

# Overweight and Obesity Associated Factors among High School Students: A Cross Sectional Study in Erbil

Sarhang Qadir Ibrahim<sup>1</sup>, Tariq S. Al- Hadithi<sup>2</sup>, Kameran Hassan Ismail<sup>3</sup>

<sup>1</sup>Bsc, Msc in Public Health, College of Medicine, Auvergne University Clermont Ferrand1, France, <sup>2</sup>Professor at College of Medicine, Hawler Medical University, Erbil, Kurdistan Region, Iraq, <sup>3</sup>Assistant Professor of Community Medicine, College of Medicine, Hawler Medical University, Erbil, Kurdistan Region, Iraq

## Abstract

**Introduction:** The overweight of youth and teens is one of the fundamental issues in the world that seems to be lifestyle and inactivity of the causes of overweight. The purpose of this study was to investigate the causes of obesity / overweight in high school students.

**Methods:** In this cross-sectional study, 1,000 students in the age range 16-18 years of Erbil, Iraq in 2016-2017 were randomly selected. Data were collected via questionnaire. Data were examined using SPSS 22 for windows and analyzed by appropriate statistical tests.

**Results:** surveys demonstrated that 30% of youth aged 16 to 18 were overweight or obese. About 30 percent met physical activity guidelines; however, physical activity was not associated with overweight or obesity in this sample. Computer games, watching TV (0.007) and irregular sleep (P-value=0.019) were among other known factors/ affecting obesity/overweight in this study.

**Conclusions:** According to findings, we concluded that a trend toward being overweight/ obese in youth and there are many factors involved, such as irregular sleep and lack of mobility in overweight.

**Key words:** *Overweight , obesity , high school students*

## Introduction

Overweight and obesity are the fifth leading risk for global deaths Worldwide, about 2.8 million deaths and 35.8 million (2.3%) of global Disability Adjusted Life Years (DALYs) are caused by overweight or obesity<sup>1</sup>. According to one US national study, the high prevalence of overweight and obesity during childhood and adolescence has been confirmed in recent decades and currently one child in ten is overweight or obese.<sup>2</sup> It is stated in one of the studies about 11% of US children and adolescents are classified as overweight (body mass index [BMI] > 95th percentile), and an additional 14% of children and adolescents have a BMI between the 85th and 95th percentiles of the reference population

that places them at risk for becoming overweight<sup>3,4</sup>. It should be noted that 44% of the diabetes burden, 23% of the ischemic heart disease burden and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity<sup>5,6</sup>. Data from the third National Health and Nutrition Examination Survey (NHANES III) presented Rapid outbreaks overweight in adolescents<sup>7</sup>. The prevalence of overweight in Iraq is experiencing a shift from underweight to overweight along with rapid socioeconomic and nutritional transition particularly in their area population. Inactivity and obesity are the leading cause of non-communicable diseases. The World Health Organization (WHO) has announced that at least 60 minutes of physical activity are necessary for all children aged 5 to 17 years<sup>8</sup>.

---

### Corresponding author:

**Sarhang Qadir Ibrahim,**

Telephone: 009647804458255

E-mail: sarhang.ibrahim@hmu.edu.krd

Given the increasing prevalence of overweight in Iraq and the importance of prevention and control of associated factors, we decided to assess the overweight in high school students and its relationship with lifestyle for the first time in Erbil.

## Materials and Method

This cross-sectional study, conducted from the 20th of September 2016 to the 10th of March 2017 where students of grade 10, 11 and 12 of public schools (between 16-18 years of age) across Erbil city of Kurdistan region of Iraq were taken as the primary sampling unit.

The sample was collected by multistage cluster sampling technique. Schools are divided into 6 groups according to the municipalities of Erbil city, to cover all quarters of the city. Schools were randomly selected according to the number of students in each region. The total number of selected schools was 32 distributed in the 6 municipalities. Of the 36,777 students in these schools, 1,000 students were randomly selected. From each school a single class was selected randomly; For Data collection from each class was attended by the counseling specialist of the school.

### Questionnaire Design:

A questionnaire that was designed by the CDC (Centers for Disease Control and Prevention) was modified and used as data collection<sup>9</sup>. The questionnaire had three parts including demographic information, habits and life style of the students and socio-economic status (SES) that was calculated taking into consideration age, education and occupation of the father, car ownership and house ownership, according to the formula designed by Omer and AL-Hadithi<sup>10</sup> and They were asked to choose between low SES, middle SES, and high SES which is one of the best types of descriptions. For better understanding; the questionnaires were adapted to each school's language of instruction (local Kurdish and also to Arabic language).

