lower in children who play exercise at the club than children who play exercise at home as outdoor sports are associated with a range of positive health benefits. Recent studies have demonstrated that a broad range of outcomes are related to contact with nature, including increased physical activity, reduced obesity, decreased stress, and improved mental health [28].

This came in agreement with the study of Labree [29] who found that children who had at least 2 hours of outdoor play were at lower risk of being overweight or obese compared with children who didn't have outdoor play.

It was recommended that health authorities should work hard to increase the awareness of doctors and mothers about the benefits of normal vaginal delivery to decrease the high rate of cesarean section, health educators should encourage mothers to promote exclusive breast feeding in the first 6 months and delay weaning and explain to them the proper method of healthy weaning, habit of frequent 'eating out' and 'fast food' should be discouraged.

Conclusions

In the current study, urban children were more liable to be obese in comparison with rural children due to differences in eating habits. The prevalence of overweight and obesity is increasing in preschool children. Behaviors that lead to increased risk of overweight and obesity in preschool children include preferring caesarean section, early weaning, and escaping breakfast, eating while watching television, eating fast foods, sleep restriction or sleeping less than six hours at night. In addition, the presence of sleeping problems is associated also with higher risk of obesity, exclusive breast milk and adopting fixed time for the three meals per day decreases to a great extent the risk of obesity. Certainly, exercising has a great effect on controlling the weight of preschool children.

Conflict of Interest

Not available

Financial Support

Not available

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