ORIGINAL ARTICLE

# Prevalence of Obesity and overweight among Primary School Children, in Majmaah Saudi Arabia

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## Abstract

**Background:** Obesity has become an epidemic worldwide. In 2010, the World Health Organization (WHO) estimated that 42 million children under 5 years of age were overweight or obese. In the Eastern Mediterranean Region, the disease reached an alarming level, the prevalence among schoolchildren was 12%–25%. The objective of the current study was to assess obesity and overweight among primary school Students in Majmaah, Saudi .Arabia

**Materials and Methods**: This was a cross-sectional and community -based study conducted at primary schools in Majmaah, the capital of Majmaah province in Riyadh region, Saudi Arabia. A sample frame included all primary schools in the city. The sample size was calculated as 400. Pre-tested questionnaire was employed to collect data. Height and weight of the children were measured and .body mass index (BMI) was calculated

**Results:** Age of respondents ranged from 6-14

## الملخص

خلفية:

اصبحت زيادة الوزن والسمنة وباءا عالميا وقدرت منظمة الصحة العالمية معدل السمنة وزيادة الوزن وسط الاطفال دون سن الخامسة ب ٤٢ مليون طفل في العام ٢٠١٠ .تعتبر مطقة الشرق الاوسط من المناطق التي وصل فيها معدل السمنة وزيادة الوزن الي معدلات عالية ودق ناقوس الخطر حيث وصلت الي ١٢٪ و٢٥٪ . الهدف من الدراسة الحالية هو تقييم معدل زيادة الوزن والسمنة في المدارس الابتدائية بمدينة المجمعة بالمملكة العربية السعودية.

منهجية الدراسة:

هذه الدراسة مقطعية مجتمعية تمت في المدارس الابتدائية بمدينة المجمعة وهي عاصمة محافظة المجمعة بمنطقة الرياض بالمملكة العربية السعودية. اشتمل اطار العينة جميع المدارس الابتدائية بمدينة المجمعة . بلغ حجم العينة ٤٠٠ طالب وطالبة. تم استخدام الاستبانة المسبقة الاختبار لجمع البيانات كما تم قياس الاطوال والاوزان للاطفال باستخدام اجهزة قياس الطول والوزن ومن ثم تم حساب معدل كتلة الجسم.

النتائج:

years (mean = 10 ± 2.1 years). The prevalence of overweight and obesity among primary school students were 10.1% and 18.9% respectively. The prevalence rate of overweight and obesity among male students were 11.2% and 17.6% respectively. The prevalence rate of overweight and obesity among females was 9.2% and 19.8% respectively. There is no significant association between nutrition status with social factors (age/gender)

**Conclusion:** Overweight and obesity were high among the school children. Fast food and soft drinks were highly consumed by the primary school children.

**Key Words:** Obesity, Overweight, social factors

عمر الطلاب والطالبات ما بين ٦ الي ١٤ سنة (الوسط الحسابي ١٠ ± ٢,١ ) .معدل انتشار زيادة الوزن والسمنة وسط الطلاب والطالبات : ١٠,١٪ و١٨,٩ ٪ . معدل انتشار زيادة الوزن والسمنة وسط الطلاب الذكور: ١١,٢٪ و١٧,٦٪ معدل انتشار زيادة الوزن والسمنة وسط الطالبات الاناث كان ٩,٢٪ و١٩,٨٪. لم تثبت الدراسة وجود علاقة بين الحالة التغذوية والعوامل الاجتماعية كالعمر والنوع.

الخلاصة:

معدل زيادة الوزن والسمنة مرتفع وسط الطلاب والطالبات بمدارس المجمعة الابتدائية كما اتضح ان استهلاك الوجبات السريعة وشرب المياه الغازية كان من اكثر الاشياء ّات العلاقة بزيادة الوزن والسمنة لدى الطلاب والطالبات.

