Overweight and Obesity Among Children Between 9.12 years "cross-sectional study"

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ABSTRACT

"Overweight" technically refers to an excess of body weight, whereas "obesity" refers to an excess of fat.Childhood obesity is a growing problem and an increasing public health concern in the developed countries. Even more worrying is the increasing prevalence of obesity in developing countries. Childhood obesity is a well-recognized problem all over the world. Obesity can cause other medical problems in childhood, adolescence and adulthood.

METHODS The study has been conducted in 9 -12 yearschildren attending Teaching Hospital from different residency (urban and rural areas). The current work represented an observational cross-sectional study which was conducted during the period extending from the first of october 2021 to the end october of 2022, with regular working hours.

Results The total sample studied in this research was (150) of the child. The age group was taken from 9to12 years .

Conclusions: The prevalence of overweight and obesity among children attending was24 cases (16%) and10cases (6.7%), respectively.

Aim This study aim to assess the health of children and detection some of the risk factors and problemes of obesity for better child welfare.

| **Keywords:** | obesity, Teaching Hospital, Body Mass Index (BMI) , Age. |

Introduction.

Obesity in children is one of the most wide spread medical problems now. Obese children are more likely to be obese adults. Increasing prevalence of overweight and obesity is an important public health problem contributing to significant excess in morbidity and mortality. [1]

Obesity generally is defined as an excess amount of body fat. That means the Body Mass Index (BMI) is above 30 for adults. Modified BMI for age was used to define obesity in children, BMI >85 percentiles is considered as overweight, BMI > 95 percentiles is considered as obese, where as the normal weight range is between 5 percentiles - >85 percentiles and under weight is below 5 percentiles [2].

Obesity during childhood is associated with a number of cardiovascular risk factors, including hyperinsulinism and insulin resistance, hypercholesterolemia, hypertriglyceridemia, reduced levels of high density lipoprotein (HDL), and hypertension . [3]

Many different factors contribute to the development of obesity mainly the imbalance between calorie intake or consumption, and energy expenditure beside the genetic factors. Obese parents may have obese children due to shared genes and environment such as availability of certain energy rich food and decreased exercise and physical activities [4].

The tendency towards obesity is fostered by lack of physical activity combined with high-calorie, low-cost foods. Low activity levels and excessive television watching were strongly related to overweight status. Possible causes of obesity include diet composition, physical activity level, feeding behaviour, endocrine and genetic factors, psychological traits, and exposure to broader environmental factors [5].

Factors contributing to the problem include eating food away from home, consuming large or excessive quantities of soft drinks and snack foods, and large portion sizes [6].

Increases in energy intake are observed in genetic syndromes, such as Prader- Willi syndrome, Cushing syndrome, drug-induced obesity, and certain mutations in genes that control appetite. Reductions in energy expenditure characterize hormonal deficiency states, including hypothyroidism and growth hormone deficiency [7].

The objectives of this study are to:
 1.Determine sociodemographic criteria of this group.

2.Recognize the prevalence of obesity among primary- school ages.

3.Assess the nutritional status of primary-school children (by using parameters).
4.Identify some of the risk factors of obesity and main complications in our samples.
  DEFINITIONS

"Overweight" technically refers to an excess of body weight, whereas "obesity" refers to an excess of fat. However, the methods used to directly measure body fat are not available in daily practice. For this reason, obesity is often assessed by means of indirect estimates of body fat [6].

The body mass index (BMI) is the accepted standard measure of overweight and obesity for children and adults [7]Body mass index provides guideline for weight in relation to height and is equal to the body weight divided by the height squared. Other measures of childhood obesity, including weight-for-height which is particularly useful for the child younger than three years) and measures of regional fat distribution (eg, waist circumference and waist-to-hip ratio)skin fold thickness[6].

The term "obesity" refers to children with body mass index (BMI) >95 percentile for age and sex and the term "overweight" refers to children with body mass index (BMI) between the 85th and 95th percentile for age and sex.

The National Center for Health Care StatisticsCenter for disease control published BMI reference standarad for children between the ages of 2 and 20 years. As children approach adulthood, the 85th and 95th percentile BMI for age and sex are approximately 25 and 30, the thresholds for over weight and obesity in adults, respectively [8].

