

Research Article

Epidemiological Survey of Obesity and “3H” of Employees in a Company

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Abstract

Objective: By conducting an investigation into the epidemiological conditions of overweight, obesity and "three highs" (Hypertension, Hyperglycemia, Hyperlipidemia) among the company's employees, a theoretical basis is provided for carrying out health education for employees. **Methods:** A total of 1,946 employees of a certain company in Wuhu were selected as the research subjects. Their height, body weight, blood pressure, blood sugar and blood lipid were measured in 2014, and the obtained data were statistically analyzed. **Results:** The detection rates of overweight, obesity, hypertension, hyperglycemia and hyperlipidemia in the research subjects were 40.80%, 9.20%, 30.83%, 20.45% and 35.46% respectively. Among them, the detection rates of male employees' overweight, obesity, hypertension, hyperglycemia and hyperlipidemia were all higher than those of female employees', and the differences were statistically significant ($P < 0.05$). The comparison of the detection rates of obesity, hypertension, hyperglycemia and hyperlipidemia among the research subjects aged < 30 years, 30-39 years, 40-49 years, 50-59 years and aged ≥ 60 years showed statistically significant differences ($P < 0.05$). Moreover, with the increase of age, the detection rates of hypertension and hyperglycemia in the research subjects showed an upward trend. The comparison of the detection rates of hypertension, hyperglycemia and hyperlipidemia among the research subjects with underweight, normal, overweight and obesity body mass index (BMI) showed statistically significant differences ($P < 0.05$). Moreover, with the change of BMI (from emaciation to obesity), the detection rates of hypertension, hyperglycemia and hyperlipidemia in the research subjects all showed an upward trend. **Conclusion:** The research subjects have prominent symptoms of overweight, obesity and "three highs", and there is an urgent need to carry out health education for them, including healthy diet, moderate exercise and regular physical examination.

Keywords

Hypertension, Hyperglycemia, Hyperlipidemia, Health Education

1. Introduction

Nowadays, with the development of the economy, the improvement of people's living standards, and the changes in lifestyle and dietary structure, the high rate of overweight and obesity among the population has become a serious social issue in our country. At the same time, overweight and

obesity are also major risk factors for the "three highs" (high blood pressure, high blood sugar and high blood lipid). This research conducted an investigation into the epidemiological conditions of excessive quality, obesity and "three highs" among 1,946 employees of a certain company, providing a

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reliable theoretical basis for the development of health education for employees.

2. Objects and Methods

2.1. Objects

A total of 1,946 employees of a certain company in Wuhu in 2014 were selected as the research objects. Among them, there were 1223 male cases (62.85%) and 723 female cases (37.15%). The age range was 21 to 90 years old. Among them, 47 cases (2.42%) were under 30 years old, 400 cases (20.55%) were 30 to 39 years old, 682 cases (35.05%) were 40 to 49 years old. There were 306 cases (15.72%) aged 50 to 59 years and 511 cases (26.26%) aged 60 years or older.

2.2. Methods

In 2014, the height, body mass, blood pressure, blood sugar and blood lipid of the research subjects were measured, and the obtained data were statistically analyzed.

2.3. Diagnostic Criteria

2.3.1. Overweight and Obesity

According to the standards of our country [1]: Body mass index (BMI) $< 18.5 \text{ kg/m}^2$ is considered underweight, BMI $18.5 \sim < 24 \text{ kg/m}^2$ is normal, BMI $24 \sim < 28 \text{ kg/m}^2$ is overweight, and BMI $\geq 28 \text{ kg/m}^2$ is obese.

2.3.2. Hypertension

According to the standards of the "Chinese Hypertension Prevention and Treatment Guidelines 2010" [2], a systolic blood pressure (SBP) of $\geq 140 \text{ mmHg}$ ($1 \text{ mmHg} = 0.133 \text{ kPa}$) and/or a diastolic blood pressure (DBP) of $\geq 90 \text{ mmHg}$, or having taken antihypertensive drugs within the past two weeks, can be diagnosed as hypertension.