## Introduction:

Childhood overweight and obesity are on the rise and considered as a serious health problem worldwide. In 2010, the World Health Organization (WHO) estimated that 42 million children under 5 years of age were either overweight or obese [1]. Obesity in general is a major risk factor for non-communicable diseases (NCDs), and it is estimated that by the year 2020, three-quarter of all deaths in developing countries will be attributed to NCDs. Many diseases and health-related abnormalities are associated with obesity such as metabolic, cardiovascular, and musculoskeletal disorders [2]. Obese children are more prone to develop such diseases and abnormalities. One study among children aged 2-19 years in USA showed that 31.7% were overweight and 16.9% were obese [1]. Increasing rates of obesity and overweight have been observed globally, For example, Brazil showed an increase from 4.1% in 1975 to 13.9% in 1997; China from 6.4% in 1991 to 7.7% in 1997; and India from 16% in 2002 to 24% in 2007

[1]. The Middle East has included its share in this global epidemic of obesity, in a national survey in the

United Arab Emirate (UAE) the prevalence of overweight and obesity were estimated to be 21.5% and 13.7% among children aged 5-17 years respectively [1]. A study on Lebanese children aged 6 and 8 years puts the prevalence of overweight and obesity at 25.5% and 6.5% respectively. In Saudi Arabia, childhood obesity is being considered as a serious public health problem. Obesity and overweight among school-age children have reached 9.3% and 23% respectively [2]. Comparatively, the rates of obesity and overweight among preschool children were reported as approximately 6% and15% respectively [3].

A variation of this prevalence is seen in the Eastern and central regions have the highest prevalence of obesity and overweight while southern regions have the lowest prevalence of obesity and overweight. Both regional and national studies showed a trend of rising obesity over time [1].

A national household survey conducted in Saudi children found that the prevalence of obesity was 16.7% among boys and 19.4% among girls ranging from highest in the Eastern province and lowest in the Southern. [2.]

Using the prevalence reported by El Mouzan in Riyadh based on a 2005 reference data set (21% for overweight and 9.3% for obesity), it was estimated that the average of overweight and obesity for the last 7 years was 21% and 12.3%, respectively [3]. Al- Rukban conducted a survey on adolescents males aged 12-20 years from government boy schools and found that 13.8% were overweight and 20.5% were obese respectively; the prevalence of obesity was highest in Riyadh city [4]. In the northwest region of Riyadh, Al Alam conducted a survey among females aged 8-12 years and found that obesity prevalence was 14.9%; the 12 years old children were mostly affected [5]. Alsaeed conducted study in Al-Khobar city in 2006, the prevalence of overweight and obesity were 20% and 11%, respectively [6]. BMI is increasing worldwide, with 36.9 % of men and 38 % of women estimated to have a BMI ≥25 kg/m2 [7]. There appears to be a changing perception of obesity; this was illustrated in a population survey in which fewer overweight and obese individuals defined themselves as overweight in 2007 when compared with 1999, despite a significant increase in the prevalence of obesity [8].

The objectives of the study were to determine the prevalence of obesity and overweight among primary school children in Majmaah, Saudi Arabia.

## Materials and Methods:

### Study design and subjects

A descriptive, cross-sectional, community -based study to assess obesity and overweight among primary school children in Majmaah city, Saudi Arabia during 2014-2015. Majmaah city is the capital of Majmaah province which is located in Riyadh region. The study population was students in the primary schools in Majmaah city of 6-14 years of age and both genders.

### Sampling

Primary Schools in Majmaah city were listed from which 20 were selected by systematic random sampling. The sample was distributed between males and females according to population size. Within the school, the students were selected from different classes. The sample size was calculated as 400.

### Data collection

A pre-tested questionnaire was used to collect data. The questionnaire contained socio-demographic characteristics, data on dietary habits and exercise. The questionnaire was filled by the parents of the children. Measurements of weight and height were conducted to calculate the body mass index (BMI).

Height was recorded using a measuring tape, with individuals standing without shoes. Each individual was asked to stand straight next to the wall. The head was kept erect and the height was measured to the nearest 0.5 cm. Weight was recorded on a measuring scale calibrated initially by taking two successive readings to the nearest 0.1kg. Each student was instructed to wear light clothes and stand barefoot on the weighing scale[ 8].

The height and weight were used to calculate the BMI using the formula:

BMI= Weight (kg)/height $(m)^2$. WHO growth chart which depended on data from widely different ethnic backgrounds and cultural settings was used [9]. Students with BMI below −2 SD (from the mean) for age and sex were defined as underweight. Students with BMI between −2 SD and +1 SD, +1 SD and +2 SD and +2 SD from the mean were defined as normal, overweight and obese respectively.

Data analysis was performed using the Statistical Package for Social Science (SPSS), version 19. Pearson's Chi Square was applied to confirm associations between qualitative variables. P value less than 0.05 was considered statistically significant.

**Ethical concern**

An ethical approval was obtained from the ethical committee of the Basic and Health Research Center of Majmaah University. Coordination and permission was obtained from the education administration in Majmaah province.