Polygenic models

The polygenic mouse models of obesity have allowed identification of multiple genetic loci within individual strains that modify obesity, plasma cholesterol levels, specific deposition of body fat depots and propensity toward development of obesity on high fat diet. These polygenic models more closely resemble the human obesity phenotypes than single gene models; however, the single gene defects producing recessive traits, dominant traits, promoter alterations, and those subject to parental imprinting must also be considered candidates for genetic effects in human obesity[10].

DIAGNOSIS

The BMI is the most effective tool for the assessment of overweight and obesity in

children. It correlates with adiposity [11]complications of childhood overweight .
The Center for Disease Control (CDC) uses the terms "at risk of overweight" and "overweight" for children with BMI between the 85th and 95th percentile and >95th percentile for age and sex, respectively. The CDC describes children whose weight is between the 85th and 95th percentile for age and sex as "at risk of overweight".

Overweight

The CDC uses the term "overweight" to describe children whose weight is >95 percentile for age and sex, whereas other experts use this term to describe children whose weight is between the 85th and 95th percentile for age and sex. Obese — Some experts, including the Institute of Medicine of the European perspective use the term "obese" to describe children whose weight is >95 percentile for age and sex[12]. The CDC does not use the term "obesity" in describing childhood weight categories because they feel that the term obesity is interpreted by children to be pejorative[13].

Table1-1 Causes ofObesity [29]

Functional	
Simple obesity	Excessive dietary intake Lack of exercise/mobility (Spina bifida, muscular dystrophy)
Organic	
Hypothalamic disturbance Hyperphagic syndromes	Pituitary tumors Prader-Willi syndrome Laurence-Moon-Biedl syndrome
Corticosteroid excess	Cushing's (iatrogenic, pituitary , and adrenal)
Hypothyroidism Chromosomal	Thyroid failure Down syndrome Klinefelter's syndrome
Cerebral disease	Tumors, infection, hydrocephalus

4Development—

Most of the syndromic causes of overweight in children are associated with cognitive or developmental delay. Prader-Willi syndrome is also associated with marked hypotonia during infancy and delayed development of gross motor skills.

2.7.3 Laboratory studies

The laboratory evaluation for overweight and obesity in children is not standardized. Some experts suggest that a basic panel of tests (ie, fasting glucose, insulin, and lipid panel) be performed in children with BMI >85th or >95th percentile to evaluate the presence of common co morbidities[59]. Laboratory tests in children with BMI >95th percentile for age and sex should include a randame glucose,

2.8Clinical Features

In children, obesity is most often associated with tall stature, slightly advanced bone age, and somewhat early puberty. It is vital to identify causes of secondary obesity early. Many obese youth also have acanthosis nigricans ; a hypertrophic hyperpigmention of the skin most commonly seen on the posterior neck and in skin creases . The condition is associated with insulin resistance and higher risk of developing type 2 diabetes .

2.9 Complications of Obesity

1-Psychosocial:- peer discrimination, teasing, reduced college acceptance, isolation, reduce job promotion*.
2-Growth:- advanced bone age, increased height, early menarchae.
3-Central nervous system:- pseudotumour cerebri.
4-Respiratory:- sleep apnea, pickwickian syndrome, asthma.

5-Cardiovascular:- hypertension, cardiac hypertrophy, ischemic heart disease*,sudden death*.

6-Orthopedic:- slipped capital femoral epiphysis, Blounts disease.

7-Metabolic:- insulin resistance, type 2 diabetes mellitus, hypertriglyceridemia, gout*, hepatic steatosis, hypercholesterolemia, polycystic ovary disease, cholelithiasis.

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* complications unusual until adulthood.

INDICATIONS FOR REFERRAL

Children who have co morbidities of obesity that require rapid weight loss warrant referral to pediatric obesity centers for appropriate dietary, pharmacologic, and/or surgical therapy. These co morbidities include: Pseudo tumor cerebri (should also be referred to a pediatric neurologist) Sleep apnea (should also be referred to a pediatric pulmonologist) Obesity hypoventilation syndrome (should also be referred to a pediatric pulmonologist) . Slipped capital femoral epiphysis or Blount disease (should also be referred to a pediatric orthopedist).