2.3.3. Hyperglycemia

According to the diagnostic criteria in the Chinese Guidelines for the Prevention and Treatment of Type 2 Diabetes Mellitus (2010 Edition) [3], impaired fasting glucose (IFG): fasting plasma glucose (FPG) $6.1 - < 7.0 \text{ mmol/L}$; diabetes mellitus (DM): FPG $\geq 7.0 \text{ mmol/L}$ and/or previous history of diabetic retinopathy. This study defines the above two situations collectively as hyperglycemia.

2.3.4. Hyperlipidemia

According to the diagnostic criteria for dyslipidemia in the "Guidelines for the Prevention and Treatment of Dyslipidemia in Chinese Adults (2007)" [4]: serum total cholesterol (TC) $\geq 6.22 \text{ mmol/L}$; Plasma triglyceride (TG) $\geq 2.26 \text{ mmol/L}$; Low-density lipoprotein cholesterol (LDL-C)

$\geq 4.14 \text{ mmol/L}$. This study defines that any one of the above three situations is diagnosed as hyperlipidemia.

2.4. Statistical Processing

All data were statistically analyzed using SPSS17.0 software. The count data were tested by χ^2 , and a P value < 0.05 was considered statistically significant.

3. Result

3.1. The Detection Status of Overweight, Obesity, Hypertension, Hyperglycemia and Hyperlipidemia in Different Genders

The detection rates of overweight, obesity, hypertension, hyperglycemia and hyperlipidemia were 40.80%, 9.20%, 30.83%, 20.45% and 35.46% respectively. Among them, the detection rates of overweight, obesity, hypertension, hyperglycemia and hyperlipidemia in men were 47.34%, 10.47%, 33.93%, 21.83% and 37.78% respectively, which were higher than 29.74%, 7.05%, 25.59%, 18.12% and 31.54% in women respectively, and the differences were statistically significant ($P < 0.05$) (Table 1).

3.2. The Detection of Overweight and Obesity Among Research Subjects of Different Age Groups

The detection rates of overweight for the research subjects aged < 30 years, 30-39 years, 40-49 years, 50-59 years and 60 years or older were 36.17%, 38.50%, 39.30%, 45.10% and 42.47% respectively, and the detection rates of obesity were 0.00%, 8.75%, 7.92%, 9.80% and 11.74% respectively. There was no statistically significant difference in the detection rate of overweight among subjects of different age groups ($P > 0.05$), while the comparison of the detection rate of obesity among subjects of different age groups showed statistical significance ($P < 0.05$) (Table 2).

3.3. The Detection Status of Hypertension, Hyperglycemia and Hyperlipidemia in Research Subjects of Different Age Groups

The detection rates of hypertension among the research subjects aged < 30 years, 30-39 years, 40-49 years, 50-59 years and 60 years or older were 6.38%, 13.50%, 21.55%, 40.52% and 53.23% respectively; and the detection rates of hyperglycemia were 2.13%, 4.50%, 13.20%, 27.78% and 39.92% respectively; the detection rates of hyperlipidemia were 19.15%, 33.25%, 30.50%, 45.10% and 39.53% respectively. The comparison of the detection rates of hypertension, hyperglycemia and hyperlipidemia among research subjects of different age groups showed statistically significant dif-

ferences ($P < 0.05$), and with the increase of age, the detection rates of hypertension and hyperglycemia in the research subjects both showed an upward trend (Table 3).

