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Survey of Food Habits and Daily Food Intake For Kindergarten According to (BMI)

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Abstract

This study was undertaken to construct percentile curves of food habits , cut off points for daily energy intake according to body mass index (BMI) of kindergarten children in Damietta,. In this study measuring height, weight and BMI for fifty two children aged 4-6 years, then make questionnaires for the food habits, and questionnaires to track the child's energy intake per day, during 2014. Obtained results indicated that: 3.8% were underweight, 67.3% were in normal weight, 19.2% were in overweight, and 9.6% were in obesity, The study also proved that no relationship between BMI in children and energy expenditure per day, all the children in underweight 2 (3.8%) and the most of the children in normal weight 15 (28.8%) expenditure more than 1400 kcal per day, the most of the children in overweight and obesity 7 (13.5%), 3(5.8%) respectively expenditure from 1000 to 1400kcal per day. This need to reconsidering of the different reasons for children overweight and obesity in all age stages.

Key Words: food habits - child obesity – energy intake

Introduction

Obesity is a major public health crisis among children and adults (**Centers for Disease Control and Prevention, Overweight and obesity., 2010; Theodore et al., 2009**) . Body mass index (BMI), a measure of weight with relation to height, is not only used as an outcome measure to determine obesity but also as a useful anthropometric index

for cardiovascular risk. For children between 2 and 19 years, Childhood obesity is defined as a BMI at or above 95th percentile for children of same age and sex. Classifications of obesity in children depend upon the body composition of the child, as it varies with respect to age and sex of the child (**Centers for Disease Control and Prevention, Overweight and obesity.,2009**).

Main meals are often defined as eating breakfast, lunch and dinner (**Mota et al., 2008**). Researchers have regarded skipping breakfast as a behavior associated with the risk of becoming overweight during adolescence (**Croezen et al., 2009**), (**Berkey et al., 2003**). Eating breakfast on a regular basis together with a regular meal pattern have in cross-sectional studies been shown to be associated with lower risk for overweight and obesity among children and adolescents (**Szajewska and Ruszczynski; 2010**), (**Vik et al; 2010**).

Also **Mei et al (1998)** A survey of nutritional knowledge-attitude-practice was conducted among 1300 preschool children, their parents, 203 teachers and nurses in Kindergarten in 1997. Results showed that the food habit of preschool children was unsuitable. From statistic analysis among affecting factors, the mother's and teachers' nutritional knowledge and the food habit of parents had significant effect on food habit of preschool children.

Breakfast has been labeled the most important meal of the day, but are there data to support this claim? Evidence suggests that breakfast consumption may improve cognitive function related to memory, test grades, and school attendance Breakfast as part of a healthful diet and lifestyle can positively impact children's health and well-being (**Rampersaud et.al., 2005**)

Also **Patricia (2015)** Although, most of the children were used to having daily breakfast, the study however underscores the need to further educate parents about the importance of giving healthful breakfasts to their children consisting a variety of foods needed for energy, growth and learning.

Laura et.al (2014) investigated the relationship of out-of-home eating frequency with beliefs about obesity causes, support to healthy eating policies, and with socio-demographic factors. from Belgium, Denmark, Italy, Poland and United Kingdom, of both sexes, the results

showed out-of-home eating varied with gender, age, marital status, education, BMI, and by country.

Emotional eating is a problematic and common behavior, empirical documentation of this phenomenon is not as extensive. Recognition of this common behavior as troublesome is evidenced by recurring scenes in television shows and movies when someone (particularly a female) is sad or stressed, is shown devouring far more food than is physiologically necessary. It may be a whole box of candy, an entire bag of chips, a carton of ice cream, or all of the above. Not just in the media, but in everyday life, we often see people eating in an attempt to deal with stressful situations, bad news and/or moods (**SELENA et al., 2009**).

Children are prone to sedentary lifestyle such as watching television, consuming more energy-dense foods or snacks with large portion sizes, and having reduced physical activity, giving rise to obesity. The television advertisements of energy-rich and sugar-rich foods influence children to make unhealthy choices. These unhealthy food choices may lead to weight gain and obesity (**Centers for Disease Control and Prevention, Overweight and obesity.,2009**).

Soft drink consumption has become a highly visible and controversial public health and public policy issue. Soft drinks are viewed by many as a major contributor to obesity and related health problems and have consequently been targeted as a means to help curtail the rising prevalence of obesity, particularly among children. Soft drinks have been banned from schools in Britain and France, and in the United States, school systems as large as those in Los Angeles, Philadelphia, and Miami have banned or severely limited soft drink sales. Many US states have considered statewide bans or limits on soft drink sales in schools, with California passing such legislation in 2005 (**Lenny et al., 2007**).

Family mealtimes are an important opportunity to develop strong parent and child relationships and a sense of family connectedness and belonging. Research focusing on the importance of family meals affirms the positive outcomes learned from time spent around the family dinner table. This simple family activity has a significant impact on family communication and functioning, the development of healthy eating patterns in children, and improved literacy and school performance in

school-age and teen students, and it also acts as a significant protective factor in reducing the risk for adolescent mental health problems and addiction(Susan.,2014).

