Prevalence of obesity among adolescents at secondary schools in Kirkuk city

انتشار السمنة بين المراهقين في المدارس الثانوية في مدينة كركوك

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المستخلص:
الهدف: لايجاد السمنةِ لدى المراهقين في المدارس الثانوية، ولتَمييز العلاقة بين صفات المُراهقين البدناء والتأريخ العائلي للسمنة.
المنهجية: دراسة عرضية نُفّذتْ بين ٥٣٧ مُراهق (٢٧٠ ولد و٢٦٧ بنت) بعمر ١٢-١٥ سَنَوات إختارتْ بواسطة تقنية عينة عشوائيةِ متعددة المراحلِ.
النَتائج: نسبة إنتشار السمنةِ بين المُراهقين كَانَت ٢٢,٣ %. (٥٥,٨ %) من المُراهقين البدناء كَانوا ذكر، و(٤٢,٥ %) من المُراهقين البدناء كانوا بعُمرِ (١٣) سنة، و(٧٩,٢ %) من المُراهقين البدناء كَانوا من مستوى متوسّط لنتيجة الحالة الإقتصاديةِ الإجتماعيةِ. هناك علاقة هامّة بين المُراهقين البدناء والتأريخِ العائلي مِنْ السمنةِ الذي أشارا بوجود سمنةِ في العائلة، السمنة للأبِّ، والسمنة للاخ والاخت (٠,٠٠٠، ٠,٠٣٧، و٠,٠٠٠) على التوالي عِنْدَها علاقة هامّة جداً مع المراهقين البدناء.
التوصيات: برامج تركز على التَرويج للتغيير في أساليبِ الحياة من عادات غذاءِ ونشاطِ طبيعي متزايدِ مَنْ الضَّرُوري أَنْ يُطبّقا على الأقل في مراحل مبكرة من حياة الاطفال.

Abstract:
Objective: to identify the secondary school adolescent's obesity, and to find out the relationship between adolescents obesity characteristics and their family history.
Methodology: A cross-sectional study was carried out among 537 adolescents (270 boys and 267 girls) aged 12-15 years selected by means of a multistage stratified random sampling technique.
Results: the prevalence of obesity among adolescents was 22.3%. (55.8%) of the obese adolescents were male, (42.5%) their age is (13) years old, and (79.2%) of them coming from middle level of socio economic status score. There are a significant relationship between obese adolescents and their family history of obesity which indicated that obese father, and obese brother /sister (0.000, 0.037, & 0.000) respectively have a highly significant relationship with adolescents' obesity.
Recommendation: Intervention programs focusing on promoting changes in lifestyles, food habits and increasing physical activity need to be implemented at the earliest stage of children life.
Key words: Obesity, Adolescents

Introduction:

Obesity increased in the societies due to poor eating habits like increase consumption of sweetened beverages, energy-dense foods and change in the eating behavior to consumption of refined grains, added sugars, added fats, snacks, beverages, fast foods and eating away from home.[1] Obesity is concerned as a cause for many health problems in the future of obese human such as gall bladder disease, ischemic stroke, osteoporosis, and some types of cancers,[2] adverse consequences of obesity, such as diabetes, cardiovascular disease,[3] .sleep apnea, gastro-esophageal reflux, depression, poor self worth,[4] non-alcoholic fatty liver disease[5] and physical and psychological aspects problems [6] .

The issue of overweight and obesity has become a serious public health concern all over the world during the last decades. The prevalence of overweight and obesity is increasing, and obesity is estimated to be a major leading cause of mortality and morbidity, causing an estimated 2.6 million deaths worldwide and 2.3% of the global burden of disease [7].

In recent years, obesity among children and adolescents has emerged as a global epidemic and serious public health problem in the Eastern Mediterranean region. In Saudi Arabia, a country that has experienced marked nutritional changes and rapid urbanization in recent decades, it was estimated that 26.6% and 10.6% of adolescents aged 13–18 years are overweight or obese, respectively [8] .

In Iraq study conducted in Karbala city related to Prevalence of Obesity among Adult Population and the result was that obesity affects about 30% of adult population in Karbala [9]. Another study conducted in Al-Najaf Al-Ashraf City to assess self esteem of obese adolescents and the prevalence of obesity was a (17.26%) of the total study samples (1350) adolescents. [10]. Hereditary factors are a major factor contributing to obesity. It most closely correlates with the biological mother's weight [11].

