An Analysis of Economic Burden of Obesity-Related Diabetes in Guandu District, Kunming

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OUTLINE

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Background

Diabetes is one of the major modifiable risk factors for cardiovascular disease. China has experienced rapid economic growth and demographic change in the last two decades. These changes have spurred a rapid rise in the prevalence of diabetes.
Background

In China, previous research has investigated the relationships between BMI and diabetes, as well as BMI and obesity, especially central obesity. However, limited research has been conducted to examine economic burden of obesity-related diabetes.
Objective

This study examined the direct costs of diabetes attributed to obesity and central obesity in Guandu District, Kunming.
Methods

1. Samples

For ensuring better representation of the sample, three villages out of nine townships were selected by PPS method. Approximately 180 people (≥18 years old) were selected from each village by simple random sampling. 4,900 questionnaires were distributed, and 4,595 were valid. Response rate was 94.2%.
Methods

2. Questionnaires

Face-to-face interviews were conducted by using self-constructed questionnaires. The questionnaire included: demographic, household income, lifestyle and behavioral diabetes, outpatient expenses, inpatient costs, medicine expenses, transportation costs, accommodation, nutrition, etc.
Methods

♣ 3. Physical examination included:

➢ height
➢ weight
➢ waist circumference
➢ hip circumference
➢ blood glucose
Methods

4. Diagnostic criteria

- Township hospital and other local hospitals, doctors’ criteria for diagnosing diabetes.
- Fasting plasma glucose ≥ 7.0 mmol/l
- BMI = weight (kg) / height^2 (m^2). BMI was 24.0 ~ 27.9 kg/m^2 is overweight, BMI ≥ 28 kg/m^2 is obese.
- Central obesity
  - Male waist circumference (cm) ≥ 85cm
  - Female waist circumference (cm) ≥ 80cm
Results

Males: 47.2%

Females: 52.8%

Age groups

- 18-34: 13%
- 35-44: 19%
- 45-54: 25%
- 55-64: 23%
- ≥65: 20%
Possible Factors Correlated to Diabetes (%)

- Family history of diabetes: 8.90%
- Obese: 11.20%
- Central obesity: 52.60%
- Frequently exercises: 89%
- Consumes more sweet food: 88%
The Prevalence of Diabetes, Obesity, and Central Obesity in Males and Females

- diabetes
- obesity
- central obesity

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>5.60%</td>
<td>6.80%</td>
<td>6.20%</td>
</tr>
<tr>
<td>Obesity</td>
<td>13.30%</td>
<td>11.20%</td>
<td>11.20%</td>
</tr>
<tr>
<td>Central Obesity</td>
<td>46.60%</td>
<td>57.90%</td>
<td>52.60%</td>
</tr>
</tbody>
</table>
The per capita and total direct cost (yuan)

- Hospitalization charges
- Transportation costs
- Accommodation
- Nutrition cost
- Outpatient fee
- Medication fees

- Males
- Females
- Total
The total direct cost and direct economic burden of diabetes attributed obesity

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>The total direct cost</td>
<td>54.43</td>
<td>48.79</td>
<td>100.49</td>
</tr>
<tr>
<td>( million )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attributed to obesity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>obesity</td>
<td>2.45</td>
<td>3.20</td>
<td>5.62</td>
</tr>
<tr>
<td>Central obesity</td>
<td>13.7</td>
<td>10.87</td>
<td>15.79</td>
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</table>
The possible influence factors of diabetes included in multivariate logistic regression model

<table>
<thead>
<tr>
<th>Influence factors</th>
<th>β</th>
<th>SE</th>
<th>Waldx2</th>
<th>P</th>
<th>OR</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity</td>
<td>0.361</td>
<td>0.173</td>
<td>4.340</td>
<td>0.037</td>
<td>1.435</td>
<td>1.022~2.015</td>
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<tr>
<td>Central obesity</td>
<td>0.294</td>
<td>0.138</td>
<td>4.533</td>
<td>0.033</td>
<td>1.342</td>
<td>1.024~1.760</td>
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<tr>
<td>Age</td>
<td>0.019</td>
<td>0.050</td>
<td>17.837</td>
<td>0.000</td>
<td>1.019</td>
<td>1.010~1.028</td>
</tr>
<tr>
<td>consume sweets</td>
<td>-1.291</td>
<td>0.113</td>
<td>130.805</td>
<td>0.000</td>
<td>0.275</td>
<td>0.220~0.343</td>
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<tr>
<td>Constant</td>
<td>-1.505</td>
<td>0.342</td>
<td>19.416</td>
<td>0.000</td>
<td>0.222</td>
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</tr>
</tbody>
</table>
Conclusion

1. The results showed that prevalence of obesity was 11.2% among rural residents in Guandu District, Kunming City. Similar results were found in related studies abroad. The prevalence of diabetes was 6.2%, which is slightly lower than Shilin County in Kunming, but much higher than any other domestic rural area.
The central obesity rate was 52.8%, higher than other domestic rural areas. Possible reasons include but are not limited to: villagers high consumption of sweets, greasy foods, foods high in fat, and other dietary habits. Females had significantly higher prevalence of obesity and central obesity than males ($P<0.05$). These findings suggest that interventions should focus on obese women.
2. The multivariate factors analysis showed that obesity, central obesity, age, and consumption of sweets are possible risk factors for diabetes. Controlling obesity, especially central obesity, is important for reducing the prevalence of diabetes.
These results indicate that health education and health promotion activities in the local village should be provided, especially for the elderly villagers. Developing healthy eating habits, reducing the volume of sweets consumption, and exercise are all important for reducing obesity and central obesity.
3. Diabetes is not only harmful to health, but also causes economic losses to society. The total direct economic burden of diabetes of Guandu District was 100.49 million, which is lower than Luoping County; this may be due to lower cost of hospitalization in Guandu District compared with Luoping County.
4. The study showed that in Guandu District, economic burden due to central obesity-related diabetes was higher than obesity-related diabetes. The study found that diabetes caused by central obesity has become a major public health problem in local populations. Therefore, reducing obesity, especially central obesity, is important for reducing economic burden.
Thank you!