This work aimed to: recognize food habits,and daily food intake according to body mass index for children aged 4-6 years.

Subjects and Methods

The random sample was 52kindergarten children from 4:6yearsaged. Theyselected from Damietta Government.

The study Contains four Questionnaires; **Questionnaire(1):**indicate general data: name and ageof 52 children. **Questionnaire(2):**indicate anthropometric measurements: height (cm), weight(k.g), and body mass index (BMI). **Questionnaire(3):** for 52 mothers children to recognize food habits. **Questionnaire(4):**indicate twenty four hour recall to recognize foods consumed during 24 hour.

Height and weight were measured to the nearest 0.1 cm and 0.1 kg, respectively.

BMI as an indicator of obesity was calculated according to the following formula:

$$\text{BMI} = \frac{\text{Weight (Kg)}}{\text{Height (m}^2\text{)}} \div \text{Height (m}^2\text{)}$$

The grades of obesity utilizing the BMI are described as in (Table 1)

Table 1: The grade of obesity utilizing the BMI.

Weight Status Category	Percentile Range
Underweight	Less than the 5th percentile
Healthy weight	5th percentile to less than the 85th percentile
Overweight	85th to less than the 95th percentile
Obese	Equal to or greater than the 95th percentile

The National Center for Health Statistics in collaboration and the National Center for Chronic Disease Prevention and Health Promotion (Blumberg et al.,2002).

All measurements were taken twice, and the two measurements were averaged for analysis.(Qiang et al., 2014).

Result and Discussion

Table 2 and fig.1 showed that frequency and distribution of Body mass index.

It is noted that 2 of the children (3.8%) were underweight, 35 children (67.3%) were in normal weight, 10 children (19.2%) were in overweight, and 5 children (9.6%) were in obesity, total of overweight and obesity were 15 cases (28.8%).

In this respect (Shaheen et al., 2004) reported that prevalence of obesity in children of normal height (1.2 percent of males and 2.1 percent of females), male and female preschool children were overweight, compared with 2.3 percent of male and 2.9 percent of female normal-height children.

On the other hand (Xiao et al., 2015) examined the trends in the prevalence of overweight and obesity among preschool children from 2006 to 2014. A total of 145,078 children aged 3-6 years from 46 kindergartens using standardized methods. Z-scores for weight, height, and BMI were calculated based on the standards for the World Health Organization (WHO) child growth standards. Result: from 2006 to 2014, mean values of height z-scores significantly increased among children from 4 to 6 years old. Between 2006 and 2014, there were prevalence of obesity (BMI z-scores >2 SD) increased from 8.8% in 2006 to 10.1% in 2010, and then kept stable until 2014 among 5-6 years children.

Table (2): Frequency distribution of Body mass index (BMI).

BMI	Under weight		Normal weight		Over weight		Obesity	
	N	%	N	%	N	%	N	%
	2	3.8%	35	67.3%	10	19.2%	5	9.6%

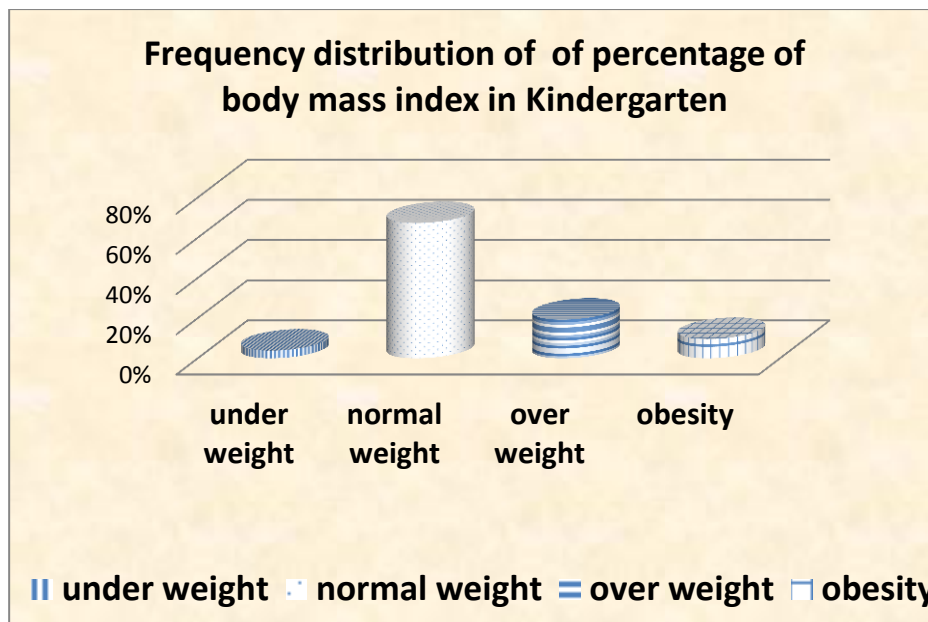


Fig.(1): Frequency distribution of Body mass index (BMI).

N: number of children.

Table 3 and fig.2 showed that frequency and distribution of meals taken all the day.