Obesity presents as a disorder of the mechanisms of energy balance in the body. Although predisposition to obesity is partly determined by genetic factors, an obesogenic environment is required for the phenotypic expression. Body weight, like height, is passed on genetically; the body fat content of adopted children shows a better correlation with that of their biological parents [12].

Methodology:

Subjects: The study population included Iraqi nationals, male and female students, aged 12 to 15 years. A representative sample of these adolescents (537 students, 270 boys and 267 girls) was selected from schools in Kirkuk city by using the proportional stratified sampling. From each school (20%) of the total number of students were randomly selected by interval number. The obese adolescents' number was 120 out of the total study sample.

Anthropometric measurements:

The weight is measured for each adolescent participant in the study. It is measured without shoes and light clothes as possible. The investigator used weight scale which is highly reliable and borrowed from the Iraqi Nutrition Research Institute made by (Seca Company, Australia), weight scale is a gift from the United Nation Children's Fund (UNICEF) and has a capacity of (188.8) kg.

Before use the scale, the investigator is checking the scale daily by weight a standard weight. During weighting, the scale was placed on a hard-floor surface, and each participant was stand still in the center of the platform of the scale with the body weight evenly distributed between both feet.

The height of adolescents is measured without shoes by using measuring tape of height two meters (UNICEF tape measure) it is already reliable. The individual should stand on a flat surface with weight distributed evenly on both feet, heals together and the head upward. The arms are hanging freely to the sides, and

the head, back, buttocks and heal are against the wall with the knee fully extended and line of vision parallel to floor.[13] According to the Dietary Guidelines for Americans 2010, body mass index is a measure of weight in kilograms (kg) relative to height in meters squared. Body mass index status categories include underweight, healthy weight, overweight, and obese.

Underweight: < 5th percentile of BMI for age

Normal weight: 5th to < 85th percentile of BMI for age

Overweight: 85th to < 95th percentile of BMI for age

Obese: ≥95th percentile of BMI for age. [14]

BMI was calculated by scientific application program (WHO AnthroPlus) which obtained from Iraqi Nutrition Research Institute.

Questionnaire: The sociodemographic data sheet, consisted of (12) items categorized as general information (adolescents age and gender) and socioeconomic data (parents level of education, parents occupation status, type of family, total number of family, number of rooms, house area, house content and car possession).

Question about the obesity history of adolescents families, if their obesity among families members (father, mother, and brother/sister).

A statistical analysis was performed using the Microsoft office excel 2007 and SPSS package (version 16). Chi- square statistics were used to determine the presence of an association between the variables.

Results:

Table 1. Distribution of the Study Sample by their General Information

Variables		No.	%
Gender	Male	270	50.3
	Female	267	49.7
Age (years)	12	79	14.7
	13	183	34.1
	14	145	27
	15	130	24.2
Socio-Economic Status Score(SESS)	High	40	7.4
	Middle	416	77.5
	Low	81	15.1

No. = number, % = percentage, SESS = Socio-economic Status Score

Table (1) shows that (50.3%) of the adolescents pupils is male, (34.1%) their age is 13 years old, and (77.5%) of them coming from middle level of socio economic status score.

Table 2. Distribution of the Study Sample by their Overall Measurement through Body Mass Index Percentile Results

BMI percentile	No.	%
Underweight (<5th Percentile)	36	6.7
Normal (5th -84th Percentile)	330	61.5
Overweight (85th -94th Percentile)	51	9.5
Obesity (=>95th Percentile)	120	22.3
Total	537	100%

No. = number, % = percentage

Table (2) shows that (22.3%) is obese from the total study sample and their percentage reflects that one fifth of study sample were obese.