Other children who may merit referral to a pediatric obesity center include overweight children younger than two years, and children with massive overweight or super obesity even if they have no co morbidities. The definition of "massive overweight" or "super obesity" requires provider judgment since a standard definition for children does not exist; one possible definition for super obesity is BMI >40. Massively overweight children may benefit from referral to a pediatric obesity specialist for more aggressive therapy than can usually be provided by the primary care provider.

Children with the following endocrine or gastrointestinal co morbidities should be referred to a pediatric gastroenterologist or endocrinologist, respectively: Cholelithiasis Nonalcoholic fatty liver disease,Type 2 diabetes. Finally, certain overweight or obese children require referral to mental health specialists. These include: Overweight children who are depressed should be referred for psychologic evaluation and treatment since weight loss therapy may be ineffective without concurrent psychologic care Overweight children with findings suggestive of an eating disorder (eg, inability to control consumption of large amounts of food, self-induced vomiting or laxative use to avoid weight gain, dorsal finger lesions) should be evaluated by a therapist with experience in eating disorders; such children require psychologic treatment and should not participate in weight control programs without the concurrence of a therapist.

Behavior Goals

The US Committee of pediatric obesity experts recommends strongly that the primary goal of a program to manage uncomplicated obesity is healthy eating and activity, not achievement of ideal body weight. To this end, the program should emphasize the skills necessary to change behavior and to maintain those changes. Skills that families should learn include:

1. Development of awareness of current eating habits, activity, and parenting behavior.
2. Identification of problem behaviors. Clinicians can help identify specific high-calorie foods or eating patterns and obstacles to activity.
3. Modification of current behavior. Specifically, families should learn to make a few small, permanent changes at a time and make additional changes only after the previous changes are firmly in place.
4. Continued awareness of behavior and recognition of problems that arise as the child becomes more independent, as family schedules change, or as other changes occur that alter the initial treatment plan .

Medical Goals

For children with a secondary complications of obesity, improvement or resolution of the complication is an important medical goal.

Weight Goals

The first step in weight control for all overweight children ≥2 years of age is maintenance of baseline weight. A child can achieve this goal through modest changes in diet and activity .The dietary goals for patients and their families are well-balanced, healthy meals and a healthy approach to eating. These changes should be considered permanent

rather than a temporary eating plan for rapid weight loss. The most helpful guide to healthy eating is the Food Guide Pyramid (Figure A).

The Food Guide Pyramid for young children was designed to promote healthy nutrition in children over two years of age. It is meant to be a general guide to daily food choices. The main emphasis of the food pyramid is on the five major food groups, all of which are required for good health. It also emphasizes that foods that include a lot of fats, oils and sweets should be used very sparingly. Counting calories is tedious, difficult, and inaccurate. Other strategies are easier and therefore more likely

to succeed. Reduction or elimination of specific foods may reduce calories without making patients feel hungry or deprived. For example, the clinician and family can eliminate from the diet one or two high-calorie foods, such as chips, ice cream, or fried foods, or they can replace all but one glass of juice a day with water. A clinical dietitian can work with families both to identify high-calorie eating habits and to guide the families as they make changes. Families may be encouraged by the recognition that modest caloric deficits can lead to significant weight loss over time. A 100-kcal deficit per day could lead to a 10-lb weight loss over 1 year.
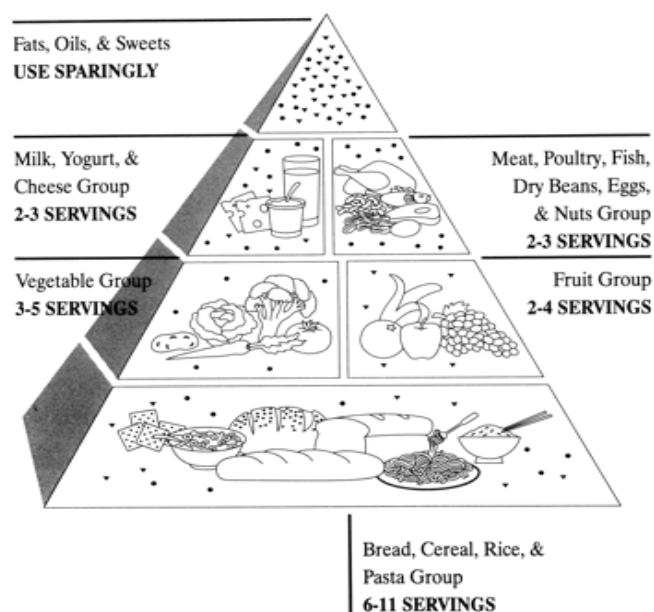
3: Patients and Methods:
3: Patients and Methods:
3.1.1: Administration and Ethical considerations:
Official permission to carry out this study was obtained from family before the study
3.1.2: Socio-Demographic Characteristic:
The study has been conducted in children age between 9.12 years attending Teaching Hospital from different residency (urban and rural areas).