## Results:

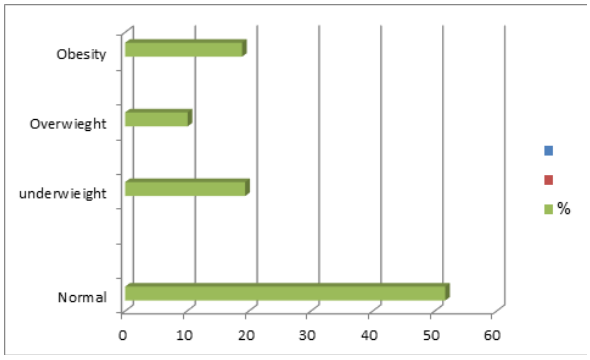



**Figure (1)**
**Nutrition status among school children in Majmaah**

A total of 387 out of 400 responded to the survey giving a response rate of 96.8%. Age of the respondents ranged from 6-15 years old (mean= 10.5 ± 2.1 years, 95% CI = 10.5-10.9).

The prevalence rate of overweight and obesity among primary school students in Majmaah primary schools was 10.1% and 18.9%

respectively

**Table (1) Association of nutrition status and social factors of Majmaah primary school children**

| Social Factors<br>Gender | Nutritional Status | | | | | |
|---|---|---|---|---|---|---|
| | Underweight | Normal | Over weigh | Obese | Total | P Value |
| Male | (35.3%)60 | (35.9%)61 | (11.2%)19 | (17.6%)30 | (43.9%)170 | 0.6933 |
| Female | (41.5%)90 | (29.5%)64 | (9.2%)20 | (19.8%)43 | (56.1%)217 | |
| Total | (38.8%)150 | (32.3%)125 | (10.1%)39 | (18.9%)73 | (100%)387 | |
| Age/years<br>6-8 | (32.2%)28 | (28.7%)25 | (8.0%)7 | (2.3%)2 | (22.5%)87 | |
| 9-11 | (25.1%)52 | (34.8%)72 | (9.7%)20 | (3.4%)7 | (53.5%)207 | 0.610 |
| More than 11 | (8.0%)70 | (9.7%)20 | (13.6%)12 | (19.1%)8 | (22.7%)88 | |
| Total | (38.8%)150 | (53.5%)207 | 10.1%)39 | (18.9%)73 | (100%)387 | |

Table (1) shows the association between the prevalence of nutritional status and social factors, p value was 0.6933. The prevalence rate of overweight and obesity among male students were 11.2% and 17.6% respectively. The prevalence rate of overweight and obesity among females .was 9.2% and 19.8% respectively .P value was 0.610

**Table (2) Association of Nutritional Status of school children and life style**

| **Life Style** | **Nutritional Status** | | | | | |
|---|---|---|---|---|---|---|
| | **Under-weight** | **Normal** | **Over weigh** | **Obese** | **Total** | **P** |
| Food Item | (31.5%)23 | (31.5%)23 | (12.3%)9 | (24.7%)18 | (18.9%)73 | |
| Meat | (46.1%)41 | (27.0%)24 | (5.6%)5 | (26.0%)19 | (23.0%)89 | |
| Vegetables | (36.6%)86 | (33.2%)78 | (10.6%)25 | (15.3%)36 | (60.7%)235 | 0.1895 |
| Carbohydrates | (38.8%)150 | (32.3%)125 | (10.1)39 | (18.9%)73 | (100%)387 | |
| Total | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Soft Drink/day | | | | | | |
| Once | (60.0%)90 | (52.8%)66 | (25.6%)10 | (27.4%)20 | (48.1%)186 | |
| time 2-3 | (28.0%)42 | (16.8%)21 | (30.8%)12 | (35.6%)26 | (26.1%)101 | 0.001 |
| and more 4 | (12.0%)18 | (30.4%)38 | (43.6%)17 | 37.0%)27 | (25.8%)100 | |
| Total | (38.8%)150 | (32.3%)125 | (10.1%)39 | (18.9%)73 | (100%)387 | |
| Eating Fast Food /Wk | | | | | | |
| Once | (35.2%)45 | (39.8%)51 | (9.4%)12 | (15.6%)20 | (38.8%)128 | |
| Twice | (37.8%)34 | (14.3%)10 | (27.2%)28 | (29.5%)31 | (31.2%)103 | |
| 3times and more | (12.2%)11 | (12.9%)9 | (24.3%)25 | (51.4%)54 | (30.0%)99 | 0.001 < |
| Total | (27.3%)90 | (21.2%)70 | (19.7%)65 | (31.8%)105 | (100%)330 | |
| Performing regular exercise | | | | | | |
| 1-2 | (11.5%)14 | (47.9%)46 | (11.5%)11 | (2.1%)25 | (44.9%)96 | |
| 3-4 | (36.9%)33 | (26.1%)18 | (2.0%)6 | (17.4%)12 | (32.2%)69 | |
| and more 5 | (55.1%)27 | (28.5%)14 | (6.1%)3 | (10.2%)5 | (22.9%)49 | < 0.001 |
| Total | (34.6%)74 | (36.4%)78 | (9.4%)20 | (19.6%)42 | (100%)214 | |

