PREVALENCE AND RISK FACTORS OF OBESITY AMONG PRIMARY SCHOOL CHILDREN IN AL-KUT CITY

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ABSTRACT

Background: Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Childhood obesity continues to increase in prevalence, this will lead to increases in adult overweight and obesity together with the consequent health problems. Hence the development of effective prevention programs in childhood is important. This, in turn, depends on the identification of modifiable risk factors for childhood overweight and obesity. **Aim:** the objective of our study to determine the prevalence and the most potential risk factors for development of obesity among students of primary schools. **Methods:** The cross-sectional study carried on 50 obese and overweight primary school children in Wasit Governorate Schools through a paper questionnaire, as well as through social media platforms by an electronic questionnaire during the period from January to May 2021 and depending on Body mass index-for-age percentiles on the growth chart. Overweight is defined as being above the 85th percentile but below the 95th percentile, while obesity is defined as being above the 95th percentile for children. **Result:** A total of 50 obese and overweight child participated in this study, about 44(88%) were obese while 6(12%) were overweight, and most of them were females 26(52%), also 22(44%) of them on exclusive breast feeding in their first year of life ,48(96%) of their mothers didn't suffer from diabetes during pregnancy ,and about 34(68%) of the participants didn't do any daily physical activity while 48(96%) watch TV for more than 8 hours daily ,we also found most of them(38%) always eat snacks and 21(42%) sometimes eat fast food ,in this study mean of child age is 10.1, mean of mother age 38 and for father was 44.4.about 25(50%) of mothers were obese and 21(42%) of fathers were obese ,about 31(62%) of mothers and 39(78%) of fathers were employed ,we found that 24(48%) of children were obese and have obese mothers While 19(38%) of them have obese fathers but both finding not in statistic significant correlation. **Conclusion:** Prevalence of Obesity in primary schools children is on the increase and mostly in female. eating fast food and snacks a lot, low physical activity and watching TV and mobile for social media more than 8 hours daily are the most important risk factors for childhood obesity. Also, the obesity of the father and the mother has a great role in the development of obesity in their children, whether it is genetic or lifestyles causes.

INTRODUCTION

Obesity is defined as increase in body weight due to accumulation of fat.[1] Many criteria and methods of measurement have been developed to diagnose and assess the severity of obesity. Among these, body mass index (BMI) defined for age and sex is the most popular and probably the most practical and accurate way of diagnosing and monitoring obesity.[1,2,3] Females are more likely to be obese as compared to males, owing to inherent hormonal differences.[4] The most serious complication of childhood obesity is prolongation into the adulthood associated with severe co-morbidity resulting from it in this life period.[5] The rapid increase in obesity and being overweight in developing countries is being exacerbated by reduced physical activity and diets rich in refined grains, vegetable oils, caloric sweeteners, and processed foods.[6,7] This nutrition and physical activity transition is mostly being experienced in urban settings.[8] Obesity develops primarily because energy intake exceeds energy expenditure, and many environmental and host factors interact in complex ways to contribute to its development.[9] Pediatricians and other health care providers to children are faced with the daunting task of addressing this epidemic. They must

identify those children and adolescents who are, or are at risk for becoming, overweight or obese, in addition to preventing the chronic illness of obesity in all children and adolescents and identifying those at increased risk. Many obese adolescents remain obese into adulthood, with increased morbidity and mortality due to cardiovascular, metabolic, or oncological disorders.[10] it has been indicated that being overweight/obese is significantly associated with physical inactivity, low educational level, and older age groups of children.[11]

These children suffer from psychosocial issues (e.g., depression, being bullied, and decreased school performance) and physical complications (e.g., hypertension, nonalcoholic fatty liver disease, type 2 diabetes, and hyperlipidemia). Being overweight in childhood significantly increases future mortality in adulthood. childhood overweight continues to increase in prevalence, with the proportion of children above the 85 the percentile of body mass index (BMI) reaching 31% in the most recent National Health and Nutrition Examination.[12] This will lead to increases in adult overweight and obesity together with the consequent health problems associated with overweight and obesity in both children and adults.