After collecting the questionnaires, Data were examined using statistical package for social sciences (SPSS) version 22 (SPSS Inc. Chicago, IL) for windows. Data were analyzed through the use of simple descriptive statistical data analysis approach and inferential data analysis approach. Chi-square test of association was used to assess the association between the prevalence and several risk factors and Fisher's exact test was used instead of the Chi square test when the expected count of more than 20% of the cells of the table was less than 5. P value of  $\leq 0.05$  was considered as statistically significant.

**Ethical Consideration:** This research study followed the tenets of the Declaration of Helsinki and written informed consent was obtained from all patients.

All students were assured that their participation in the study was voluntary; they were informed about the purpose of the study; their anonymity and confidentiality were assured. Also an official permission from Erbil General Directorate of Education and from schools' administrations to collect data was obtained.

## Results

Total 1000 high school students were analyzed. Among them were 572 women and 428 men with an average age of  $16.94 \pm 0.79$ .

According to Table 1, the prevalence of overweight and obesity in the whole sample was 30% that was significantly higher in men than in women ( $p=0.001$ ). Youth who reported a low socio-economic status were Overweight and obesity higher than those from households with high socio-economic status but this difference was not significant ( $p=0.595$ ). There is no relationship between obesity/overweight with different municipalities ( $p=0.418$ ) and living with parents ( $p = 0.836$ ). Obese caregivers, compared to desirable weight parents, were more likely to have overweight or obese children. The relationship between diabetes and overweight of parents with overweight in youth was also determined that only maternal diabetes was significant in this regard (0.040).

Table 2 shows the effect of dietary habits on overweight and obesity. These results indicate that the rate of eating, Time to eat, and type of food is effective in overweight and obesity. For example, eating food before bed and also eating rice more than once a day is significantly associated with overweight and obesity.

Table 3 examines the degree of sleep and mobility, these results show, Although inactivity is one of the main causes of overweight and obesity, and there is a meaningful relationship, but there is not related to the type of activity. Significant association was detected between the prevalence of Overweight and obesity with regular sleeping as presented which shows also that the prevalence among those who take a nap was significantly higher than the prevalence among those who don't take a nap ( $p < 0.001$ ).

**Table1. Youth demographic information and family/parental characteristics with youth overweight and obesity status**

| Variables   | N   | Prevalence of overweight & obesity |        | P_value |
|-------------|-----|------------------------------------|--------|---------|
|             |     | No.                                | %      |         |
| Age (years) |     |                                    |        |         |
| 16          | 346 | 126                                | (36.4) | 0.005   |
| 17          | 364 | 98                                 | (26.9) |         |
| 18          | 290 | 76                                 | (26.2) |         |
| Gender      |     |                                    |        |         |
| Male        | 428 | 157                                | (36.7) | 0.001   |
| Female      | 572 | 143                                | (25.0) |         |
| Class       |     |                                    |        |         |
| 10          | 348 | 128                                | (36.8) | 0.003   |
| 11          | 371 | 100                                | (27.0) |         |
| 12          | 281 | 72                                 | (25.6) |         |
| SES         |     |                                    |        |         |
| Low         | 253 | 82                                 | (32.3) | 0.595   |
| Middle      | 425 | 126                                | (29.6) |         |
| High        |     |                                    |        |         |
| Overweight  | 322 | 92                                 | (28.6) | 0.414   |
| Father      | 175 | 57                                 | (32.6) | 0.173   |
| Mother      | 194 | 66                                 | (34.0) | 0.449   |
| Diabetes    | 115 | 31                                 | (27.0) | 0.040   |
| Father      | 112 | 43                                 | (38.4) |         |
| mother      |     |                                    |        |         |

**Table 2. The characteristic dietary habits of youth with obesity and overweight**

|   | N   | Prevalence of overweight & obesity |        | P       |
|---|-----|------------------------------------|--------|---------|
|   |     | No.                                | (%)    |         |
| daily eating pattern < 0.001*                         |     |                                    |        |         |
| Less than normal                                      | 87  | 7                                  | (8.0)  |         |
| Normal  | 748 | 236                                | (31.6) |         |
| Overeat   | 109 | 44                                 | (40.4) |         |
| Binge   | 3   | 2                                  | (66.7) |         |
| Serious eating disorder                               | 38  | 3                                  | (7.9)  |         |
| Excessive snacking                                    | 15  | 8                                  | (53.3) |         |
| eat/snacks just before bedtime 577 236 (40.9) < 0.001 |     |                                    |        |         |
| eat breakfast   | 863 | 275                                | (31.9) | 0.001   |
| eat lunch   | 996 | 299                                | (30.0) | >0.999* |
| eat supper  | 885 | 822                                | (31.9) | < 0.001 |
| eat between meals                                     | 923 | 292                                | (31.6) | < 0.001 |