The result showed that,only one case (1.9%),16 cases (30.8%), 3 cases (5.8%) and 0 (0%) of childreneatsthree meals dailywere under weight, normal weight, overweight, and obesity respectively, 0 (0%),12 (23.1%), 4 (7.7%) and 4 (7.7%) of childrenskipping dinner daily were under weight, normal weight, overweight, and obesity respectively, 1 (1.9%),7 (13.5%), 2 (3.8%) and 1 (1.9%) of childrenskipping breakfast daily were under weight, normal weight, overweight, and obesity respectively, although no child skipping lunch daily except 1 (1.9%) were overweight. The most of overweight, and obesity children was4 (7.7%) eats daily breakfast-lunch. The most ofchildren eat less than three meals per day (61.5%).

These results are in harmonizing with these observed by(Nyaruhucha et al; 2006) noted thatthe study was undertaken to assess the nutritional status and feeding practices of <5 year children among the pastoral communities of Simanjiro district, northern Tanzania. Anthropometric measurements using weight-for-age criterion

were employed to assess the nutritional status. The study showed that 31% of the children were undernourished, some (6%) of them severely. reported to eat less than three meals per day (75%).

Table (3): Frequency distribution of meals taken all the day.

Meals taken all day long	Under weight		Normal weight		Over weight		Obesity	
	N	%	N	%	N	%	N	%
Eating three meals	1	1.9%	16	30.8%	3	5.8%	0	0%
Skipping breakfast	1	1.9%	7	13.5%	2	3.8%	1	1.9%
Skipping dinner	0	0%	12	23.1%	4	7.7%	4	7.7%
Skipping lunch	0	0%	0	0%	1	1.9%	0	0%

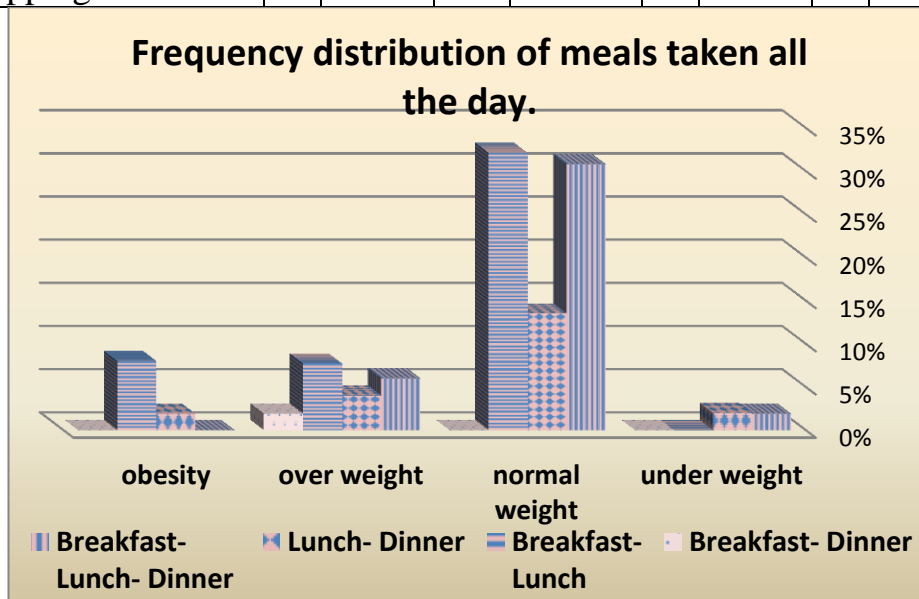


Fig.(2): Frequency distribution of meals taken all the day

N: number of children.

Table 4 and fig.3 showed that frequency and distribution of eating breakfast daily.

The result showed that, one case (1.9%), 13 cases (25%), 3 cases (5.8%) and 4 cases (7.7%) of children eating breakfast daily were under weight, normal weight, overweight, and obesity respectively, one case (1.9%), 20 cases (38.6%), 6 cases (11.5%) and 0 cases (0%) of children eating breakfast sometimes were under weight, normal weight, overweight, and obesity respectively, no one eating breakfast few times, 0 cases (0%), 2 cases (3.8%), one case (1.9%) and one case (1.9%) of children don't eat breakfast were under weight, normal weight, overweight, and obesity respectively. The most of overweight children eat breakfast sometimes. The most of obesity children eat breakfast daily. The most of children don't eat breakfast daily (59.6%).

This finding are in agreement with **(Küpers et.al; 2014)** they examined the association between breakfast skipping and objectively measured overweight at the age of 2 (n=1488) and 5 (n=1366) years. At 2 years, 124 (8.3%) children were overweight and 44 (3.0%) did not eat breakfast daily. At 5 years, 180 (13.2%) children were overweight and 73 (5.3%) did not eat breakfast daily. Breakfast skipping in 2- and 5-year-olds is rare in the Netherlands. We found no association between skipping breakfast and overweight, neither at age 2 (odds ratio (OR): 1.85 nor at age 5 . Also the type of breakfast was not related to overweight at 5 years. An explanation for this finding might be that skipping breakfast is not (yet) an issue in these children.

Table (4): Frequency distribution of eating breakfast daily.

