

# Childhood obesity in association with eating habits & lifestyles among Saudi students in low socioeconomic status: A cross sectional study

## Abstract

**Aims:** Obesity is an issue that affects all levels of society with high rates of childhood obesity increasing in developing countries, due to poor meal quality, lack of awareness and physical inactivity.

**Methods:** This is a cross-sectional study conducted on 28 children over the age of six. The main objectives of the study are to assess their weights using anthropometric measurements and to evaluate their eating habits and lifestyles using an interview based questionnaire.

**Results:** The results show that 50% of the children are overweight or obese, with significantly low to medium awareness of nutrition, and high consumption of sweets and sugary drinks.

**Conclusions:** Our findings confirm that eating habits and poor lifestyles contribute to obesity and weight, which suggests that further research should be conducted on children via schools to identify the factors associated with obesity in both children and adolescents in Saudi Schools and design health promoting programmes accordingly.

**Keywords:** obesity, children, nutrition, food consumption, lifestyles

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**Noura M S Eid, Razan Albar**

Department of Clinical Nutrition, King Abdulaziz University, Saudi Arabia

**Correspondence:** Noura M S Eid, Faculty of Applied Medical Sciences, Department of Clinical Nutrition, King Abdulaziz University, PO Box 80200, Jeddah 21589, Saudi Arabia, Tel 00966507691249, Email Ooaeid2@kau.edu.sa

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## Introduction

Childhood obesity, diabetes, and allergies have surfaced as new challenges for healthcare providers and parents across the globe.<sup>1</sup> Their prevalence is increasing worldwide and is not limited to western or developed countries, it is also prevalent in high income and developing countries.<sup>2</sup> Increasing consumption of energy-dense and poor nutritional value foods with high levels of sugar and saturated fats,<sup>3</sup> coupled with reduced physical activity has resulted in high obesity rates among children.<sup>4</sup> The majority of youth and children, including pre-primary school children from the KSA, consume an insufficient amount of fruits and vegetables, which in turn can lead to inadequate consumption of dietary fibre and essential nutrients. The prevalence of childhood nutrition-related issues is rapidly increasing among school-going and pre-primary school children in the KSA.<sup>3</sup> Furthermore, a survey indicated that most overweight or obese pre-primary school children hail from high-income or affluent families.<sup>5</sup> Therefore, both parents and children require formal training in food and nutrition to establish proper and healthy eating habits and lifestyles, thus ensuring preventive measures to ward off the associated adverse health conditions.<sup>6</sup> Eating out and ready to eat food are more likely to be low in dietary fibres and other beneficial nutrients and high in fat, cholesterol, calories, sodium, and artificial food additives.<sup>7</sup> This is a common habit in GCC predominantly in middle-income countries, particularly in urban areas.<sup>8</sup> In addition, many European and US-based fast food chains have entered the GCC countries, particularly KSA and the UAE.<sup>9</sup> In the absence of accurate data points regarding pre-primary school children's food habits in Saudi Arabia, the literature has shown that children aged between three and six years are usually fed by their mothers whenever they demand to be fed which may make them more prone to nutrition related issues,

hence formal training at an early stage could help children develop healthy eating habits.<sup>10</sup> Being overweight, obese, or diabetic is widely associated with frequent consumption of sugar, savoury and crispy snacks, flavoured milk and soda drinks and snacking between meals. Pre-primary school children habitually go to bed with a bottle of milk, specifically flavoured milk, which puts them at a higher risk of developing symptoms of obesity.<sup>11</sup> These eating habits are prominent among pre-primary school children in the KSA, which leads to the onset of health-related issues among teens or persons in their early twenties, which results in obesity, diabetes, and other nutrition related issues.<sup>12</sup> Dietary habits and nutritional intake amongst the KSA's pre-primary school children needs to be improved to ensure healthy diet and prevent nutrition-related diseases in the adult population in the future.<sup>6</sup> School-based nutrition education programmes need to be initiated to increase awareness of the health risks of improper food consumption habits and preferences among parents and children.<sup>13</sup> This is a cross-sectional study conducted on groups of elementary level children (N=28). The main objectives of the study are to assess their weights and related to other environmental factors using interview based questionnaires, which include the following parameters; BMI, level of education, physical activity level, amount of fruit and vegetables consumed, and sweets and soft drink intake.

## Materials and methods

### Study design

A cross-sectional study based on face to face interviews with children was conducted in one private elementary school (28 girls) from September 2017 till January 2018. Exclusion criteria include children under six years old or more than 10 years old. Inclusion criteria include children between six and 10 years old. Ethics. King

Abdul-Aziz University Human Ethics Committee gave ethical approval, where, informed consent was signed by children parents.