3.4. The Detection Status of Hypertension, Hyperglycemia and Hyperlipidemia in Research Subjects with Different BMI

Among the research subjects, there were 32 underweight individuals, 941 with normal body weight, 794 overweight individuals, and 179 obese individuals. The detection rates of hypertension among the research subjects with BMI classified as underweight, normal, overweight and obese were 18.75%, 20.51%, 38.04% and 55.31% respectively, and the detection rates of hyperglycemia were 12.50%, 14.03%, 25.19% and 34.64% respectively. The detection rates of hy-

perlipidemia were 15.63%, 25.93%, 44.96% and 46.93% respectively. The comparison of the detection rates of hypertension, hyperglycemia and hyperlipidemia among different BMI (thin, normal, overweight, obese) research subjects showed statistically significant differences ($P < 0.05$). And with the change of BMI (thin to obese), the detection rates of hypertension, hyperglycemia and hyperlipidemia in the research subjects all showed an upward trend (Table 4). The pairwise comparison results showed that the detection rates of hyperglycemia, hyperglycemia and hyperlipidemia in the overweight and obese research subjects were all higher than those in the normal weight research subjects, and the detection rate of hypertension in the obese research subjects was higher than that in the overweight research subjects. The differences all had statistical significance ($P < 0.008$).

Table 1. The detection status of overweight, obesity, hypertension, hyperglycemia and hyperlipidemia in research subjects of different genders [n (%)].

Gender	Overweight	Obesity	Hypertension	Hyperglycemia	Hyperlipidemia
Male (n=1223)	579 (47.34)	128 (10.47)	415 (33.93)	267 (21.83)	462 (37.78)
Female (n=723)	215 (29.74)	51 (7.05)	185 (25.59)	131 (18.12)	228 (31.54)
X ²	58.282	6.310	14.760	3.836	7.681
P	0.000	0.012	0.000	0.050	0.005

Table 2. The detection of overweight and obesity among research subjects of different age groups [n (%)].

Age (years)	Overweight	Obesity
30 (n=47)	17 (36.17)	0 (0.00)
30~39 (n=400)	154 (38.50)	35 (8.75)
40~49 (n=682)	268 (39.30)	54 (7.92)
50~59 (n=306)	138 (45.10)	30 (9.80)
≥60 (n=511)	217 (42.47)	60 (11.74)
X ²	4.123	10.288
P	0.302	0.036

Table 3. The detection status of hypertension, hyperglycemia and hyperlipidemia in research subjects of different age groups [n (%)].

Age (years)	Hypertension	Hyperglycemia	Hyperlipidemia
<30 (n=47)	3 (6.38)	1 (2.13)	9 (19.15)
30~39 (n=400)	54 (13.50)	18 (4.50)	133 (33.25)
40~49 (n=682)	147 (21.55)	90 (13.20)	208 (30.50)

Age (years)	Hypertension	Hyperglycemia	Hyperlipidemia
50~59 (n=306)	124 (40.52)	85 (27.78)	138 (45.10)
≥60 (n=511)	272 (53.23)	204 (39.92)	202 (39.53)
X ²	205.444	223.487	23.299
P	0.000	0.000	0.000

Table 4. The detection status of hypertension, hyperglycemia and hyperlipidemia in research subjects with different BMI [n (%)].

BMI status	Hypertension	Hyperglycemia	Hyperlipidemia
Emaciation (n=32)	6 (18.75)	4 (12.50)	5 (15.63)
Normal (n=941)	193 (20.51)	132 (14.03)	244 (25.93)
Overweight (n=794)	302 (38.04)	200 (25.19)	357 (44.96)
Obesity (n=179)	99 (55.31)	62 (34.64)	84 (46.93)
X ²	118.800	58.204	84.459
P	0.000	0.000	0.000

4. Discussion

The World Health Organization points out that in recent years, the number of overweight people worldwide has exceeded one billion, and the current situation of overweight and obesity among the Chinese population is also not optimistic [5]. Overweight and obesity are precisely the "common soil" for many chronic diseases such as hypertension, hyperlipidemia and diabetes. Therefore, the prevention and treatment of overweight and obesity among the population has become one of the most urgent tasks in the field of public health in our country at present.