Eating breakfast daily	Under weight		Normal weight		Over weight		Obesity	
	N	%	N	%	N	%	N	%
Yes	1	1.9%	13	25%	3	5.8%	4	7.7%
Sometimes	1	1.9%	20	38.6%	6	11.5%	0	0%
Rarely	0	0%	0	0%	0	0%	0	0%
No	0	0%	2	3.8%	1	1.9%	1	1.9%

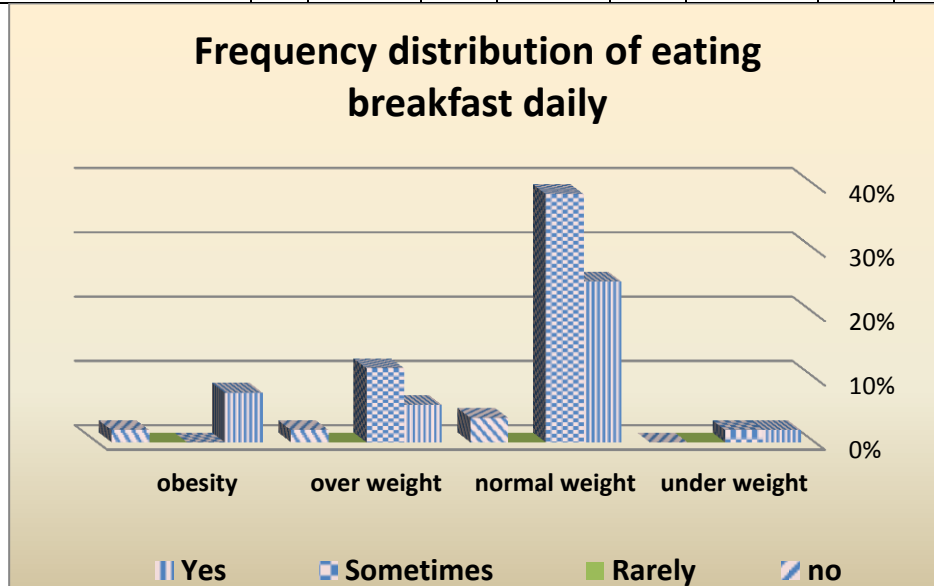


Fig.(3): Frequency distribution of eating breakfast daily.

N: number of children.

Table 5 and fig.4 showed that frequency and distribution of eating out of home

The result showed that,one case (1.9%), 12 cases (23.1%), 3 cases (5.8%) and 2cases (3.8%) of children don't eat out of home were under weight, normal weight, overweight, and obesity respectively,one case (1.9%), 23 cases(44.2%), 7 cases(13.5%) and 3 cases (5.8%) of children sometimes eating out of home were under weight, normal

weight, overweight, and obesity respectively, no one eating out of home all the times.

These values were nearly equals that of (Ilana and Rosely; 2010) they using a complex sample of 48,470 Brazilian households, selected from the 2002-2003 Household Budget Survey (HBS) was analyzed. Out-of-home eating was defined as the purchase of at least one type of food for consumption out of the home during seven days. Frequencies of out-of-home eating were estimated according to age, sex, level of education, monthly per capita household income, number of residents per household, Brazilian regions, result: frequency of out-of-home eating was 35%, being higher in the Southeast region (38.8%) and lower in the North region (28.1%) of Brazil.

Table (5): Frequency distribution of eating out of home.

BMI Eating out of home	Under weight		Normal weight		Over weight		Obesity	
	N	%	N	%	N	%	N	%
No	1	1.9%	12	23.1%	3	5.8%	2	3.8%
Sometimes	1	1.9%	23	44.2%	7	13.5%	3	5.8%
Yes	0	0%	0	0%	0	0%	0	0%

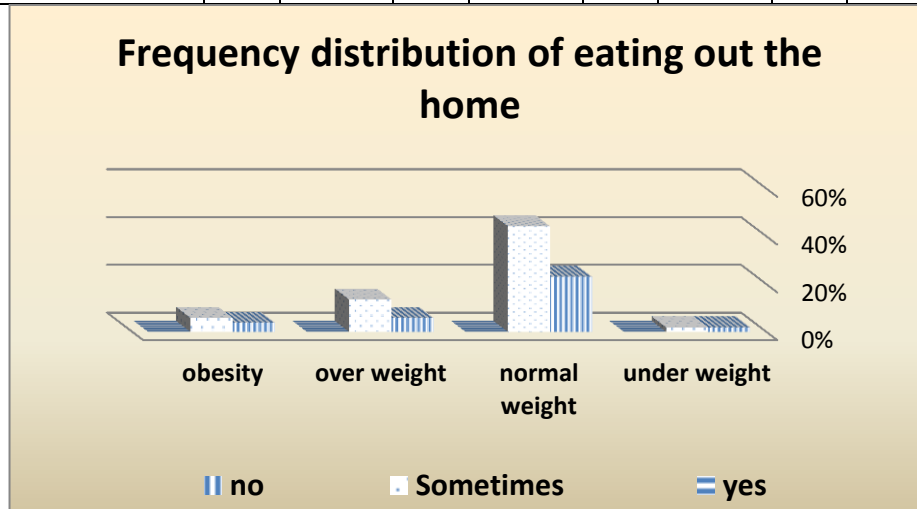


Fig.(4): Frequency distribution of eating out of home.

