Original Article

Investigation of health and nutrition status of middle-aged and old residents in the urban district of Chongqing

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Objective：To investigate the health and nutrition status in middle-aged and old people in the urban district of Chongqing City, China in order to provide a rational diet construction for the population.
Method: This investigation was performed in 2004 and 1801 public officials both at post and retired in the urban district of Chongqinging City were enrolled in this investigation. Among them 96.7% were at age of over 40. The investigation was based on questionnaire, physical examination, laboratory biochemical test and bone density measurement.
Result: In the incidences of nutrition-related non-communicable diseases, overweight/obesity accounted for 50.5 %, hyperlipidemia 36.1%, hypertension 30.3%, fatty liver 22.3%, osteoporosis 16.1%, hyperuricemia 12.2%, and diabetes 11.2%, while the incidence of dystrophy is low. Correlation analysis of these diseases demonstrated that the rates of hypertension, hyperlipidemia, fatty liver, diabetes, coronary heart disease and gallstone were significantly higher in overweight or obesity than in normal-weight people. The rates of hypertriglyceride, hypercholesteremia, diabetes, hyperuricemia, coronary heart disease, and fatty liver were higher in people with hypertension than in people with normal blood pressure. The rates of hypertension, hypertriglyceride and hypercholesteremia, coronary heart disease and fatty liver were higher in diabetes than in non-diabetes people.
Conclusion: Our study shows that health and nutrition status of the public officials of Chongqing city is not favourable Overnutrition is the main problem.

Key Words: middle-aged and old people, health and nutrition status, investigation, urban district, Chongqing.

Introduction

With the development of economy and continuous improvement of citizens' life, the types of diseases have been varying. Though Department of Health carried out the fourth investigation of public nutrition and health status in 2002, there was no report about it in middle-aged and old people in cities. The incidence of non-communicable diseases, such as coronary heart disease, hypertension, stroke, diabetes, tumor, etc, which closely associate with nutrition in food and diet, has increased obviously in middle-aged and old people. Therefore, the prevention of nutrition-related diseases for the middle-aged and old people has become the highlight in the whole society. This text shows our investigation of nutrition status and nutrition-related diseases in the middle-aged and old people living in the urban area of Chongqing City of China in order to provide a rational diet construction for this population.

Materials and method

This investigation was performed in 2004 and the subjects were from a survey of measurement of health status in 1801 public officials both at post and retired in the urban area of ChongQing city, China in 2004. After ethics committee approval and informed consent, we randomly choosed the samples. All the 1801 public officials were enrolled in our investigation. Among the 1801 people, 62 were under 40 years, 942 were at the ages of 40 - 60, and 797 were over 60. This investigation items included questionnaire, food intake, nutritional status, physical measurement, clinical/physical examination, laboratory biochemistry test, bone density measurement and other related examinations. SPSS statistical software was used for statistical analysis of the results.

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Results

1. Testing results of body mass index (BMI) is shown in Table 1.

Table 1. The result of BMI measurement

	BMI*	Male (%)	Female (%)	Total number (%)
Underweight	<18.5	48 (4.1)	19 (6.6)	67 (3.9)
Nor-mal-weight	18.5~23.9	489 (41.5)	286 (54.8%)	775 (45.6)
Overweigh	24~27.9	506 (43.0)	172 (33.0%)	678 (39.9)
Obesity	≥28	135 (11.5)	45 (8.6)	180 (10.6)
Total		1178 (100)	522 (100)	1700 (100)

According to the standard proposed in the article written by Chinese Working Group for Obesity Problems published in Nutritional Journal, 2004, 26 (1):1-4.

2. Table 2 shows nutrition dependent diseases in people of different ages.
3. The relationship between weight and nutrition dependent diseases is shown in Table 3.
4. The relationship between diabetes and nutrition dependent diseases is seen in Table 4.
5. The relationship between hypertension and nutrition dependent diseases is shown in Table 5.
6. The result of bone density measured is shown in Table 6.