Table 3. Association between Obese Adolescents General Information and their Body Mass Index

Variables		BMI percentiles Obesity (≥ 95th percentile) No.	BMI percentiles Obesity (≥ 95th percentile) %	p-value χ^2
Gender	Male	67	55.8	χ^2 =14.77 Sig=0.002*
	Female	53	44.2	
Age (years)	12	15	12.5	χ^2 =9.629 Sig=0.381
	13	51	42.5	
	14	31	25.8	
	15	23	19.2	
Socio-Economic Status Score	High	11	9.2	χ^2 =5.260 Sig=0.511
	Middle	95	79.2	
	Low	14	11.7	

No. = number, % = percentage, P= probability level, χ^2 = Chi-square, Sig. = level of significant, * = significant at p-value ≤ 0.05

Table (3) show (55.8%) of the obese adolescents is male, (42.5%) their age is 13 years old, and (79.2%) of the obese adolescents come from family of middle level of socio economic status score.

Table 4. Association between Obese Adolescents and the History of Obesity of their Families Members

History of Obesity	Items	No.	%	P-value χ^2
Obesity in the Family	Yes	71	59.2	χ^2=24.852 sig=0.000*
	No	49	40.8	
Obese Father	Yes	27	22.5	χ^2=8.508 sig=0.037*
	No	93	77.5	
Obese Mother	Yes	29	24.2	χ^2=5.075 sig=0.166
	No	91	75.8	
Brother/Sister Obesity	Yes	37	30.8	χ^2=20.938 sig=0.000*
	No	83	69.2	

No. = number, % = percentage, P= probability level, χ^2 = Chi-square, Sig = level of significant, * = significant at p-value ≤ 0.05

Table (4) shows that (59.2%) of the obese adolescents has obesity history in their family, (22.5%, 24.2%, and 30.8%) of the obese adolescents has obese fathers, obese mothers, and obese brothers or sisters respectively.

Discussion:

Table (1) which refers to the statistically distribution of the observed freq-uencies, percentages of some related demographical characteristics variables for the entire studied sample.

Regarding to the gender, the finding indicate that males more than females (50.3%, 49.7%) respectively. Regarding to the age, the finding indicate that adolescents with 13 years old more than other age groups (34.1%).

Regarding to the socio-economic status, it is found that most of the study sample is from the middle level of SES. The study results in table (2) shows that more than half of the study sample in regarding to their BMI percentile has normal weight (61.5%) and (22.3%) were obese. This result agrees with Bin Zaal et al., in his study Dietary habits associated with obesity among adolescents in Dubai, United Arab Emirates for age (12-17), prevalence of obesity was 21.3% of the study sample. Table (3) refers to the statistically distribution of some related demographical characteristics variables for obese adolescents. [15]

Regarding to the gender, the finding indicates that obesity is more common in males than females (55.8% males). Concerning to the obese adolescents age, the finding of this study shows that the obesity is increasing in thirteen years old of adolescents more than other ages. This result agree with Bin Zaal et al., in his study

Dietary habits associated with obesity among adolescents in Dubai, United Arab Emirates for age (12-17), he find that obesity in male more than female and obesity increase in fourteen years old for male and thirteen years old for female.

Regarding to the socioeconomic status, it is found that most of the obese adolescents is from middle SES.

Parental obesity has been identified as a predominant risk factor for childhood obesity, probably owing to a combination of genetic, epigenetic, social and environmental factors. Children with two obese parents have a higher risk of obesity than those with one or no obese parent. [16]

The results of the table (4) refer to the correlation between the obese adolescents and their family history of obesity, the study results indicate that there is highly significant relationship between obese adolescents and obesity in the family, obese father, and obese brother /sister (0.000, 0.037, 0.000) respectively, while there is a no significant relationship between obese adolescents and obese mother. Svensson et al., agree with this result, he fined that in his study associations between severity of obesity in childhood and adolescence, obesity onset and parental BMI: in a longitudinal cohort study, Severity of obesity was significantly correlated with both maternal and paternal BMI ($P<0.01$).[16] Jiang et al., in their study an association between child and adolescent obesity and parental weight status: a cross-sectional study from rural north China, they found that there is a highly significant relationship between child/adolescent obesity was significantly associated with parental obesity (12.53% for father and 14.29 for mother) at p-value≤0.01. [17]

Recommendations:

1. The Ministry of Health must be provided a health staff for each school to follow up adolescents' health.
2. Regular visits to schools to detect obesity and its complications.
3. Continue to research the long-term health benefits that result from eating a healthy diet.
4. Research innovative, cost effective ideas to provide nutritious snacks during the school day.
5. Place posters throughout the school showing foods rich in various nutrients.
6. Healthy food tips in the school news letter for parents.
7. Provide facilities and environment for physical exercise in the schools.
8. Educational activities and more orientation about their diet and physical exercise at early ages involving the whole family to control the excess of weight.
9. Encourage adolescents and their families to read the list of calories on the backed foods.