3.1.3: Design of Study:
The current work represented an observational cross-sectional study which was conducted during the period extending from the first of october 2021 to the end of october 2022, with regular working hours.

3.1.5: Data Collection:
The study includes two components: interviewer administration of questionnaire and anthropometric measurements(Ht,Wt,Blood pr). Prior to the interview, the purpose of data collection was explained and consent was obtained. The children were interviewed and examined at consulting room of Teaching Hospital.The sample done by selecting achild out everyfor children.
3.1.7: Inclusion and Exclusion Criteria:
 1 Inclusion criteria:
Primary's children with the age of more than 9 years old had been included in the sample
2. Exclusion Criteria

child diagnosed to have a medical condition that may cause overweight or obesity like nephrotic syndrome or those who are taking drugs like steroids had been excluded from the study.

3.1.7: Examination:

1. Weight:

All children were weighed wearing minimal clothing without shoes to the nearest of 100g using UNICEF Seca personal scales that are checked regularly and routinely before recording the weight of each children and the pointer was adjusted to zero.[6]

2. Height:

Height was measured with the children standing at ground level without footwear to the nearest of 0.1 cm against the wall as a vertical tape fixed perpendicular to the ground on the wall was used as scale. This tape was of non-stretchable fibreglass. It was fixed with transparent tape and care was taken to see that there were no folds or tilting to any side. Contact point includes head, shoulder, buttocks, knee and feet. During the examination also the scale was repeatedly checked for loosing of adhesive tapes or tilting of the scale.[6]

4. Blood Pressure:

Blood pressure was measured using standardized sphygnomanometer when the children was sitting comfortable after explaining that the procedure is not harmful to them and the device at the level of heart.

Blood pressure was checked 2 times for each children and readings were recorded and classified into normal, prehypertensive and hypertensive according to standard tables.

5. Random Blood Sugar:

Blood sugar was measured using ACCU-CHEK® Active meter system after assuring the children that the procedure is not harmful and brief.

Readings were classified into two groups, below 200 mg/dl and above 200 mg/dl.

3.1.8: Data Interprimarytation:

BMI was calculated as weight (kg) divided by height squared (m). The classification of nutritional status depending on BMI cut-off points into four groups: underweight, normal, overweight and obesity following the recommendation cut-off point of WHO. This cut-off points are:, BMI < 18.5 for underweight, BMI 18.5 to 24.9 for normal weight, BMI 25 to 29.9 for overweight and BMI ≥ 30 for obesity.

3.2: Statistical Analysis:

Data entry and analysis were done using the SPSS program, version 11. Comparison of proportions was performed using chi square, P-value of less than 0.05 was considered as statistically significant, P-value <0.01 as highly significant and <0.001 as extremely significant.

Results

4.1. Demographic characteristics of the study:

The total sample studied in this research was (150) of the Primary child. The age group was taken from 9 years and above. The child was recorded in the data collection of the sample in which (73) of the children has been living in urban areas representing 48.7% of the total sample, (77) children have been living in rural areas representing 51.3% of the total sample in the research. The sex of child was also recorded, male students were 81(54.3%), and female students were 69 (45.7%).

Table4.1:Distribution of the sample siz according to Residenc and gender

Sample	No. of children	%
Residence		
Urban	73	48.7%
Rural	77	51.3%
Tota	150	100%
SEX		
Male	81	54.3%
Female	69	45.7%

Total	150	100%

4.2. Relationship between B.M.I and Residency:

The prevalence of nutritional status was distributed differently according to the residence.
Table (4.2) shows that urban areas have more cases of overweight 42(28.7%) and obesity 14(9.5 %) than rural areas in which overweight students were7(4.5%) and obese child were 5(3.2) respectively .

