Analysis of Related Factors of Overweight and Obesity among Secondary School Students in Chongqing, China

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Abstract

To analyze the prevalence of overweight and obesity, as well as the risky factors among secondary school students, and to put forward policy suggestions for health management department. A stratified and cluster sampling trial was conducted in Chongqing, China. A total of 524 students who met the criteria from 5 secondary schools were recruited in the study. The study carried out by questionnaire. The overweight and obesity among the students were overall prevalent, and the rates were 7.82% and 1.72%, respectively. The body mass index (BMI) of parents and birth weight of the students were significantly correlated (P <0.05). It was of great significantly difference on the living habits and food consumption choices, such as eating food two hours before bedtime, having pressure to learning, introvert, eating vegetables infrequently and drinking carbonated drinks often, among the overweight and obesity students group and control group (P <0.05). Multiple variables Logistic regression analysis showed that the BMI of parents, birth weight, and bad eating habits were the risky factors of the secondary school students in overweight and obesity, while doing exercise was the protective factor. The BMI of parents and the birth weight of students were significantly correlated with the BMI of the students. The overall prevalence of overweight and obesity of the students in the study was significantly lower than the average of the nation, but overweight and obesity among the adolescents are nutritional problems, which should be emphasized by all sectors of society instead of neglected.

Introduction

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With the development of national economy and the improvement of people's living standard, the nutrition status of our countries' children and adolescents have improved a lot while incident of malnutrition decreased a lot. But incidence of obesity has increased greatly [1] and the trend of the incidence is ahead on age and younger year by year because of the change on dietary structure and lifestyle. The result of China fourth nutrition and health survey showed that: in 2002 the rate of overweight in the adolescence is 17.5% in our country, the rate of obesity is 5.7%. The estimated rate of overweight and obesity are respectively 23.9% and 10.5% and the ill people will respectively reach 29 billion and 13 billion. Obesity hasn’t much underestimated negative effect to the health and development of children and adolescence. Many chronic diseases such as hypertension, dyslipidemia and diabetes which always occur in adults begin to gather in adolescence [2, 3]. If we do not take effective intervening measures in time, it will become a serious public health problem which can influence national quality and social development. Nowadays there are many researches about overweight and obesity adolescence in or abroad. But few considered at a specific point in time. In order to find out the influence factors of overweight and obesity, take really effective intervention measures and adjust measures to local conditions. We conducted sampling survey about obesity related factors among junior school students (Grade3) who were chosen from 5 junior schools in main urban zone. The result is listed below.

1. Materials and Methods

1.1 Participants: Informant combining stratified sampling and cluster sampling, draw 5 junior schools in Chong Qing city at random, 2 classes in Grade3 each school, 560 informants in total. And there are 524 effective questionnaires with the effective rate 93.57%. Inclusion criteria: 1) no family diabetes and hypertension history 2) in good health condition and no chronic disease.

1.2 Methods

1.2.1 Questionnaire survey: Design the questionnaire. After correction by specialist over times, the questionnaire should be completed by student himself in quiet condition under the supervision of professionals who had been unified trained and teachers during the course of Health Education. After class, investigators retrieve all questionnaires. The content includes general information, personal, social, family diet, behavior of psychological factors, etc.

1.2.2 The evaluation criterion of overweight and obesity: According to the recommendation of ILSI WGOG Chinese adolescence overweight and obesity group standard: BMI (Body mass index) = weight (kg)/height*height (m). When the age is 15, BMI<18.5 is emaciation, and 18.5<=BMI<23.1 is normal, and 23.1<=BMI<26.9 is overweight, and 26.9<=BMI is obesity. Birth weight evaluation: birth weight <2500g is low birth weight infant, birth weight between 2500g~3999g is normal infant, birth weight >=4000g is high birth weight [4].

All adolescence who are overweight or obesity has been concluded in the exposed group, while others are in the control group.

1.3 Quality control and statistical methods

After the survey, professionals re-check the questionnaire including major items, skipped items, and misentry. Log data twice using EPIDATA 3.0 and conduct consistency test to ensure the veracity of data entry. Use SAS8.1 to do the statistical analysis. Conduct $\chi^2$ test and Multivariate logistic regression analysis.
2. Results

2.1 The overweight and obesity of junior students in Grade 3 from Chongqing urban zone: This survey had selected 524 students, 267 male and 257 female, and aged 15 ± 0.62. Overweight rate is 7.82% (41/524), while obesity rate is 1.72% (9/524). The overweight rate of boys is 10.11% (27/267), and the obesity rate is 1.50% (4/267). The overweight rate of girls is 5.45% (14/257), and the obesity rate is 1.95% (5/257). The boys’ overweight rate is significantly higher than that of girls (p<0.0001), but the obesity rate of boys and girls are of no significantly differences (p=0.236). Parental BMI and its degree of overweight and obesity in children have significant differences ($\chi^2=11.9215, \chi^2=5.2868, p<0.05$). In this survey, the students who have high birth weight have a escalating trend in their BMI values, and there are significant differences ($\chi^2=4.7048$, $p=0.030$). (Table 1 and 2)

