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The relationship between obesity and forced vital capacity among university students

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Abstract

Objective: We sought to explore the relationship between vital capacity and obesity among university students in China.

Methods: A cross-sectional study was designed to collect the routine health screening data for university students in 2013. The height, weight and force vital capacity of students were measured, and BMI was calculated with height and weight, so as to estimate the relationship between force vital capacity and obesity.

Results: Based on Working Group on Obesity references in China, obesity has a higher force vital capacity in both male and female university students. No correlation was found between vital capacity and BMI.

Conclusion: Obesity may have effect on pulmonary function among university students, which is a reference for further epidemic study.

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Key words: Underweight. Obesity. University students. Force vital capacity.

Introduction

Increasing number of study reported that a high prevalence of obesity and overweight in developing countries undergoing nutritional transition1-6. Some researcher found that body mass index correlated with forced vital capacity in a population with a relatively low prevalence of obesity7. A study conducted in Korean reveals that changes of pulmonary function were related to menstrual cycle and obesity in adolescent girls8. However, the relationship between obesity and pulmonary function among university students is still unclear.

In this study, we sought to evaluate whether obesity is correlate with force vital capacity.

Methods

Subjects and Methods

Participants

This study is a school-based cross-sectional study which was conducted in a university student who admitted routine health screening in 2013. This subjects consist...
of 2617 subjects (1131 male and 1486 female), with a age range from 19 to 23 years. All subjects agreed to provide their personal information regarding the purpose and the procedures of our study, and written informed consent. This study was approved by local ethics committee.

Anthropometric measurements

Height was measured to the nearest 0.1 cm with a standard stadiometer following study protocols, and weight in kilograms was measured in light clothing to the nearest 0.1 kg on an electronic scales. All anthropometric data were collected by trained staff and supervised by the school nurse. BMI was computed using the following standard equation: BMI = Weight in kg/height squared in meter. Force vital capacity was measured. The vital capacity (VC) will be measured with a spirometer (Wright Mark 8) with the patient in a seated position and connected to a disposable mouthpiece and nose clip to prevent air leakage. The test starts with inspiration to total lung capacity, followed by expiration to the residual volume. The greatest of three consecutive measurements will be considered.

Definitions

Based on Working Group on Obesity references in China the BMI cut-off points are 24 and 28 for overweight and obesity, respectively.

Statistical analysis

Excel software was performed to describe the prevalence of overweight/obesity among university students. A line graph was draw for the prevalence of overweight and obesity among university students by age.

Results

In this study a total of 2617 subjects (1131 male and 1486 female) was recruited in 2013, aged 19-23 years. The percentage of age and body type, mean values (±SD) of weight, height, and BMI are shown in Table I. Figure 1 showed the vital capacity volume between gender by age. Figure 2 reveal a increasing trend of vital capacity with body type by gender.

Correlation between vital capacity and BMI by gender

Table II Showed the correlation between vital capacity and BMI by gender. In male and female, vital capacity had a significant positive correlation with BMI ($P<0.05$). no correlation was found between age and vital capacity ($P>0.05$).

![Fig. 1.—Mean level of vital capacity by age and gender.](image)

![Fig. 2.—Mean level of vital capacity by age and gender.](image)
Discussion

In the present study, we use Working Group on Obesity references in China (2004) to define the overweight and obesity among university students. The results reveal that obesity has a higher force vital capacity in both male and female university students. No correlation between vital capacity and BMI was found by gender.

Previous study documented that a positive independent relationship was found between lung function impairment and metabolic syndrome in both sexes, predominantly due to abdominal obesity. Thus, further investigation should be taken to confirm that whether there are a relationship between obesity and force capacity among university students.

There are also some limitations in present study, for example, lacking of more detail information on pulmonary function. Confound bias maybe exist in our study, so as to further explore the relationship between pulmonary and obesity after controlling to confound bias.

Conclusion

Obesity may have effect on pulmonary function among university students, which is a reference for further epidemic study.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Male (n=1130)</th>
<th>Female (n=316)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>p</td>
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<tr>
<td>BMI</td>
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</tr>
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<td>Age</td>
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<td>0.118</td>
</tr>
</tbody>
</table>

Conflict of Interest

None

References