**Cont... Table 2. The characteristic dietary habits of youth with obesity and overweight**

|  |     |     |        |         |
|--|-----|-----|--------|---------|
| eat between supper and bed time          | 563 | 237 | (42.1) | < 0.001 |
| eat fruits/vegetables during the day     | 862 | 265 | (30.7) | 0.200   |
| drink soft drinks during the day         | 564 | 187 | (33.2) | 0.013   |
| eat chocolate, potato chips, etc         | 653 | 197 | (30.2) | 0.873   |
| drink tea                                | 759 | 260 | (34.3) | < 0.001 |
| drink juice                              | 732 | 233 | (31.8) | 0.037   |
| have lunch/dinner outside at restaurants | 377 | 129 | (34.2) | 0.024   |
| eat rice                                 |     |     |        | < 0.001 |
| More than once a day                     | 188 | 72  | (38.3) |         |
| Once a day                               | 176 | 54  | (30.7) |         |
| 2-3 times / week                         | 325 | 110 | (33.8) |         |
| Weekly                                   | 220 | 44  | (20.0) |         |
| Others (eating rice with other foods)    | 91  | 20  | (22.0) |         |

\*By Fisher’s exact test

**Table3. Effect of exercise and sleep on overweight and obesity**

|                                    | N   | Prevalence of overweight and obesity |        | P       |
|------------------------------------|-----|--------------------------------------|--------|---------|
|                                    |     | No.                                  | (%)    |         |
| exercise/physical activity         | 848 | 261                                  | (30.8) | 0.205   |
| Riding bicycle                     | 137 | 39                                   | (28.5) | 0.673   |
| Play football                      | 281 | 77                                   | (27.4) | 0.262   |
| Walking/running                    | 714 | 209                                  | (29.3) | 0.427   |
| Way to school                      |     |                                      |        | 0.087   |
| Walking                            | 772 | 242                                  | (31.3) |         |
| Car/Bus                            | 228 | 58                                   | (25.4) |         |
| sleep regularly                    | 691 | 223                                  | (32.3) | 0.019   |
| take a nap during the day          | 513 | 220                                  | (42.9) | < 0.001 |
| watch TV/play video games/computer | 943 | 292                                  | (31.0) | 0.007   |

**Discussion**

In this study to assess the overweight in student, Factors affecting it and its relationship with lifestyle, our estimates of overweight/obesity showed the prevalence of overweight and obesity in the whole sample was 30%. In a study in Tehran, which was conducted on 158 children, this number is reported to be 36%<sup>11</sup>.

We found that the relationship between socio-economic status and overweight in children was significant, so that by increasing SES, overweight among children increased. In other studies, they have merely examined the economic situation, all of which express the significance of this relationship. In other studies, it was also well-documented that low socioeconomic groups are heavily influenced by obesity<sup>12, 13</sup>.

The, 66.6% of parents were overweight in our study which coincided with the study of Jeremiah and colleagues; they reported parental obesity about 70%<sup>9</sup>. In general, studies show that children who are at least one of their parents are obese have a higher risk for obesity than parents with healthy weight<sup>14-16</sup>.

A study by Patrick et al. showed that those who were overweight had less physical activity<sup>17</sup>. According to the results of this study, the relationship between overweight and physical activity was significant but have no significant relationship with physical activity. Low physical activity and reducing energy consumption and reducing the oxidation of fats in the body leads to overweight. Results of the some study showed that the consumption of more fruits, vegetables and protein are seen in children and youth with regular physical activity<sup>4</sup>. But in our Study there was no significant difference related to less use of fiber and vegetables with the overweight.

The results of this study revealed the relationship between sleep and overweight, so that people who had a regular sleep and were napping during the day were less likely to be obese and overweight. The relationship between sleep deprivation and obesity has been studied in epidemiological studies in different countries<sup>18</sup>. Sleep deprivation is associated with reduced energy consumption<sup>19</sup>. St-Onge and Associates study of 5115 people showed that sleep deprivation is associated with body mass index, body composition and abdominal obesity<sup>20</sup>.

We concluded that a trend toward being overweight/obese in youth and there are many factors involved, such as irregular sleep and lack of mobility in overweight. It seems that people in terms of diseases and genetic factors should also be compared in future studies.