The results of this study show that the detection rates of overweight and obesity in the study subjects are 40.80% and 9.20% respectively, both of which are higher than the survey results in China in 2004 [1]. The detection rates of hypertension, hyperglycemia and hyperlipidemia were 30.83%, 20.45% and 35.46% respectively, which were much higher than the investigation results of previous studies [2, 3, 6].

The results of this study also show that with the change of BMI (from emaciation to obesity), the detection rates of conditions such as hyperglycemia, hyperglycemia and hyperlipidemia in the study all show an upward trend. This also reflects that the tendency of hypertension, hyperglycemia and hyperlipidemia in overweight and obese individuals is greater than that in other individuals, which is consistent with the results of previous studies [7-10]. Domestic research [7] has found that individuals with a BMI of $\geq 24 \text{ kg/m}^2$ have a significantly increased risk of developing diabetic retinopathy, hypertriglyceridemia and hypertension. At the same time, BMI is the most definite independent risk factor for metabolic syndrome, and it is also a relatively easy-to-obtain indicator. Moreover, it is a factor that can be regulated by changing unhealthy lifestyles through physical changes [11]. Therefore, the prevention and treatment of overweight and obesity, as well as the reduction of an individual's BMI, have profound significance for the prevention and treatment of hypertension, hyperglycemia and hyperlipidemia.

In addition, this study also found that the detection rates of overweight and obesity among male subjects were higher than those among female subjects, and the differences were statistically significant, which was consistent with the research results of Lu Wei et al [12, 13]. Meanwhile, the detection rates of hypertension, hyperglycemia and hyperlipidemia in male subjects were all higher than those in female subjects, and the differences were statistically significant. This might be related to the fact that men have more unhealthy living habits (such as smoking, heavy drinking and lack of exercise) and unhealthy eating and drinking habits (such as consuming high-sugar and high-fat foods) than women. Moreover, women, as a means to maintain their health, often pay attention to controlling their diet and regular exercise. In addition, research [14] has found that estrogen in women's bodies plays a certain role in preventing "three highs".

Slow metabolism, lack of exercise and decreased female estrogen levels among middle-aged and elderly people can all make this group a high-risk group for overweight, obesity and "three highs" [15]. The results of this study also indicate this point: with the increase of age, the detection rates of

hypertension and hyperglycemia in the research subjects both showed an upward trend.

5. Conclusion

To ensure the physical and mental health of the majority of company employees, it is urgently necessary to carry out health education for company staff. The content includes the following three points. (1) Cultivate good dietary habits (low-fat, low-salt, low-energy, low-cholesterol and high-fiber dietary drinks). (2) Refrain from smoking and limit alcohol intake, increase physical activity (engage in 30 to 60 minutes of aerobic exercises such as jogging, brisk walking, badminton or swimming every day), and change unhealthy lifestyles to gradually bring body mass to the target level [1] (3) Regular physical examinations should be conducted and health records for employees should be established. In addition, it is necessary to pay attention to providing health education to overweight and obese employees as early as possible to build their confidence in losing weight. At the same time, efforts should be made to increase health education related to the prevention and treatment of chronic diseases for retired workers, so as to reduce the incidence of chronic diseases among the middle-aged and elderly population and thereby improve the health level of the majority of employees.

Abbreviations

BMI	Body Mass Index
3H	Three Highs (Hypertension, Hyperglycemia, Hyperlipidemia)