Table (2) shows the association between nutritional status and respondents' socio--demographic factors. There was significant association between obesity/overweight and students eating fast food ($p < 0.001$), performing regular exercise ( $p < 0.001$) and consuming soft drinks($p = 0.001$): However, there was no significant association between obesity/overweight and eating different food items (p=0.1895),).

## Discussion:

The results of the present study is similar to previous studies; Ali Al Shehri et al found the prevalence of overweight and obesity among Saudi school children as 23% and 9.3% in boys and girls respectively [1]. The current study is also in line with results of a cross-sectional national epidemiological household survey conducted among Saudi children in which the prevalence of obesity was 16.7% and 19.44% in the boys and girls respectively [2]. Similarly a review article by Ali Al Shehri between 2000 -2012 revealed that the rates of overweight and obesity among school-age children have reached 23.1% and 9.3%, respectively [10].

Our findings are consistent with Al-Almaie SM who showed that the prevalence of overweight and obesity among male adolescents was 10.2% and 19.3% respectively [11]. Our findings also finds similarity with a previous study about obesity prevalence among Saudi school boys (6-12 years old) in 1988 and 2005, where the prevalence increased from 3.4% 1988 to 24.5% in 2005 [12]. There is evidence that the prevalence of childhood overweight and obesity in Saudi Arabia is growing dramatically, this may be attributed to urbanization and adopting sedentary life style; the problem seems to be worsening when the children grow older [8]. Our study findings go in line with a study done In 2008, by Amin etal who found that the prevalence of overweight and obesity among schoolboys aged 10-14 years were 14% and 9.7% respectively [12].

Our findings support Al Dossary who conducted a representative study comparable to the Al Saeed survey in time, place, and references among children aged 2-18 years,it found that 19% of the children were overweight and 23.3% were obese. Al Dossary study also indicated that adolescents aged 14-18 years have the highest rates of overweight and obesity. [13]

The prevalence of overweight and obesity in adolescents in the eastern region has reached approximately 29%. This finding serves as evidence that the rates of overweight and obesity in adolescents have reached alarming levels. The estimated average prevalence of overweight in the eastern region was19.1%. Based on reference data from 2005, El Mouzan showed in 2012 that the prevalence of overweight and obesity reached 20.1% and 9.1% respectively [4].

In our study there is significant association between overweight/obesity and eating fast food ($p < 0.001$), with performing exercise ($p < 0.001$), and with drinking soft drinks ($p = ٠,٠٠١$). However, there is no significant association between overweight/obesity and eating different food items ($P = 0.1895$). The result does not show significant association between overweight/obesity and social factors i.e. age and gender. Global, regional and national prevalence of overweight and obesity in children and adults 1980-2013, A systematic analysis was conducted which

showed that there have been substantial increases in prevalence among children and adolescents in developed countries, with 23.8% of boys and 22.6% of girls being either overweight or obese in 2013. [14]. Musaiger .A.O etal conducted a study in the Mexico City area, on Physical activity and television viewing were related to obesity prevalence in Mexican children 9 ± 16 y old and significant association was found .[15]

Concerning factors associated with obesity in the Eastern Mediterranean Region, During the past decade, there has been increasing emphasis, especially in Saudi Arabia, Bahrain, Egypt, Kuwait, Lebanon and Tunisia, on determining the factors associated with obesity [17,18,19]. Nevertheless, in-depth studies on this aspect are few, which means there is a grave need for establishing a well-designed, community- based study in the Region. [16]

Changes in lifestyle, dietary habits, physical activity, and the socio-cultural environment play an important role in obesity.[20] combination of an excessive nutrient intake such as fast-food chains, high soft drinks and a sedentary lifestyle are the main causes in developing obesity.[21] Changes in socioeconomic status have had a significant effect on physical activity with the availability of easy transport, the increase in electrical home appliances long periods in watching television and sedentary activities.

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