<table>
<thead>
<tr>
<th>BMI</th>
<th>&lt;2500</th>
<th>2500–3999</th>
<th>≥4000</th>
<th>N</th>
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<tbody>
<tr>
<td>&lt;18.5</td>
<td>29</td>
<td>134</td>
<td>9</td>
<td>168</td>
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<tr>
<td>18.5+</td>
<td>40</td>
<td>227</td>
<td>35</td>
<td>302</td>
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<tr>
<td>23.1+</td>
<td>6</td>
<td>28</td>
<td>7</td>
<td>41</td>
</tr>
<tr>
<td>26.9+</td>
<td>0</td>
<td>5</td>
<td>4</td>
<td>5</td>
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<tr>
<td>Total</td>
<td>75</td>
<td>304</td>
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<td>434</td>
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$\chi^2=4.7048$, $p=0.030$

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2.2 Life style and dietary behavior (From table 3), there are a lot of bad habits and dietary behavior among Grade 3 students, such as Eating two hours before bedtime, study pressure, eating too full, eating much sweet and fried food, drinking much carbonated fruit juice-based drinks and disliking vegetables. Compare the overweight and obese group with the control group. The differences in lifestyle and general category of food consumption choices between different objects have statistical significance such as
eating two hours before bedtime, study pressure, eating too full, eating much sweet and fried foods, drinking much carbonated fruit juice-based drinks and disliking vegetables (p<0.05).

2.3 Logistic regression analysis of influence factors of overweight and obesity: Merge the cases, 524 grade three junior students in Chongqing urban zone, of overweight and obesity as the dependent variable, and take the parents’ BMI, birth weight and the factors in Table 3 as independent variables. Use multiple Logistic regression analysis of independent factors to analyses the data. Find the specific situation on table 4 and table 5. As the Logistic regression analysis showed: there are 5 factors related to overweight and obesity, including mother’s BMI, father’s BMI, birth weight, doing sports and eating two hours before bedtime. Risk factors are mother’s BMI, father’s BMI, birth weight and eating two hours before bedtime, while the protective factors is doing sports.

3. Discussion

With the improvement of living standards, the incidence of overweight and obesity is also increasing. The obese patients may have more chances to get some of diseases than control group, such as Type 2 Diabetes, Gallbladder Disorders, dyslipidemia, MS and so on. Obesity makes a negative effect on lots of body systems such as cardiovascular system, endocrine system, immune system, Psychosocial behavior and so on. It seems that obesity has already become an important public health problem today which should be solved at present. But the mechanism of the occurrence of obesity is very complicate, for it not only connected to the genetic factor but also connected to environmental factor.
This survey shows that, the overweight rate and obesity rate of Junior Three students in city of Chongqing are lower than the national average. The reason may be that Junior Three is a particular
period, the students face to enter Senior school, and they have learning challenges and large consumption of energies. The birth weight has a high relevance to the students’ BMI, for that the one who have a heavy birth weight, who have a high BMI in adolescence. The result agreed to the results made by Huaqi. (The cohort study about the relevance between teenager’s birth weight and obesity, blood lipid, blood glucose, blood pressure). Single factor analysis indicated that parents’ BMI are significantly related to students’ BMI. Multivariate logistic regression analysis shows that parents’ Obesity is also a risk factor to students’ obesity. It is the same as Li Chunying and Chen Chunming’s study. These shows that obesity may have family orientation, the common Environmental factors of genetic and family have some effects on obesity.

Among the junior three students in this survey, more than thirty percent have unhealthy life style and eating habits such as eat two hours before bedtime, learning pressure, enjoy Sweets and Fried food and carbonated beverages type juice, disliking vegetables and so on. Unhealthy life style and eating habits are common among Children and adolescents nowadays but it also be a major risk factor of obesity. Compared with the control group, the obesity and overweight group like to eat 2 hours before sleep time, have Learning pressure, introverted, like vegetables and drinking much carbonated fruit juice-based drinks. The obesity and overweight ones have more learning pressure and they are more introverted. Recent researches demonstrated that when people face to pressures they will choose eating something, especially the high-energy food to lowdown their pressures, it makes the energy surplus and then lead to gaining weight. Teenagers are in self consciousness formation, Obese Adolescents may have some problems which are caused by their self-image such as depression, loneliness, inferiority and so on. Some foreign researchers believe that these problems not only aggravate some risk factors of the metabolic syndrome, but also make the obese patients lose their faith and power to lose weight seriously. One of results lead to by these problems is dislike sports; this is also a reason for the obesity. In this survey, logistic regression analyses shows that like sports is a protective factor, for that sports can increase the body’s energy consumption, and make adipose tissue into energy consume, and reduce the accumulation of fat tissue so that reduce the incidence of obesity Exercise not only reduces the incidence of overweight and obesity in children and adolescents, but also plays an important role in the growth and development.

In conclusion, genetic factor, the life style and the selection of food are very important to the occurrence of overweight and obesity. To the teenagers who are in the critical period of growth, especially who are facing to the stress of entering a higher school, we should not only put emphasis on the prevention of the shortage of nutrition but also on the obesity caused by energy surplus and mental pressure. So it is essential important to prevent the obesity by psychological counseling and the eating habits guide and strengthen the movement.

Acknowledgment

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References