Author Contributions

Zhang Lianhua is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

References

- [1] China Obesity Working Group Guidelines for the Prevention and Control of Overweight and Obesity in Chinese Adults (Excerpt) [J] Chinese Journal of Nutrition, 2004, 26(1): 1-4. <https://doi.org/10.13325/j.cnki.actanutr.sin.2004.01.001>
- [2] The Revision Committee of the Chinese Hypertension Prevention and Control Guidelines Chinese Guidelines for Hypertension Prevention and Treatment 2010 [J] Chinese Journal of Hypertension, 2011, 19(8): 701-742. <https://doi.org/10.16439/j.cnki.1673-7245.2011.08.009>
- [3] Diabetes Society of the Chinese Medical Association Chinese Guidelines for the Prevention and Treatment of Type 2 Diabetes Mellitus (2010 Edition) [J] Chinese Journal of Diabetes, 2012, 20(1): 2-4.
- [4] Xu Haiyan, Xiang Zhimin, Lu Zongliang. Summary and Interpretation of the Guidelines for the Prevention and Treatment of Dyslipidemia in Chinese Adults (2007) [J] Chinese Journal of Geriatric Cardiovascular and Cerebrovascular Diseases, 2008, 10(3): 238-240. <https://doi.org/10.3969/j.issn.1009-0126.2008.03.029>
- [5] Zhao Hui, Liu Ying. The Relationship between Body Mass Index and Blood Pressure, Blood Glucose and Blood Lipid in the Population undergoing Health Check-ups [J] Journal of Dalian Medical University, 2008, 30(6): 551-553.
- [6] Guo Xue, Gan Yu, Wang Na. Analysis of Blood Lipid Status in 746 Health Check-ups [J] Journal of Mudanjiang Medical University, 2010, 31(1): 56-57. <https://doi.org/10.13799/j.cnki.mdjxyxb.2010.01.022>
- [7] Gan Xiaoling, Chen Qingyu, Liao Bei, et al. The influence of body weight index on blood glucose, blood lipid and blood pressure [J]. Clinical Medicine, 2010, 30(6): 9-10. <https://doi.org/10.3969/j.issn.1003-3548.2010.06.004>
- [8] Chen Yao, Chen Enqiang, Tang Hong, et al. Correlation Analysis of Blood Lipid and blood Glucose Test Results and Body Mass Index in Physical Examination Population [J] West China Medical Science, 2010, 25(3): 487-490.
- [9] Liu Yuchao, Zhao Tingting, Zhang Rongrong, et al. Analysis of the Correlation between Body Mass Index, Waist Circumference, blood lipid Levels and Hyperglycemia [J] Tianjin Medicine, 2014, 42(10): 1016-1019. <https://doi.org/10.3969/j.issn.0253-9896.2014.10.016>
- [10] Zhang Weiqi, Li Weiqiang. Survey on the Health Status and Overweight of Employees in a Certain Enterprise in 2011 [J] Chinese Journal of Practical Medicine, 2014, 9(31): 255-257.
- [11] Wang Limin, Yang Chunsheng, Wang Da, et al. Research on the Relationship between Body Mass Index and High Blood Pressure, Blood Lipid and Blood Glucose in Middle-aged People [J] Chinese General Practice, 2011, 14(2B): 503-505. <https://doi.org/10.3969/j.issn.1007-9572.2011.05.016>
- [12] Lu Wei, Wang Yanping The influence of physical constitution index on blood pressure, blood glucose and blood lipid [J]. Chinese Journal of Hospital Infections, 2010, 20(23): 3715-3716.
- [13] Lu Jianping, Tang Jie, Tao Minfang, et al. Analysis of the Results of 7,767 Health Physical Examinations for Vocational Workers in a Certain High School [J] Chinese Journal of Clinical Health Care, 2011, 14(2): 154-156. <https://doi.org/10.3969/j.issn.1672-6790.2011.02.015>
- [14] Yu Zhenqiu. The pathogenesis, diagnosis and treatment of Hyperglycemia in women [J]. Chinese Community Physicians, 2008, 24(13): 24.

- [15] Zhang Yuxiang, Guan Yaming, Gao Xiuhua. The interrelationship between body mass index and hypertension, hyperlipidemia, and hyperglycemia [J] Inner Mongolia Journal of Traditional Chinese Medicine, 2011, 30(5): 110-111.
<https://doi.org/10.3969/j.issn.1006-0979.2011.05.102>