N: number of children.

Table 6 and fig.5 showed that frequency and distribution of eat in tension or boring.

The result showed that,2 cases (3.8%), 31 cases (59.7%), 8 cases (15.4%) and 3 cases (5.8%) of children don't eat in tension or boring were under weight, normal weight, overweight, and obesity respectively,0cases(0%), 3 cases (5.8%), 2 cases (3.8%) and 2 cases (3.8%)of children sometimes eating eat in tension or boring were under weight, normal weight, overweight, and obesity respectively, no one eating in tension or boring except one case (1.9%) were in normal weight. The most of the children don't eat in tension or boring (84.6%).

Table (6): Frequency distribution of eat in tension or boring.

Eat in tension or boring	Under weight		Normal weight		Over weight		Obesity	
	N	%	N	%	N	%	N	%
No	2	3.8%	31	59.7%	8	15.4%	3	5.8%
Sometimes	0	0%	3	5.8%	2	3.8%	2	3.8%
Yes	0	0%	1	1.9%	0	0%	0	0%

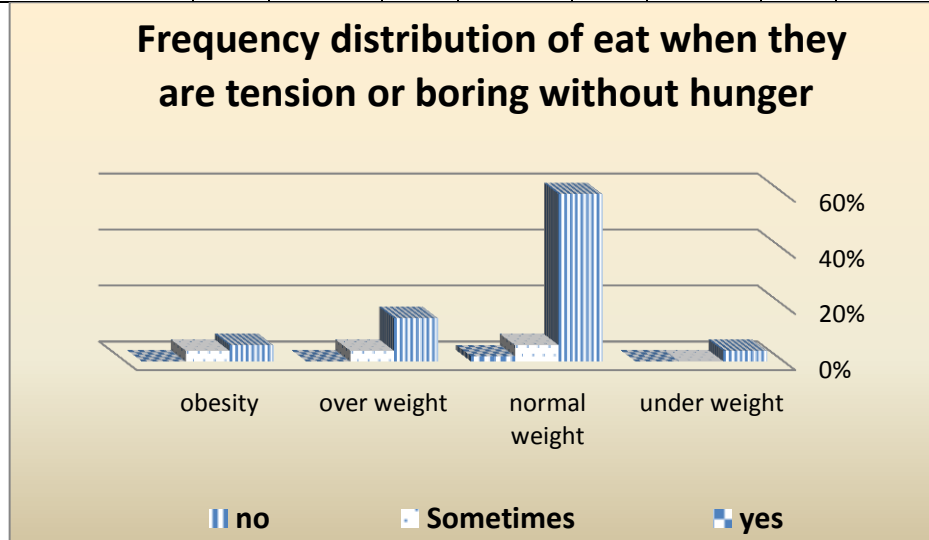


Fig.(5): Frequency distribution of eat in tension or boring .
N: number of children.

Table 7 and fig.6 showed that frequency and distribution of main meal intake daily.

The result showed that,one case (1.9%), 4 cases (7.7%), one case(1.9%), and 2 cases (3.8%) of childreaneating breakfast as a main meal intake dailywere under weight, normal weight, overweight, and obesity respectively,one case (1.9%), 31 cases (59.7%), 9 cases (17.3%), and3 cases (5.8%) of childreaneating lunch as a main meal intake daily were under weight, normal weight, overweight, and obesity respectively, no child eats dinner as a main meal intake daily. The most of children (84.6%) eats lunch as a main meal intake daily.

Table (7): Frequency distribution of daily main meal intake.

BMI Main meal intakedaily	Under weight		Normal weight		Over weight		Obesity	
	N	%	N	%	N	%	N	%
Breakfast	1	1.9%	4	7.7%	1	1.9%	2	3.8%
Lunch	1	1.9%	31	59.7%	9	17.3%	3	5.8%
Dinner	0	0%	0	0%	0	0%	0	0%

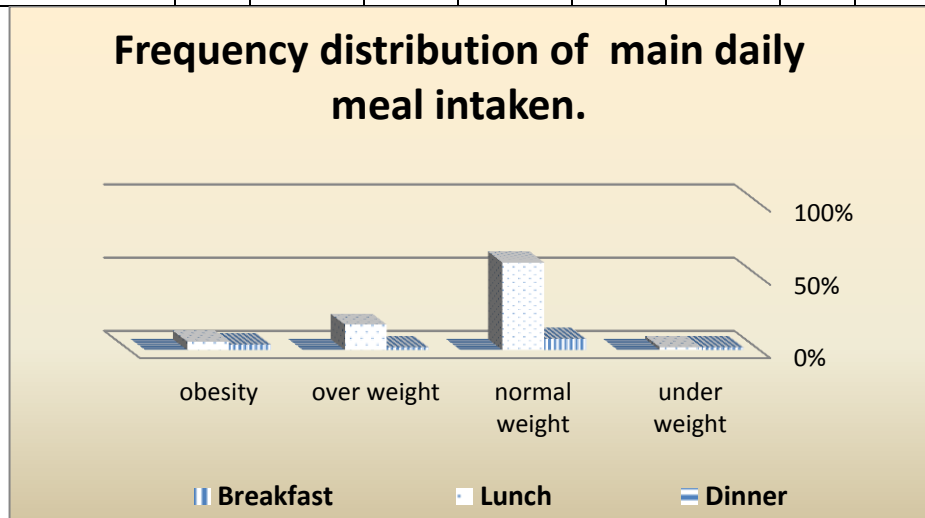


Fig.(6): Frequency distribution of daily main meal intake.