### Healthy weight measurement

Anthropometry includes height, weight and body mass index (kg/m<sup>2</sup>) measurements, performed by registered dietitians. Weight was measured once using an electronic balance from Detecto company and height was measured thrice using a freestanding stadiometer.

### Eating habits and lifestyles questionnaires

Eating habits and lifestyles was assessed based on five measurements: nutrition education, physical activity level, amount of fruit and vegetables consumed, and sweets and soft drink intake.

### Statistical analysis

The descriptive data was collected and reported as frequency and percentage (%). One-way analysis of variance (ANOVA) was used to show significant differences in the BMI between ages, classes and BMI categories (underweight, normal, overweight), and the differences within each group. Significant differences between and within age, classes BMI categories was detected using the LSD tests and represented by “\*”  $p < 0.05$ , “\*\*”  $p < 0.01$  and “\*\*\*”  $p < 0.001$ . SPSS version 16.0 was used to analyse the data.

## Results

### Anthropometric measurements analysis

The height and weight of all children was measured, and the BMI calculated. The prevalence of normal weight, underweight, overweight and obesity of the subjects was 20.49%, 21.40% 32.10% and 25% respectively (Table 1) and there were no class differences in the BMI.

**Table 1** The prevalence of BMI categories between student

N	%	BMI categories
6	21.4	Underweight
6	21.4	Normal
9	32.1	Overweight
7	25	Obese

a, significant different between b & c,  $p \geq 0.001$ ; b, significant different between a & c,  $p \geq 0.001$ ; c, significant different between a & b,  $p \geq 0.001$ .

### Eating habits and lifestyles

An interview based questionnaire was delivered orally to the children to assess their eating habits and lifestyles. First, nutrition knowledge (food groups, healthy plate, and the health benefits of each group) were assessed and scores showed that 46.40% had low knowledge, 42.90% medium knowledge and 10.70% high knowledge (Table 2). A significant difference between high and low knowledge students was seen ( $p \geq 0.001$ ). 10.7% consume sweets 1-2 times per week, 50% consume sweets 2-3 times per week, and 39.3% consume more (Table 3). A significant difference between high and low consumption of sweets was evident ( $p \geq 0.001$ ). With regards to the other measurements, 26 students (92.90%) were physically active and only two students (7.10%) were not. Only one student (3.6%) reported that they do not consume fruit and vegetables every day. Only eight students (28.60%) reported that they do not consume sugary drinks on a daily basis (Tables 4–6).

**Table 2** Nutrition knowledge categories between students

N	%	BMI categories
13	46	Low
12	42.9	Medium
3	10.70a	High

a, significant different between b & c,  $p \geq 0.001$ ; b, significant different between a & c,  $p \geq 0.001$ ; c, significant different between a & b,  $p \geq 0.001$ .

**Table 3** Sweets and candy consumption during the week

N	%	BMI categories
3	10.7a	01-Feb
14	50	02-Mar
11	39.3	More

a, significant different between b & c,  $p \geq 0.001$ ; b, significant different between a & c,  $p \geq 0.001$ ; c, significant different between a & b,  $p \geq 0.001$ .

**Table 4** Daily physical activity

N	%	BMI categories
26	92.90a	Yes
2	7.1	No

a, significant different between b & c,  $p \geq 0.001$ ; b, significant different between a & c,  $p \geq 0.001$ ; c, significant different between a & b,  $p \geq 0.001$ .

**Table 5** Daily Fruit and Vegetables Consumption

N	%	BMI categories
27	96.40a	Yes
1	3.6	No

a, significant different between b & c,  $p \geq 0.001$ ; b, significant different between a & c,  $p \geq 0.001$ ; c, significant different between a & b,  $p \geq 0.001$ .

**Table 6** Daily Sugary Soft Drinks consumption

N	%	BMI categories
20	71.40a	Yes
8	28.6	No

a, significant different between b & c,  $p \geq 0.001$ ; b, significant different between a & c,  $p \geq 0.001$ ; c, significant different between a & b,  $p \geq 0.001$ .

## Discussion

Healthy nutrition is an essential factor for healthy living. It is especially important during the early growth stages, as these are essential years for physical and mental growth.<sup>14</sup> Dietary habits established in early childhood significantly influence inclination towards junk food in the future, which could lead to overweight or obesity, diabetes, and allergies.<sup>15</sup> This study followed the previous work conducted by Dr Eid and colleagues,<sup>3</sup> which assessed one of the main risk factors for obesity; meal quality. However, this study focuses on eating habits and lifestyles, which are regarded as major risk factors and include nutrition awareness,<sup>16</sup> physical activity,<sup>17</sup> consumption of sugary drinks and sweets<sup>18</sup> and low consumption of fruits and vegetables.<sup>19</sup> Our findings show that 50% of children are overweight or obese, with significantly low to medium awareness of nutrition, and high consumption of sweets and sugary drinks, however, the other risk factors appeared to have no significant influence.