Table (4.2): Relationship between the BMI and Residency

B.M.I	Residency					
	Urban		Rural		Total	
	No.	%	No.	%	No.	%
Underweight	3	2	9	6	11	8
normal weight	42	28	62	41.3	104	69.3
overweight	21	14	4	2.4	25	16.3
obese	7	4.6	2	1.7	9	6.4
Total	73	48.6%	77	51.4%	150	100%

4.3. Relationship between B.M.I and Age:

Concerning the age of children and its relations to B.M.I the study found that obesity and overweight weight tend to be more prevalent with increasing age as shown in table (4.3)

Table (4.3): Relationship between BMI and Age Groups

BMI	Age(years)									
	9-<10		<10->11		<11>12		≥12		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Underweight	2	1.3	1	0.6	8	5.3	2	1.7	13	9

normal weight	27	18	34	22.7	19	12.7	23	15	102	68.3
overweight	7	4.7	2	1	7	5	8	5.3	24	16
obese	2	1	2	1	2	1.7	4	3	11	6.7
Total	38	25%	39	25.3 %	36	24.7 %	37	25%	150	100%

4.4. Relationship between B.M.I and Sex:

Regarding sex of children overweight and obesity were found to be more prevalent among female child. For overweight there were 39cases (28.4%) and10 cases (6.1 %) for females and males respectively. Mean while obesity accounts for 11 cases (6.8%) and 11 cases (8%) for females and males respectively as shown in table (4.4)

Table (4.4): Relationship between BMI and Sex.

BMI	sex				Total	
	male		female			
	No.	%	No.	%	No.	%
Underweight	4	3	6	4	10	7
normal weight	66	44.3	38	25	104	69.3
overweight	5	3.3	19	13	24	16.3
obese	6	3.7	6	3.7	12	7.4
Total	81	54.3%	69	45.7%	150	100%

4.5. Relationship Between B.M.I and Social Class:

Regarding social class and it's to relation nutritional status; the following table shows that obesity and overweight are more common in high social level 7 cases (17.3%) and 10cases (28%) respectively.

Table (4.5): Distribution of the Cases According to the BMI and social class

BMI	Social class							
	High		Middle		Low		Total	
	No.	%	No.	%	No.	%	No.	%
Underweight	1	0.6	8	5.7	3	2.3	13	8.7
normal weight	19	13	44	29	41	27	103	69.
overweight	10	7	4	2.6	5	3.7	20	13.3
obese	7	4.4	5	3	3	1.7	14	9
Total	37	25%	61	40.3 %	52	34.7%	150	100%

4.6. Relationship between B.M.I and Family History :

Regarding the nutritional and it's relation to obesity and overweight the following table shows that overweight counts for 17cases (44.7%) of those with positive family history and obesity counts (23.7%)9cases of them. While those with a negative family history count for (5.8%)7cases and 1cases(%0.8) for overweight and obesity respectively .as showed in table (4.6).

Table (4.6): Relationship between BMI and Family History.

BMI	Family history					
	+vet		-ve		Total	
	No.	%	No.	%	No.	%
Underweight	0	0	12	8	12	8

normal weight	12	8	92	61.7	104	69.6
overweight	17	11.3	7	4.4	24	15.7
obese	9	6.	1	0.6	10	6.7
Total	38	25.3%	112	74.7%	150	100%

4.7. Relationship between B.M.I and Type of Diet:

Table (4.7) show that children who eat meals and snacks are liable to be obese or overweight, it show that the number of overweight child who eat meals and snacks is26 cases (60%) and obese child is 7cases(17.7%) which is more than those who only eat 3 meals per day.

Table (4.7): Relationship between BMI and diet

BMI	Diet					
	Just meals		Meals &snacks		Total	
	No.	%	No.	%	No.	%
Underweight	11	7.7	1	0.3	12	8
normal weight	86	56.7	9	6	95	62.7
overweight	8	5.3	25	17	33	22.3
obese	3	2	7	5	10	7
Total	108	71.7%	42	28.3%	150	100%

4.8. Relationship between B.M.I and Blood Primaryssure:

This table shows that pre.hypertensive and hypertensive children are as follow 3cases (50%) and 3 cases (33.3%) for overweight and   fore (61.1%) cases 6 and(25%)cases 1   obese children respectively which was higher than those who are normal or underweight.