References:

1. Drewnowski A., **Obesity, diets, and social inequalities**, Nutrition Reviews®, 2009: Vol. 67(Suppl. 1):S36–S39, p-s36.
2. AIHW-Australian Institute of Health and Welfare and National Heart Foundation of Australia**. The relationship between overweight, obesity and cardiovascular disease**. AIHW Cat 2004. No. CVD 29. Canberra: AIHW (Cardiovascular Disease Series No. 23). P. 4.
3. Simon G., Ludman E. J., Linde J. A., Operskalski B. H., Ichikawa L., Rohde P., Finch E. A., Jeffery R. W., **Association between obesity and depression in middle-aged women**, Elsevier Inc.2008: www. Scien ce direct .com, p-32.
4. Steinbeck K., **Adolescent overweight and obesity; How best to manage in the general practice setting**. 2007. Reprinted from Australian Family Physician Vol. 36, No. 8, p.607.
5. Crocker M., Yanovski J., **Pediatric Obesity: Etiology and Treatment. Endocrinol Metab Clin North Am**. 2009 September; 38(3): 525–548. doi:10.1016/j.ecl.2009.06.007.

6. Amiri P., Ghofranipour F., Ahmadi F., Hosseinpanah F., Montazeri A., Jalali-Farahani S., Rastegarpour A., **Barriers to a healthy lifestyle among obese adolescents: a qualitative study from Iran**, **J Public Health**, Swiss School of Public Health 2010: DOI 10.1007/s00038-010-0119-6, p-1.
7. Hussein M. M., **The Relationship of Waist-Hip Ratio and Body Mass Index to Blood Pressure of Employee in Sulaimani Teaching Hospital**. Master thesis. 2011. P. 1.
8. Al-Hazzaa H. M., Abahussain N. A., Al-Sobayel H. I., Qahwaji D. M., Musaiger A. O., **Lifestyle factors associated with overweight and obesity among Saudi adolescents**, **BMC Public Health**, 2012, p-2, http://www.biomedcentral.com/1471-2458/12/354.
9. Al-Hilaly K. A., Aboud H.A., Al-Ghabban S.I., **Prevalence of Obesity among Adult Population in Karbala**. **Kufa Med. Journal** 2008. Vol. 11. No.1.pp. 343-344.
10. Al-Dakheel M. B. H., **Assessment of obese adolescents' self-esteem in secondary schools at al-Najaf al-Ashraf city** thesis master college of nursing university of Baghdad, 2012. Pp.31-35, 50.
11. Myers M. D**., Causes of obesity:** Updated: 28 May 2004. P. 2. http://www.Weight.com.
12. Bircan I., **Genetics of Obesity**: **J Clin Res Ped Endo**, 2009 ;(Suppl 1). P. 54.
13. Wong D., Eaton M. H., Wilson D., Winkelstein M. L., Schwartez P., **Wong's essentials of pediatrics nursing**. 6th edition, Mosby. 2001. P. 156.
14. **Dietary Guidelines for Americans**. 7th Edition U.S. Department of Agriculture and U.S. Department of Health and Human Services. Washington, DC: U.S. Government Printing Office, December 2010.p.9. www.dietary guidelines.gov.
15. Ben Zaal A. A., Musaiger A. O., Souza R. D., **Dietary habits associated with obesity among adolescents in Dubai, United Arab Emirates**. Nutr Hosp. 2009; 24(4). Pp. 438-444.
16. Svensson V., Jacobsson J.A., Fredriksson R., Danielsson P., Sobko T., Schiöth H.B., Marcus C., **Associations between severity of obesity in childhood and adolescence, obesity onset and parental BMI: a long-itudinal cohort study**. **Inter-national Journal of Obesity** (2011) 35. P. 46.
17. Jiang M., Yang Y., Guo X., Sun Y., **Association between child and adolescent obesity and parental weight status: A cross-sectional study from rural north China**. **Journal of International Medical Research**. 2013. 0(0). P. 3.