As the prevalence rates of infant and early childhood overweight (>85th centile) and obesity (>95th centile) are increasing within global populations.[13] BMIs for children and teens can be calculated in the same way, but the results do not have the same meaning because the normal amount of body fat varies with age and gender. Therefore, normal and overweight BMIs are defined according to age and gender. Overweight is defined as being above the 85th percentile but below the 95th percentile, while obesity is defined as being above the 95th percentile for children of the same age and sex.[14] Childhood obesity affects all, irrespective of their age, sex, or ethnicity. However, it is found to be particularly prevalent in areas that have undergone economic growth, urbanization,[15,16,17] technological advancement, and food behavior modification.[18,19,20,21,22] There is growing evidence that childhood obesity can be more effectively averted by interventions than adult obesity; thus, interventions aimed at modifying risk factors to reduce/prevent childhood obesity in developing settings should be considered.[23]

Aim of the study
✓ To establish the prevalence of obesity and potential risk factors responsible for the development of obesity among children attending primary schools in Wasit,

✓Assess the importance of this problem and to work out possibilities of timely prevention at the earliest age with the ultimate goal of promoting population health.

METHODS AND MATERIALS

cross-sectional study,the duration of study was 8 months from January to August 2021, 50 obese and overweight primary school children in Wasit Governorate Schools through a paper questionnaire, as well as through social media platforms by an electronic questionnaire and depending on Body mass index-for-age percentiles on the growth chart. The study included children who are their Percentile more than 85 and their ages.[6-14] The children under 6 years of age are excluded. The information was taken from the parents after their consent, the questionnaire contained 44 questions about the child's age and weight, as well as the parents' age and weight, the parents' education level and occupations and information on the child's birth, growth and nutrition at home and school. Raw data were entered into Microsoft Excel. Statistical analyses were conducted using IBM SPSS Statistics 24. The analysis involved computation of descriptive statistics; frequencies, means, and standard deviations. Statistical analysis outputs were presented in form of tables.

RESULT

Regarding demographic data is shown that 44(88%) of children are Obese, while only 6(12%)are overweight, 26(52%)are female, 24(48%) are male. 29(58%)were vaginally delivered, while 21(42%) were delivered by caesarean section, also for feeding the child in his first year was 22(44%) on breastfeeding, 13(26%) of them formula feeding, and 15(30%)mixed feeding. One of the most important diseases that the mother suffers during pregnancy is diabetes,The percentage of children whose mothers suffered from diabetes during pregnancy was 4%(2), while 48(46%) of their mothers did not suffer from diabetes during pregnancy, as for the daily life of the child and spending time in physical activities or watching TV,34 (68%) of them do not participate in daily physical activities and 48(96%) of them spend more than 8 hours watching TV or phone as show in Table no (1).

Table (1): Demographic data of child with obesity.

Item	No	Percent
Obesity type		
obese	44	88.0
overweight	6	12.0
Gender		
male	24	48.0
female	26	52.0
Mode of devilry		
normal vaginal	29	58.0
caesarean	21	42.0
Infant period feeding		
breast feeding	22	44.0
formula	13	26.0
mixed	15	30.0
DM during pregnancy		
yes	2	4.0
No	48	96.0
participating in physical activity		
yes	16	32.0
No	34	68.0
Watching TV or phone for social media more than 8 hours		
yes	48	96.0
No	2	4.0

Regarding child nutrition,21 (42%)of the children always eat breakfast, and only 5(10%) never eat breakfast. 19(38%) of them often eat when they feel lonely or angry, as well as 19(38%) of them always eat snacks while 11(22%) eat them sometimes. As for fast food, 21(42%)eat fast food sometimes while 10 (20%) eat it usually as show in table no.2**.**

Table (2): nutritional behavior of child with obesity.

Item	No	Percent
eating breakfast		
always	21	42.0
usualy	9	18.0
often times	3	6.0
sometimes	12	24.0
absolutely not	5	10.0
child eating when he/she is angry or alone		
always	10	20.0
usually	3	6.0
often times	19	38.0
sometimes	15	30.0
never	3	6.0
eating snacks		
always	19	38.0
usually	10	20.0
often times	9	18.0
sometimes	11	22.0
never	1	2.0
eating fast food		
always	5	10.0
usually	10	20.0
often times	8	16.0
sometimes	21	42.0
never	6	12.0

Table (3): descriptive data of child and their parents.

Item	N	Minimum	Maximum	Mean	S.D
age of child	50	6	14	10.1	2.2
mother age	50	20	73	38.3	9.1
father age	49	28	66	44.4	9.4
BMI of child	50	20	47.9	29.5	5.6
BMI of mother	50	22.4	39.6	29.9	4.3
BMI of father	50	18.9	37.5	28.3	4.6

25(50%) of the mothers are obese while21(42%)are overweight and 21(42%) of the fathers are obese while 16(32%) are of them are normal weight. As for the work of parents, 31(62%) of the mothers are employed, while 39(78%)of the fathers are employed. as show in table no. (4).

Table (4): demographic data of child's parents.