Table (4.8): Relationship between BMI and Blood Pressure.

BMI	Hypertension							
	Normal		Prehypertension		Hypertension		Total	
	No.	%	No.	%	No.	%	No.	%
Underweight	12	8.3	0	0	0	0	12	8.3
normal weight	101	67.7	1	1	1	0.3	103	69.
overweight	18	12.3	3	2	3	2	24	16.3
obese	3	1.7	1	1	7	3.7	11	6.4
Total	134	90%	5	4%	11	6%	150	100%

4.9. Relationship between B.M.I and Random Blood Sugar Measurement:

This table shows increased number of children having high random blood sugar measurement among those who are considered to be obese or overweight 2 cases (42.8%) and 2cases (42.8 %) respectively.

Table (4.9): Distribution of the Cases According to the BMI and DM

BMI	DM					
	<200		>200		Total	
	No.	%	No.	%	No.	%
Underweight	13	9	0	0	13	9

normal weight	101	67.3	1	0.3	102	67.6
overweight	23	15.7	2	1	25	16.7
obese	8	5.7	2	1	10	6.7
Total	145	97.7%	5	2.3%	150	100%

5.Discussion

Body mass index (BMI) is now widely used around the world as a measure of nutritional health. The nutritional issues were measured using a body mass index cut off points that were linked to adult cut off points. This is the first study ever conducted on children. Since this is an important age group to study, the procedures and data generated can serve as a foundation for future research in this area. The current study's strengths include its sociodemographic sample (urban and rural), its simple anthropometric measurements, and its age-adjusted results. Nutritional Status Distribution across Participants in the Study. The current study found a higher prevalence of overweight and obesity than previous research from K.S.A., which found an 11% and 5.9% prevalence of overweight and obesity among children aged 1-7 years old, respectively. They reported that 3.2% and 8.8% of boys and girls were overweight, and 1.6% and 5.4% of both sexes were obese, which is higher than the prevalence of obesity in Qatar. There wasn't as much of an issue with obesity as there was in Kuwait. Kuwaiti children's body mass index (BMI) was higher than that of Saudi children's, even after controlling for differences in developmental patterns and economic prosperity between Iraq and these countries. This discrepancy can be attributed to a variety of factors, including shifts in social and economic conditions, population size, and genetic predisposition as well as differences in body image and access to energy-dense foods.

Body mass index and age: the current study showed that the prevalence of overweight and obesity increased substantially with age. By age 6 and up, the percentage of overweight and obese people increased from 4.7% and 1%, respectively, at age 2 to 5.3% and 3.0%, respectively. This could give the impression that obesity is a progressive condition that worsens over time once it has established itself. This is in line with the results of a study of preschoolers in Leeds, which found an alarming rise in the number of overweight and obese youngsters. Consistent with the findings of Sanjay et al., who surveyed nearly 30,000 children between the ages of 1 and 9, this study confirms that the prevalence of obesity rises with age, being nearly double in the oldest age quarter compared to the youngest age quarter.Body Mass Index and Sex: Although the current study found a higher prevalence of overweight in females than in males, this difference was not statistically significant (13% vs. 3.3%).This result contradicts the findings of Nicolas et al., who found that female sex is an independent risk factor in their African American cohort study.Housing Costs and BMIIn the present study, the rate of overweight people was found to be 14 percentage points higher in the city than in the country. Zuguo et al. in the United States found a similar increase in the prevalence of overweight among both urban and rural children, so these findings are consistent with their findings. although the patterns were more obvious and steady in the cities. In addition, our findings corroborate those of Fredrik et al., who conducted a study in the Netherlands and found that urban areas have a higher prevalence of obesity than rural ones. This

finding could be because people in cities eat more and exercise less.Weight and Eating Patterns:The study found that children who ate more than three times a day had a significantly higher body mass index (BMI) than their normal-weight counterparts (56.7 percent vs. 6.2 percent).