Nutrition education is an important tool in reducing levels of obesity via changing eating habits and lifestyles.<sup>10</sup> In accordance with previous work, data collected from the Shaping Healthy Choices Program (SHCP) was tested among fourth graders and showed improvements in BMI scores and in nutrition education.<sup>21</sup> In addition, the Maryland Expanded Food and Nutrition Education Program (EFNEP) observed that nutrition education is associated with reduced BMI levels and increased fruit and vegetable consumption and physical activity.<sup>22</sup> However, this contradicts our findings where students have been observed to be physically active and consuming enough fruit and vegetables even though their knowledge on nutrition is low and their BMI is high. In our study we did not specify amounts of fruit and vegetables consumed, or availability or specific types consumed. Previous work demonstrated that several factors may affect their intake such as parental consumption, washed and chopped fruits, availability and types present.<sup>23</sup> Our findings may have shown false results, due to the limited information requested in the questionnaires. Sugar intake has been correlated with obesity levels in children.<sup>24</sup> Our findings have shown a significant increase in children's intake of sweets and sugary drinks. In the recently conducted Saudi School Meal and Home Meal Study (SSMHMS), a meal analysis showed that school meals contain a high amount of carbohydrates, which is also associated with high levels of obesity and overweight children.<sup>3</sup> In addition, other studies have observed that sugar-sweetened carbonated drinks are significantly associated with BMI scores and obesity levels.<sup>25</sup> This is due to the high energy intake and availability, which has critical impact on causing obesity, which is accompanied by low activity levels.<sup>26</sup>

Sweets and sugar can also be obtained from other sources that we did not address in our study, such as bread, pasta, cereal, fast food, desserts, and snacks.<sup>27</sup> A school based cross sectional study, which was part of the Arab Teens Lifestyle Study (ATLS), was conducted on Saudi adolescents and showed that high BMI scores are correlated with dietary habits, which include high sugar content food, such as sugar-sweetened drinks, cake, donuts, sweets and energy drinks. In addition, other eating habits and sedentary life factors have been taken into account, including breakfast consumption, fast food, watching TV duration and physical activity.<sup>28</sup> In Iran, a cross sectional study was conducted on children recruited from a primary school and it showed that watching TV for more than two hours everyday increases the risk of obesity, which, again, is correlated with physical inactivity.<sup>29</sup> It is evident that our interview with the children did not clearly define physical activity. According to the literature physical inactivity and sedentary lifestyles are strongly associated with obesity. Sociodemographic and economic status also influence the population's eating habits and lifestyles, where the urban population is typically less active than the rural one.<sup>30</sup> The participants from this study were from the urban population and had low socioeconomic status, therefore, previous research indicated that they would favour a sedentary lifestyle.

## Conclusion

This study was conducted for the first time based on findings from one-to-one interviews with children. The main purpose is to assess honestly and the children's perception of the measurements we selected; nutrition education, fruit and vegetable consumption, physical activity, sweets and soft drink consumption and using anthropometric measurements to detect BMI levels. We noticed that their knowledge of nutrition is low and their sugar and sweets intake is high in association with the high percentage of obese children in

the class. However, protective factors, such as fruit and vegetable consumption and physical activity have not been associated with high levels of BMI and a low education level. The limitations could be due to our selection of the interview based methodology.<sup>31</sup> It is essential to specify the food items tested in a validated questionnaire, including parental involvement, to confirm the data collected from the children.<sup>32</sup> Since 1979, the literature has discussed the importance of parental involvement, proving that their perception and attitude towards foods highly influences their children's food choices, which are affected by their mother's marital status, employment and income level.<sup>33</sup> Parents usually control their children's eating behaviour and lifestyle, which affects their health and obesity levels. Therefore, nutrition education programmes must target mothers or both parents before targeting children as children's perception of food originates from their homes and the environmental factors present at a young age.<sup>34</sup> We plan to follow a study conducted on the Lebanese population to identify major eating patterns associated with both children and mothers in Saudi Arabia using similar methods, which are one to one interviews and FFQs,<sup>35</sup> to create a suitable health promoting programme which targets mothers and children in Saudi schools.<sup>36</sup>

## Ethical approval

Ethical approval has been taken from the Faculty of Applied Medical Sciences.

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## Conflicts of interest

There is no conflict of interest.

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