N: number of children.

Table 8 and fig.7 showed that frequency and distribution of preferred place to eat

The result showed that, 2cases(3.8%), 13 cases (25.1%), 2 cases (3.8%), and one case (1.9%) of childreaneating in the dining room

were under weight, normal weight, overweight, and obesity respectively, 0 cases (0%), 21 cases (40.4%), 8 cases (15.4%), and 4 cases (7.7%) of children eating in front of TV were under weight, normal weight, overweight, and obesity respectively, no one eating in the other place except one case (1.9%) were in normal weight. The most of the children (63.5%) eating in front of the TV.

In this respect (Salmon et al; 2006) examined that whether children's television viewing may be a useful indicator of risk of obesity-promoting versus healthy eating behaviors, low-level physical activity (PA) and overweight or obesity among children of primary school entry and exit ages. 1560 children (613 aged 5–6 years [50% boys], from 24 primary schools in Melbourne, Australia, randomly selected proportionate to school size between 1 November 2002 and 30 December 2003 .results: after adjusting for the age and sex of child, the parents' level of education, clustering by school, and all other health behavior variables, children who watched television for > 2 h/day were significantly more likely than children who watched television for ≤ 2 h/day to.

Table (8): Frequency distribution of preferred place to eat.

Preferred place to eat \ BMI	Under weight		Normal weight		Over weight		Obesity	
	N	%	N	%	N	%	N	%
In the dining room	2	3.8%	13	40.4%	2	3.8%	1	1.9%
In front of TV	0	0%	21	40.4%	8	15.4%	4	7.7%
Other place	0	0%	1	1.9%	0	0%	0	0%

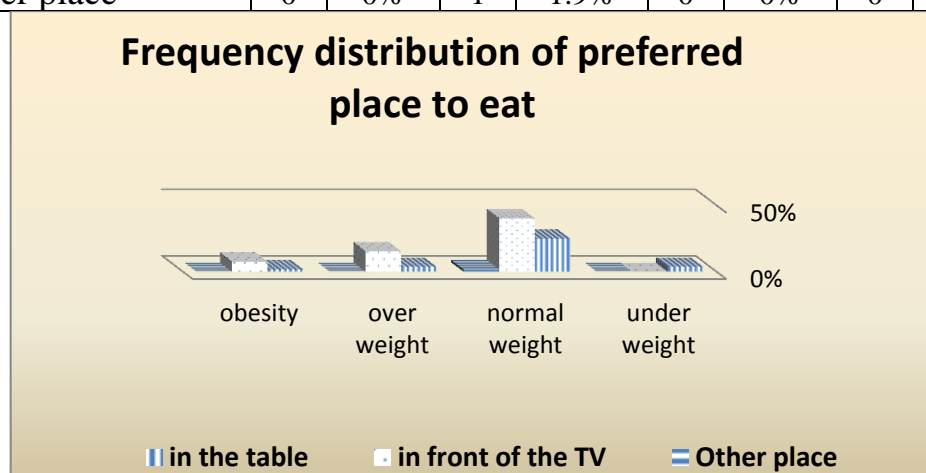


Fig.(7): Frequency distribution of preferred place to eat.

N: number of children.

Table 9 and fig.8 showed that frequency and distribution of soda drinking weekly.

The result showed that, 2 cases(3.8%), 17 cases(32.8%), one case (1.9%), and 2 cases(3.8%) of children don't drink any soda weekly were under weight, normal weight, overweight, and obesity respectively, 0 cases (0%), 18 cases (34.6%), 9 cases (17.3%), and 3 cases (5.8%) of children drinking 1 liter of soda weekly were under weight, normal weight, overweight, and obesity respectively, no one of children drinking more than 1 liter.

These results are in harmonizing with these observed by (Karina et al; 2006) they examined parental feeding practices with preschool children consumption of sugar-sweetened beverages (SSB) which included (juice drinks, soda) among children with SSB intake in their food recalls (consumers). Among consumers, median total child intake of SSB was 8.7 oz/day, while juice drinks and soda were 6.7 oz/day and 5.4 oz/day, respectively. SSB and juice drinks intakes were not associated with child's BMI percentile.

Table (9): Frequency distribution of soda drinking weekly.