Studies that found no difference in dietary habits between obese and normal-weight children found the opposite to be true in our sample. High body mass index was strongly associated with snacking between meals.The research revealed a strong correlation between body mass index (BMI) and socioeconomic status (SES). There appears to be a correlation between parental socioeconomic status and their children's increased body mass index. These findings run counter to those of Fredrik et al., who looked at data from Sweden and found that children from the lowest socioeconomic backgrounds had the highest body mass index values,() but they do corroborate the findings of a study conducted in the United States by Mihaela et al., who found no difference in the educational attainment of mothers of obese and non-obese children. This may be due in part to the fact that even among Iraqis of higher socioeconomic status, there is no evidence that they have the same level of medical literacy as their counterparts in the West. Having found that 3.7% of obese children are hypertensive and 1.0% were prehypertensive, the current study's findings corroborate those of (Muntner P. etal.), who also discovered a strong correlation between high blood pressure and childhood obesity. The current study's HT prevalence is lower than that previously reported for Arabian countries. Meanwhile, it's lower than the numbers coming out of foreignCountries. A number of factors, including study design, HT definition, BP recording method, observer effect, age range, sample size, and socioeconomic status, could account for these discrepancies.Measurements of children's blood sugar were taken at random and found to be higher in those who were overweight. This finding indicates that obesity and excess weight are major contributors to the development of type 2 diabetes in children. Those findings corroborated those of (Eric Ravussin and Boyd A. Swindurn), who discovered that the prevalence of diagnoses of impaired glucose tolerance and type 2 diabetes in overweight children and adolescents is increasing, and that these patients exhibit early markers of the insulin resistance syndrome and cardiovascular risk. Dr. Ranjana Sinha found that an increase in the prevalence of type 2 diabetes among children and adolescents is associated with the epidemic of childhood obesity in the United States and that impaired glucose tolerance is common among children and adolescents who are severely overweight regardless of their race
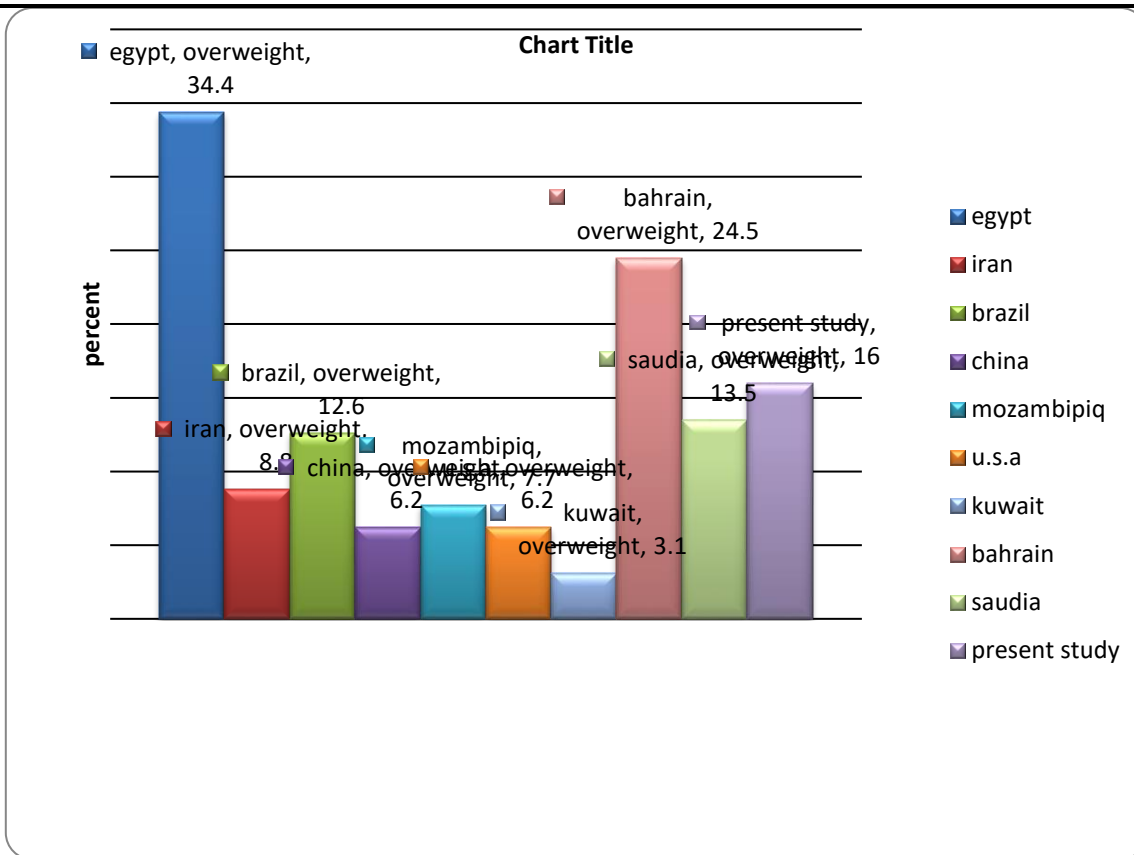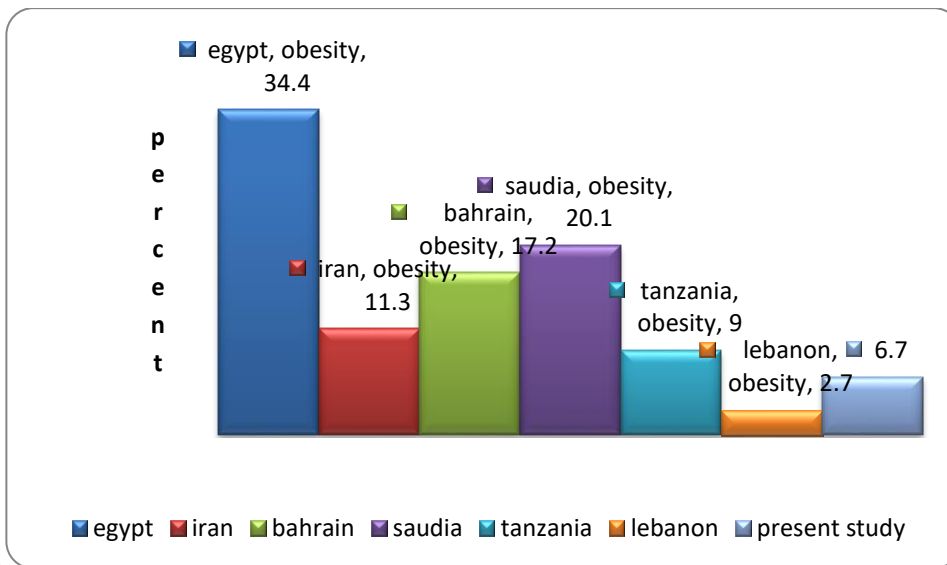
Figure (1): Comparison of the current study Result in Overweight Prevalence with Other

