Association Between Sleep Duration, Food Consumption Patterns and Obesity Among Adolescents in Qatar

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ABSTRACT
Background: Recent research suggests that sleep duration contributes towards developing unhealthy dietary habits which can lead to obesity. Further study in this field can provide a new direction in addressing this epidemic.

Objective: To examine the association between sleep duration, food consumption pattern, and obesity in adolescents in Qatar.

Hypothesis: Sleep duration and unhealthy dietary pattern may be positively correlated to obesity.

Methods: This is a cross-sectional, descriptive and analytical study including 1161 adolescents aged 14-19 years from a representative sample of independent secondary schools in the state of Qatar. Validated questionnaire was used to collect data on sleep duration and frequency of intake of foods. Sleep duration was classified as short (≤ 6 hrs), sufficient (7-8 hrs) and long (≥ 9 hrs). Anthropometric indicators included body weight, height and waist circumference (WC) that were measured using standardized procedures. General obesity was defined according to International Obesity Task Force (IOTF) age- and gender-specific body mass index (BMI) reference values. Age-specific cutoff values for WC were used to define abdominal obesity. Factor loading matrix was used to categorize healthy and unhealthy foods. The association between the study variables was assessed using multiple regression analysis.

Results: The mean frequency of food consumption was lower for students of shorter sleep duration regardless of the day of the week. Students who reported long sleep duration had higher mean frequency of consumption of unhealthy food (fast food, French fries, cakes/donuts, candy/soft drinks, sugar sweetened beverages). Females showed an unhealthy eating pattern as compared to males. Multiple regression analysis revealed that the WC and BMI increased, consumption of healthy eating pattern decreased by 33% and 10% respectively (p<0.001).

Conclusion: Lack of sufficient sleep and decreased consumption of healthy foods have an association with increased risk of being obese among adolescents.

INTRODUCTION
Obesity rates have been remarkably increased over the past decades, with more than 124 million children and adolescents being obese in 2016 alone. Diet quality and excessive food intake has been concerned in many studies as a primary factor contributing towards childhood obesity.1 Another factor less commonly studied, contributing towards obesity, is sleep duration. Studies show that longer sleep duration was associated with a higher consumption of fresh fruits, vegetables, whole milk, water and lower consumption of Western fast foods and sweets among obese individuals.2 Habitual short sleepers are more than 3 meals a day compared to those who sleep more than 9 hours a day.3 This shows that sleep duration contributes towards developing unhealthy dietary habits which leads to obesity. Hence, this study is expected to be the first to highlight the crucial role of sleep duration in developing childhood obesity in Qatar.

METHODOLOGY
This is a cross-sectional, descriptive and analytic study including adolescents from independent secondary schools in the State of Qatar during the academic year 2013-2014.

Dimensions and Structure
Selection was done through two sampling stages: first being random school selection and second random class selection.

The Sample
The final sample consisted of 1161 students, aged between 14-19 years. For data analysis, the subjects were divided into two groups based on their age: 14-16 years and 17-19 years. The sample selection was controlled and included only those who were free from any physical abnormalities. Written consent was obtained from all participants.

Anthropometric measurements
Height, weight, waist circumference (WC) and BMI were measured using standard methods and calibrated tools. Overweight and obesity among 14-17-year adolescents were defined using IOTF age- and gender-specific BMI reference values. WC values were used to define for adolescents aged 18-19 years i.e. BMI = 25 to 29.9 kg/m² and BMI > 30 kg/m² for overweight and obese respectively. The criteria used to define abdominal obesity were gender- and age-specific WC values associated with high trunk fat measured by DXA.

Lifestyle Measurements
Data about lifestyle measurements were collected using Arabic Teens Lifestyle Study (ATLS) questionnaire. It included 10 questions addressing the frequency of consuming healthy and unhealthy foods and two questions regarding sleep duration.

RESULTS

Table 1: Prevalence of general and abdominal obesity according to sleep categories.

<table>
<thead>
<tr>
<th>Sleep Duration</th>
<th>WC*</th>
<th>BMI*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B 95% CI</td>
<td>P value</td>
</tr>
<tr>
<td>Weekday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short</td>
<td>18.0 (3.927)</td>
<td>0.000</td>
</tr>
<tr>
<td>Sufficient</td>
<td>10.9 (2.007)</td>
<td>0.344</td>
</tr>
<tr>
<td>Long</td>
<td>7.8 (1.132)</td>
<td>0.155</td>
</tr>
<tr>
<td>Weekend</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short</td>
<td>9.8 (1.875)</td>
<td>2.621</td>
</tr>
<tr>
<td>Sufficient</td>
<td>9.2 (1.900)</td>
<td>0.155</td>
</tr>
<tr>
<td>Long</td>
<td>17.6 (2.757)</td>
<td>45.9</td>
</tr>
</tbody>
</table>

Notes: WC = waist circumference; BMI = body mass index; ß = beta coefficient; CI = confidence interval.

Figure 2: Frequency of consumption of different foods according to short, sufficient and long sleep duration among subjects during the weekdays.

CONCLUSION
The present study revealed an inverse relationship of obesity indicators with healthy eating pattern and sufficient sleep duration among adolescents.

REFERENCES

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