Item	No	Percent
Mother BMI		
normal	4	8.0
overweight	21	42.0
obese	25	50.0
Father BMI		
normal	16	32.0
overweight	13	26.0
obese	21	42.0
Mother work		
unemployed	19	38.0
employee	31	62.0
Father work		
unemployed	11	22.0
employee	39	78.0

24 (48%)of children are obese and have obese mothers, and 17 (34%) of them have overweight mothers while 4(8%) of children are overweight and have overweight mothers. P value isn't significant as show in table no. (5).

Table (5): correlation between obesity type and mother BMI.

Item	Normal (%)	Overweight (%)	Obese (%)	Total (%)	P value
obese	3 (6)	17 (34)	24 (48)	44 (88)	0.2
overweight	1 (2)	4 (8)	1 (2)	6 (12)	

19 (38%) of children are obese and have obese fathers, and14(28%) of them have fathers with normal weight. P value isn't significant as show in table no. (6).

Table (6): correlation between obesity type and father BMI.

Item	Normal (%)	Overweight (%)	obese (%)	Total (%)	P value
obese	14 (28)	11 (22)	19 (38)	44 (88)	0.8
overweight	2 (4)	2 (4)	2 (4)	6 (12)	

DISCUSSION

In Table no.(1) show 88% obese in comparison to the 22%overweight,in Cynthia L. Ogden et al. study done in United States show that one-sixth of US children and adolescents aged 2 to 19 years are obese, and about the same proportion are overweight(24) and According to the 2016 Global Health Observatory (GHO) data published by the World Health Organization (WHO), 13.1% of the global population was obese and 38.9% was overweight.[25] We believe that there differences because our small sample and most of parents do not understand the obesity of their children until they exceed their weight and become obese , so most parents who have obese children fill the questionnaire. Also in our study we find that 52%female while 48%male , this confirmed in Garawi et al study done in USA show that females overall prevalence exceeds that of males by 4%.[26] and this due to upstream factors influencing an individual's food consumption and energy expenditure are

multilayered and include not only the physical and food environment but also wider societal factor.[27] We found also that most of children in our study delivered vaginally and in Mueller et al. Article published in National Library of Medicine show that Of 1441 mothers, 961 delivered vaginally and 480 by cesarean. Compared with vaginally delivered children, cesarean delivered children had 1.4 (95% confidence interval (CI) 1.1-1.8) times greater odds of becoming overweight or obese in childhood(28).this may be due to most of mothers are old age and multiparty and obese child was the last child in the family,so for that most of them vaginally delivered.About the feeding in the first year of child ,in our study we found that 44%of children on breastfeeding feeding and 26% on formula and 30% mixed feeding , in Horta Bl et al . Article published in Geneva found that breastfeeding was associated with a reduction of 13% in the odds of overweight and obesity , and found that each additional month of breastfeeding was associated with a 4% reduction in the prevalence of overweight.[29] In our study the most children on exclusive breast feeding and this may be due to our small sample regarding diseases of mother during first year which most important disease is Diabetes mellitus ,We found in our study that 96% of children whose mothers didn't suffer from DM during pregnancy but most of mothers are complaining of increase the weight which in Metzger Et al article published in England found that mothers of increased weight are more likely to have higher glucose levels that do not exceed the cut off for GDM, but nevertheless confer elevated risks similar to those associated with frank GDM.[30]

About time spending for physical activities or watching TV ,in our study we find that 68%of children don't participate in daily physical activity and this may be due to their obesity.in Lazzer S et al article showed that children involved in relatively high levels of activity often have less adiposity than more sedentary youth.[31] Accelerometers have been used to define physical activity in terms of intensity and Trost SG, Et al studies have observed that children who are obese spend less time than healthy- weight peers in vigorous and hard activity.[32]

and When compared to time that child spends for watching TV or phone ,in our study about 96% of children spend more than 8 hours for watching TV or phone so this cause decrease physical activity and In addition, most children enjoy watching TV and eating unhealthy foods such as sweets and fast food,according to Thivel & Chaput, et al.the time spent on sedentary behaviors is exacerbated by excessive calorie intake Thus, spending more time in less vigorous activities, such as watching TV, using the computer, and playing video games, has contributed to the weight gain of children , as the main physiopathology of this disorder is the positive balance of energy intake.[33] The study of Francis et al. showed that an average child spends 93% of their lunch time and 97% of the time during snacks in front of TV screen.[34]