Soda drinking weekly	BMI		Under weight		Normal weight		Over weight		Obesity	
	N	%	N	%	N	%	N	%	N	%
No	2	3.8%	17	32.8%	1	1.9%	2	3.8%		
1 liter	0	0%	18	34.6%	9	17.3%	3	5.8%		
More than 1 liter	0	0%	0	0%	0	0%	0	0%	0	0%

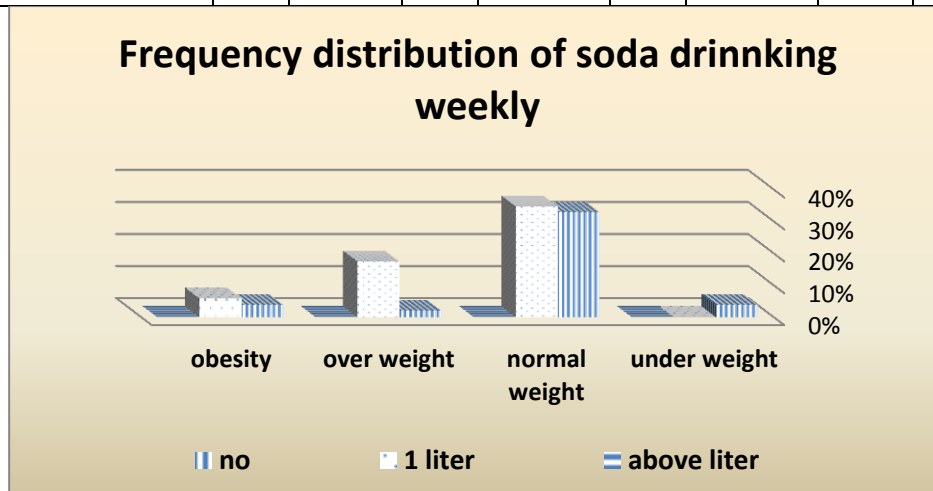


Fig.(8): Frequency distribution of soda drinking weekly.

N: number of children.

Table 10 and fig.9 showed that frequency and distribution of who shared meals.

The result showed that, 2 cases (3.8%), 32cases(61.6%), 9cases(17.3%), and 4cases(7.7%) of children eating with their family were under weight, normal weight, overweight, and obesity respectively, no one eating alone except one case (1.9%) were overweight, 2 cases(3.8%), one cases(1.9%) eating with another people like friends were normal weight, and obesity respectively. The most of the children (90.4%) eating with their family.

These values were nearly equals that of (Amber and Barbara; 2011) they showed that the primary objective was to determine consistency and strength of effects across 17 studies that examined overweight and obese, food consumption and eating patterns, and disordered eating. The total sample size for all studies was 182 836 children and adolescents (mean sample age: 2.8–17.3 years). They found that children and adolescents who share family meals 3 or more times per week are more likely to be in a normal weight range and have healthier dietary and eating patterns than those who share fewer than 3 family meals together. In addition, they are less likely to engage in disordered eating.

Table (10): Frequency distribution of who shared meals.

Whom Sharing in meals	Under weight		Normal weight		Over weight		Obesity	
	N	%	N	%	N	%	N	%
With family	2	3.8%	32	61.6%	9	17.3%	4	7.7%
Alone	0	0%	0	0%	1	1.9%	0	0%
Other	0	0%	3	5.8%	0	0%	1	1.9%

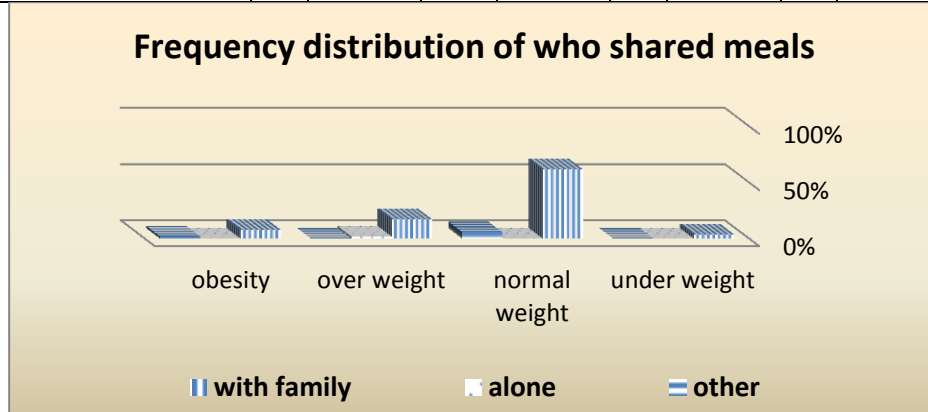


Fig.(9): Frequency distribution of who shared meals.

Table 11 and fig.10 showed that frequency and distribution of energy expenditure per day.

The result showed that, all the underweight children 2 cases (3.8%) expenditure more than 1400 kcal/day, the most of normal weight children 15cases(28.8%) expenditure more than 1400 kcal/day, the most of overweight and obesity children 7 cases (13.5%) ,3 cases (5.8%) respectively expenditure from 1000 to 1400 kcal/day.

These result has slightly similar with **(Reedy and Krebs; 2010)** they reported that the objective of this research was to identify top dietary sources of energy, solid fats, and added sugars among 2-18 year olds in the United States. were used to examine food sources of total energy (2005-06) and calories from solid fats and added sugars (2003-04). Results The top sources of energy for 2-18 year olds were grain desserts (138 kcal/day), pizza (136 kcal), and soda (118 kcal). Sugar-sweetened beverages (soda and fruit drinks combined) provided 173 kcal/day. Major contributors varied by age, sex, race/ethnicity, and income. Nearly 40% of total calories consumed (798 kcal/day of 2027 kcal) by 2-18 year old.