Countries.

Figure (2): comparison of the current study result in obesity prevalence with other countries. 0

6.1: Conclusions:

6.1.1. The prevalence of overweight and obesity among primary school children attending was24 cases (16%) and10cases (6.7%), respectively.

6.1.2. Over weight were more common in females19 (13%) than males5 (3.3%).

6.1.3obesity equal in females6cases(3.7%) and6cases in male(3.7%).

6.1.4. All the kinds of nutritional status were higher in urban than rural areas.

6.1.5. The associated risk factors in this study were: dietary habits, family history, and social level.

6.1.6. Complications of obesity and overweight were high blood sugar and high blood pressure.

6.2: Recommendations:

Part 1- for feeding

Improving nutritional quality after weaning:

❖ Orientation of the medical staff of the primary health care center, together with pediatricians for detection and evaluation 0f overweight Primary children ,and proper referral when indicated.

❖ Introduce healthy foods and continue offering it, if initially refused. Parents should not introduce foods without overall nutritional value simply to provide calories.

❖ Respond to satiety clues and do not overfeed; infants and young children can usually self-regulate total caloric intake; do not force children to finish meals if not hungry, because they often change caloric intake from meal to meal.

Part 2 for parents:

● For children aged > 2 year, parents and caregivers should follow special dietary recommendation for healthy feeding which include:

❖ Enhancing eating vegetables and fruits daily, limit juice intake,and Eating whole-grain breads and cereals rather than refined-grain products.

❖ Reducing the intake of sugar-sweetened beverages and foods.

● For treatment of obesity, intervention should begin early with gradual changes, and the clinician should involve the family and all caregivers in the treatment program.

● Clinician should educate families about medical complications of obesity and long term risk of obesity.

Part 3 for ministry:

● . To ministry of higher education to do more researches on this field all over our country in order to:

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