#### **Conflict of Interest:** Not

**Clearance Ethical:** The study was approved by the Ethics Committee of the college of medicine of the Hawler medical university.

#### **Source of Funding:** Not

### **References**

1. Kearns K, Dee A, Fitzgerald AP, Doherty E, Perry IJJBph. Chronic disease burden associated with overweight and obesity in Ireland: the effects of a small BMI reduction at population level. 2014;14(1):143.
2. Hazbun OM, Azcona C, Martínez JA, Martí AJAD. Management of overweight and obesity in adolescents: an integral lifestyle approach. 2009;13(4):153-60.
3. Story MT, Neumark-Stzainer DR, Sherwood NE, Holt K, Sofka D, Trowbridge FL, et al. Management of child and adolescent obesity: attitudes, barriers, skills, and training needs among health care professionals. 2002;110(Supplement 1):210-4.
4. Shahverdi E, Taheri F, Pourmohammad A, Shahverdi A, Konjedi M, Vakiloroaya Y, et al. Overweight in students and its relationship with the lifestyle: A cross sectional study in Birjand, 2014. 2016;2(3).
5. Organization WH. World health statistics 2010: World Health Organization; 2010.
6. Lobstein T, Jackson-Leach R, Moodie ML, Hall KD, Gortmaker SL, Swinburn BA, et al. Child and adolescent obesity: part of a bigger picture. 2015;385(9986):2510-20.
7. Rashidi A, Mohammadpour Ahranjani B, Vafa M, Karandish MJOr. Prevalence of obesity in Iran. 2005;6(3):191-2.
8. Bhuiyan MU, Zaman S, Ahmed TJBp. Risk factors associated with overweight and obesity among urban school children and adolescents in Bangladesh: a case-control study. 2013;13(1):72.
9. Garza JR, Pérez EA, Prelipe M, McCarthy WJ, Feldman JM, Canino G, et al. Occurrence and correlates of overweight and obesity among island Puerto Rican youth. 2011;21(2):163.
10. Nichols S, Cadogan FJEjocn. BMI-based obesity cutoffs and excess adiposity in a Caribbean adolescent population of African origin. 2009;63(2):253.
11. Otero-Gonzalez M, Garcia-Fragoso LJPRhsj. Prevalence of overweight and obesity in a group of children between the ages of 2 to 12 years old in Puerto Rico. 2008;27(2).
12. Miech RA, Kumanyika SK, Stettler N, Link BG, Phelan JC, Chang VWJJ. Trends in the association of poverty with overweight among US adolescents, 1971-2004. 2006;295(20):2385-93.
13. Wang Y, Beydoun MAJEr. The obesity epidemic in the United States—gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a

- systematic review and meta-regression analysis. 2007;29(1):6-28.
14. Lawlor DA, Timpson NJ, Harbord RM, Leary S, Ness A, McCarthy MI, et al. Exploring the developmental overnutrition hypothesis using parental-offspring associations and FTO as an instrumental variable. 2008;5(3):e33.
  15. Kivimäki M, Lawlor DA, Smith GD, Elovainio M, Jokela M, Keltikangas-Järvinen L, et al. Substantial intergenerational increases in body mass index are not explained by the fetal overnutrition hypothesis: the Cardiovascular Risk in Young Finns Study. 2007;86(5):1509-14.
  16. Smith GD, Steer C, Leary S, Ness AJAodic. Is there an intrauterine influence on obesity? Evidence from parent-child associations in the Avon Longitudinal Study of Parents and Children (ALSPAC). 2007;92(10):876-80.
  17. Patrick K, Norman GJ, Calfas KJ, Sallis JF, Zabinski MF, Rupp J, et al. Diet, physical activity, and sedentary behaviors as risk factors for overweight in adolescence. 2004;158(4):385-90.
  18. Vorona RD, Winn MP, Babineau TW, Eng BP, Feldman HR, Ware JCJAoim. Overweight and obese patients in a primary care population report less sleep than patients with a normal body mass index. 2005;165(1):25-30.
  19. Benedict C, Hallschmid M, Lassen A, Mahnke C, Schultes B, Schiöth HB, et al. Acute sleep deprivation reduces energy expenditure in healthy men. 2011;93(6):1229-36.
  20. St-Onge M-P, Perumean-Chaney S, Desmond R, Lewis CE, Yan LL, Person SD, et al. Gender differences in the association between sleep duration and body composition: the Cardia Study. 2010;2010.