

# Investigation and Analysis on the prevalence of diabetes among the elderly in Chengyang District of Qingdao City

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**ABSTRACT Objective:** The prevalence and influencing factors of diabetes over 65 years old in Chengyang District of Qingdao city provide scientific basis for the comprehensive prevention and treatment of diabetes in the elderly. **Methods:** The physical examination data of 21928 patients over 65 years old who participated in the health examination in 2013 were analyzed. The biochemical indexes such as height, weight, blood pressure and blood glucose were measured. **Results:** The overall prevalence of diabetes in the elderly was 23.70%; the prevalence rate of female was higher than male elderly diabetes ( $P < 0.01$ ); diabetic hypertension detection rate was 64.29%, hypertension detection rate in non diabetes group was 58.11% ( $P < 0.01$ ); diabetes hyperlipidemia was 47.87%. The hyperlipidemia detection rate in non diabetic group was 31.29% ( $P < 0.01$ ); overweight or obese ( $BMI \geq 25$ ) diabetes detection rate was 28.43%, non overweight or obese ( $BMI < 25$ ) in the detection rate of diabetes was 20.60% ( $P < 0.01$ ). **Conclusion:** The prevalence rate of diabetes in the elderly is high, the harm is serious and the prevention and treatment of the task is hard.

## KEYWORDS

Diabetes  
The elderly  
Prevalence

## Introduction

Compared with the developed countries, the prevalence of diabetes in China is not high, but due to the large population, the absolute number of sick is ranked first in the world. About 1/4 of people with diabetes were elderly[1]. According to the results of epidemiological characteristics of domestic diabetes, China's elderly people over 60 years old possess the probability of diabetes more than 12.43%[2]. For study the diabetic elderly in Chengyang District of Qingdao City prevalence, this paper focuses on the physical examination of the elderly in the district, the prevalence of diabetes is illustrated and its influencing factors are analyzed.

## 1. Objects and methods

### 1.1 Objects

The people over the age of 65 in Chengyang District of Qingdao city from January to December in 2013 volunteered to participate in the health examination, a total number of 21928 people were picked up which includes 9175 males and 12753 females, respectively.

the subjects must be without cerebral apoplexy, ischemic heart disease, congenital heart disease, valvular heart disease, cardiomyopathy, and ECG results without ischemic heart disease, positive hepatitis B surface antigen and positive HCV antibody.

### 1.2 Methods

Well trained professional personnel examine surgical routine, blood routine, blood biochemical of respondents.

### 1.3 Diagnostic criteria

(1) Diabetes: Fasting blood glucose  $\geq 6.1$  mmol /L or subjects have been diagnosed with diabetes and received the treatment; (2) overweight or obesity: body mass index ( $BMI = 25 \text{ kg/m}^2$ ); (3) hypertension: systolic blood pressure  $\geq 140$  mm Hg and (or)

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diastolic blood pressure  $\geq 90$  mm Hg, or subjects have been diagnosed with hypertension and received the treatment; (4) hyperlipidemia: fasting triglyceride (TG)  $\geq 1.7$  mmol/L and (or) fasting HDL cholesterol (HDL-C) for male  $< 0.9$  mmol/L, for female  $< 1.0$  mmol/L.

#### 1.4 Statistical analysis

Statistical analysis was performed using SPSS19.0,  $\chi^2$  test is applied on comparison among the rates. Choosing  $P < 0.05$  as the difference possesses a significant statistical meaning.

## 2 .Results

### 2.1 Prevalence rate of diabetes in the elderly

The overall prevalence rate of elderly diabetes was 23.70%, 70~74 year old people had the highest number, other three groups reveal a little variance, the difference was not statistically significant ( $\chi^2=0.442$ ,  $P>0.05$ ). Table 1.

Table 1 Prevalence rates of diabetes in the elderly

Age	Survey number	Prevalence of illness	rate (%)
65~69	8295	1962	23.65
70~74	5761	1383	24.01
75~79	4515	1063	23.54
80~	3357	789	23.50
total	21928	5197	23.70

### 2.2 The relationship between the prevalence rates of diabetes and gender

The prevalence rate of female group was significantly higher than that of male diabetes group, the difference was statistically significant ( $\chi^2=202.924$ ,  $P<0.01$ ). Table 2.