In Table no (2) We find that 42% of children always and 24% sometimes eat breakfast While in line with Wang et al. and Bruening et al., we found students having two breakfasts had the lowest risk of being overweight, and breakfast skippers had the highest risk.[35,36] And also we found that 38%of children eat when they alone or angry .in the study of Moens Et al shown that overweight children eat when they are not hungry much more often than non-overweight children due to emotional stress.[37] our study also shows that 38%of children always eat snacks and this confirmed in Fisher et al study that in the obese children the amount of energy consumed as snacks was 19% higher comparing to their non-obese counterparts.[38] And 42% of them sometimes eat fast food .In a research run by Gillis and Bar et al.eating out" or ordering food became avery popular habit. The favourite foods which children eat outside of their homes is so called fast food hamburgers, hot-dogs, pizzas. Such meals are most often high in calories, saturated fats, at the same time they are scanty in nutrients needed for proper development of a child and in the group of obese children 8 meals per month were eaten outside of home and children with a proper weight ate on average 5meals per month outside of home.[39]

In table no (3) we found that mean of age of obese and overweight children was10 and mean of child BMI was 29.5,according to new figures published on 24 July 2018 by Public Health England (PHE) found that the level of severe obesity in children aged 10 to 11 years in England has reached the highest point since records began(40) and also we find that mean of ages for mother and father are 38 and 44 respectively , in Myrskyla M et al. study done in 2012 found that children born to older mother have high risk of being obese and higher rates of diabetes.[41]

In Table no(4) ,we find that 50 %of mothers obese and 42% are overweight and 42% of the fathers are obese Previous studies reported that children of obese parents have a higher risk of obesity. If both parents are obese, they were reported to have a 30–40% risk of their children being obese,when both parents were not obese, the risk was only 14%.[42,43] in a retrospective cohort study. Lazzeri et al. showed that maternal obesity increased risk of childhood obesity by 6 times compared with normal weight mothers.[44] Also we found that 62% of mothers and 78%of fathers are employed .In Cawley and Liu et al. Study who examine mothers' time use based on the American Time Use Survey, find that employed women spend less time cooking and eating with their children.[45] Likewise, Gaina et al. who investigate the effects of maternal employment on nutrition habits such as the regularity of breakfast, snacks and dinner and the speed at which meals are eaten,show that among a sample of 12- to 13-year-old Japanese schoolchildren, mother's employment status affects

children's eating habits in a way that could lead to weight problems.[46] Also these mean better family income than unemployed parent ,In Alwan et al study done among school children in Riyadh, Saudi Arabia showed the relation of Family income and childhood obesity found that children aged 6–16 years were more likely to be overweight if their families had higher income (p-value < 0.01), compared to families with low income.[47]

In Tables no (5) (6) we found that there is most of obese children have obese parent. But no significant correlation between them . In Savashan et al. Study found that the prevalence of obesity increased significantly in children of parents with high Body Mass Index (BMI)[48] Ozturk and Akturk Et al.also found that the BMI averages of parents of the obese stu- dents were higher.[49] in Manios Et al study confirmed parental overweight shows a significant association with the children's weight status and this effect is mainly accounted for by a combination of genetic and behavioral factors, as parents have a strong influence on their children's eating and drinking habits, as well as on their activity levels.[50] Non significant correlation in our study maybe due to our small sample and our sample mostly consist of obese children and very few overweight children.

CONCLUSION

The growing problem of childhood obesity can be curbed if society focuses on the causes. There are many components that affect childhood obesity, some more important than others. A combined diet and physical activity intervention carried out in the community with an educational component is most effective for obesity or overweight prevention. If parents followed a healthier lifestyle at home, many obesity problems could be avoided. This will have the biggest impact on the decisions children make when choosing foods to eat at school and in fast food restaurants and choosing to be active. Focusing on these causes can reduce childhood obesity over time and lead to an overall healthier society.It is very important to recognize overweight and obese children in school. Obesity prevention programs should be organized for all children. Social and school life can be managed with programs that involve teachers, students and their families to raise awareness of obesity. Obesity should be a national public health priority in our country.

LIMITATIONS

1. Difficulty collecting data due to schools being disrupted as a result of the COVID-19 pandemic
2. Difficulty completing the questionnaire as a result of the many questions that need to allocate more time by parents and children
3. Some children and parents do not know their weight and height accurately and we had to measure their weight and height

4. Some parents do not remember enough information about their children in the first years of their life

Recommendation

The study recommends educating people by providing practical and understandable information about healthy eating that people can easily incorporate into their daily lives and to encourage active lifestyles in children. Governments should make sure that adequate facilities, like recreational spaces, walking and cycling pathways , all these places should be available for children, as well as the establishment of timely and appropriate examination, diagnosis and treatment of diseases that may increase the risk of developing obesity in children.

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