Also **(Watowicz et al; 2015)** showed that the aim of this study was to update the current body of literature describing beverage intake in children by weight category, with the addition of consumer-only data. Day one 24-hour recalls from the National Health and Nutrition Examination Survey 2005-2010 were analyzed to assess beverage intake of children 2-18 years old and differences by weight category. Beverages were coded as water, milk, 100% juice, coffee/tea, fruit drinks, soda, or low-calorie/diet drinks. Results: On average, 18.7% of total daily calories for 2- to 18-year-old children came from beverages; 60% of total daily calories from added sugar came from beverages. Mean calories from beverages were 359, 358, and 386 kcal for normal weight, overweight, and obese children, respectively:

Table (11): Frequency distribution of energy expenditure per day.

Energy expenditure Per day	Under weight (BMI<20)		Normal weight (BMI20-25)		Over weight (BMI25-30)		Obesity (BMI≥30)	
	No	%	No	%	No	%	No	%
<1000	0	0%	7	13.5%	2	3.8%	1	1.9%
1000-1300	0	0%	13	25%	7	13.5%	3	5.8%
>1300	2	3.8%	15	28.8%	1	1.9%	1	1.9%

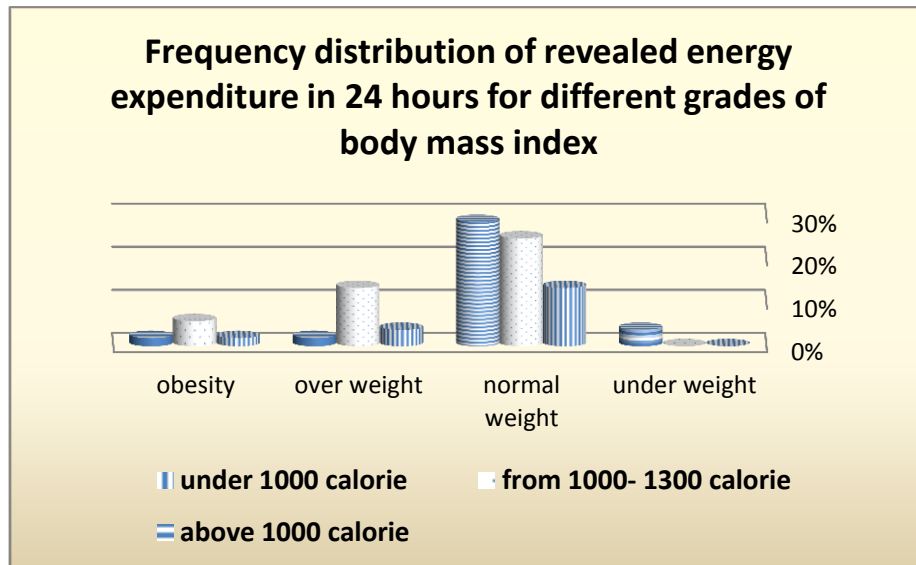


Fig.(10): Frequency distribution of energy expenditure Per day.

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دراسة مسحية عن العادات الغذائية والأغذية المتناولة لأطفال الروضة وارتباطها بمقياس كتلة الجسم

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هدفت هذه الدراسة: الى التعرف العادات الغذائية والسعرات المتناولة على مدار اليوم لأطفال الروضة بالاستعانة بمقياس كتلة الجسم بمحافظة دمياط. تم قياس كلا من الطول والوزن للتعرف على كتلة الجسم لاثنتان وخمسون طفل في المرحلة العمرية ٤-٦ سنوات (ذكور واثان)، وعمل استبيانات لقياس الحالة الغذائية، واستبيانات لتقدير السعرات الحرارية المتناولة على مدار اليوم خلال عام ٢٠١٤. وأظهرت النتائج أن طفلان (٣,٨ %) من الأطفال تحت الوزن الطبيعي و ٣٥ طفلا (٧٦,٣%) كان وزنهم طبيعي و ١٠ أطفال (١٩,٢%) كانوا أعلى من الطبيعي وخمسة أطفال (٩,٦%) يعانون من السمنة، كما أثبتت الدراسة عدم ارتباط كتلة الجسم للأطفال بالسعرات المتناولة على مدار اليوم، وقد يكون ذلك لأن كل الأطفال الذين يعانون من وزن أقل من الوزن الطبيعي (٤,٣%)، والنسبة الأكبر من الأطفال ذو الوزن الطبيعي (٢٨,٨%) يستهلكون أكثر من ١٣٠٠ سعر حراري في اليوم، بينما النسبة الأكبر من الأطفال الذين يعانون من زيادة الوزن والسمنة (١٣,٥%) و(٥,٨%) على التوالي يستهلكون من ١٠٠٠ ل ١٣٠٠ سعر حراري على مدار اليوم، وذلك على عكس المتوقع، وبما يستدعي إعادة النظر في العوامل المختلفة التي تساعد في زيادة الوزن بالنسبة للأطفال في هذه المرحلة العمرية.