Table 2 The relationship between diabetes and gender

sex	Number of diabetic patients	Number of non diabetic patients	total	rate (%)
male	1732	7443	9175	18.88
female	3465	9288	12753	27.17
total	5197	16731	21928	23.70

### 2.3 The relationship between prevalence rate of diabetes mellitus and hypertension

The prevalence rate of hypertension in the elderly diabetic group was significantly higher than that in the non diabetes group, and the difference was statistically significant. Table 3.

Table 3 Comparison of hypertension relevance ratio in diabetic and non diabetic patients

	Number of diabetic patients	Number of non diabetic patients	$\chi^2$	P
patients with elevated blood pressure case rate (%)	3341	9722	62.870	$<0.01$
	64.29	58.11		

### 2.4 The relationship between prevalence rate of diabetes and hyperlipidemia.

The prevalence rate of hyperlipidemia in the elderly with diabetes was significantly higher than that in the non diabetes group, and the difference was statistically significant. Table 4.

Table 4 Comparison of hyperlipidemia relevance ratio in diabetic and non diabetic patients

	Number of diabetic patients	Number of non diabetic patients	$\chi^2$	P
Hyperlipid emia patients	2488	5235	478.028	$<0.01$
case rate (%)	47.87	31.29		

### 2.5 The relationship between relevance rate of diabetes and overweight.

The prevalence rate of diabetes in the obese group was significantly higher than that in the non obese group, and the difference was statistically significant. Table 5.

Table 5 Prevalence rate of diabetes among overweight subjects

	Survey number	Number of diabetic patients	Number of non diabetic patients	Relevance ratio (%)
BMI $\geq 25$	8676	2467	6209	28.43
BMI $< 25$	13252	2730	10522	20.60
total	21928	5197	16731	23.70
$\chi^2$			177.952	
P			$<0.01$	

### 3. Discuss

In 2000, WHO Bulletin reveals that there is a global total number of 175 million diabetes patients currently, and in 2025 it will increase to 300 million<sup>[3]</sup>. In this study, among the people aged over 65, there is 23.70% patients who are with diabetes, which is significantly higher than the domestic elderly diabetes prevalence rate, 12.43%. Through the survey, it's found that the prevalence rate of diabetes and many factors are closely connected.

#### 3.1 Aging is an independent risk factor for prevalence rate of diabetes increasing

The results of this study indicates that the total prevalence rate of diabetes in elderly in Chengyang District of Qingdao city was 23.70%, 70~74 years old age group possesses the highest rate, and the variation of other three groups prevalence was not statistically significant ( $P>0.05$ ), while it's not consistent with the relevant research results, it reveals that aging is an independent risk factor for the prevalence rate of diabetes growth<sup>[4]</sup>.

#### 3.2 The remarkable correlation between hypertension and diabetes

According to the abroad report, the prevalence rate of hypertension in patients with diabetes was 40% to 80% , and about 28 % to 40 % in China<sup>[5]</sup>. The results of this study showed that hypertension and diabetes were significantly correlated.

#### 3.3 The remarkable correlation between high blood lipids and diabetes

The results of this study found that the incidence of hyperlipidemia in patients with diabetes accounted for 47.87%, non diabetic patients with hyperlipidemia accounted for 31.29%, and it can be considered as a significant correlation between hyperlipidemia and diabetes.

#### 3.4 The remarkable correlation between overweight and diabetes

The prevalence rate of diabetes in the overweight group was 4 times higher than that in normal weight group, the rate of hyper obese may increase another 30%<sup>[6]</sup>. According to Wang and his team, the risk of being diabetes is rising with the increasing of people's waistline, and the object with the largest waistline possesses the risk twelve times higher than the one with normal waistline. In the meantime, the object with the highest waist-to-hip ratio and physical fitness index reveals a 7 times higher and 8 times higher risk, respectively<sup>[7]</sup>. The results of this study show the remarkable correlation between overweight or obesity and diabetes and it's consistent with the results of other relative surveys<sup>[8]</sup>.

Above all, the health status of the elderly over 65 years old in Chengyang District of Qingdao City is alarming. Diabetes is a common disease for the elderly. With the people's aging,

physiological function declines, they need a reasonable diet nutrition to adjust themselves. Qingdao city locates in the coastal developed area, the economic situation is quite well, the quality of life for the elderly is also higher, lack of attention to the diet with the collocation of meat and vegetables and to the intake of sugar can easily lead to diabetes and other chronic diseases. Therefore, it's not only needed to strength the screening to elderly chronic diseases, but also needed to focus on their living habits and enhance their knowledge on nutrition, in order to reduce the prevalence rate of diabetes and other chronic diseases for elderly.

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