Discussion

1. The incidence of nutrition dependent diseases

Tables 1 and 2 reveal that among the non-communicable nutrition-related diseases mentioned above, overweight (39.9%) and obesity (10.6%) account for 50.5%, occupying 1/2 of the population, being the highest rate, followed by hyperlipemia(36.1%), hypertension (30.3%), fatty liver (22.3%), osteoporosis, (16.1%), hyperuricemia (12.2%), and diabetesmellitus (11.2%). Our investigation has found that the incidences of overweight/obesity, diabetes, hypertension, fatty liver, hyperuricemia are obviously higher in males than in females, but there is no significant difference in the incidence of hyperlipemia between men and women. Fatty liver is not an independent disease, its pathological phenomenon is caused by multiple factors, such as alcohol, obesity, diabetes, and hyperlipoidemia, ect, all of them are risk factors for fatty liver. [1] Our investigation indicates that the total incidence of fatty liver is 22.3%, with a high rate in men in all different age groups; but the incidence is high in women aged over 50 years; this significant difference may be the cause that men drink more alcohol.

"The study on nutrition and health status of Chinese citizens" by Information Office of the State Council on Oct 12, 2004 [2] announces that in citizens aged over 18 years the incidence of hypertension is 18.8%, the rate of diabetes is 2.6%; for people living in large cities, 30.0% adults suffer overweight, 12.3% have obesity, and 18.6% have hyperlipidaemia. Li Rong's study on the health of people aged over 60 in Chongqing shows that the rates of overweight / obesity, hyperlipidemia, hypertension, diabetes are 36.55%, 52.42%, 50.92% and 15.86%, respectively. Our investigation demonstrates that the rates of overweight/obesity, diabetes, hypertension, and hyperlipidemia are higher than the results reported by the Information Office of the State Council; and the incidence of hyperlipidemia is lower than that reported by Li Rong, while the rate of diabetes is similar to that by reported Li Rong. The difference may contribute to the different ages investigated. As the sources of food are various and abundant now, the rate of dystrophy is very low, for instance, underweight occupies only 3.9% in our series. This suggests that with the development of economy and improvement of life quality, dystrophy rarely occurs, on the contrary, overnutrition has become the main nutrition problem among the middle-aged and old people in cities.

Currently, osteoporosis is the most important public health issue in developed countries, and it has become a predominant issue in China. It is reported that in Europe and America, 30% of women and 12% of men have experienced osteoporotic fracture during their lifetime. In America, an investigation shows that in 1995 the annual incidence of osteoporotic fracture was far higher than that of heart attack, stroke, and breast cancer. In 2000, Hanmin Zhu reported that for people at the age of over 60, the incidence of osteoporotic fracture was 14.6% in males and 61.8% in females. [4] Bingyan Chang reported that the incidence rate of osteoporosis after 40 years old was 28.3% (male) and 45.2% (female) in urumqi in 2005. [5] Our investigation shows that the total rate of osteoporotic fracture is 14%, with 10.6% in males and 21.4% in fe

Table 2. The incidence of nutrition-related diseases in people of different ages (%)

Sex	Age	Number of persons	Hypertension	Hyperlipide-mia	Diabetes	Fatty liver	Hyperurice-mia
Male	30~	45	8.9	26.7	2.3	31.1	17.8
	40~	306	13.6	39.2	8.6	27.5	15.4
	50~	315	24.1	38.4	11.1	31.1	12.4
	60~	581	47.7	32.4	15.8	17.0	15.7
	total	1265	31.7	35.9	12.3	23.7	14.1
Female	30~	17	5.9	5.9	0	5.9	0
	40~	146	6.8	22.6	3.4	4.8	2.0
	50~	157	15.9	41.4	4.4	25.4	6.4
	60~	216	50.5	48.1	15.7	25.0	13.9
	total	536	27.0	37.9	8.6	19.0	8.0
	sum	1801	30.3	36.1	11.2	22.3	12.2

how the diagnoses were made: Hypertension: the diagnostic standard by WHO in 1999; Hyperlipidemia: total cholesterol > 572mmol/L，triglyceride > 1.70mmol/L; Diabetes: the diagnostic standard by WHO in 1999; Fatty liver: by the ultrasonic diagnosis; Hyperuricemia: blood uric acid > 390umol/L

Table 3. The relationship between weight and nutrition dependent diseases (n=1176)

	Incidence in weight normal	Incidence in overweight	Incidence in obesity
Hypertension	22.9% (20.5%, 25.3%)	42.8%**(39.97%, 45.63%)	55.3%**(52.46, 58.14)
Hyperlipidemia	35.2% (32.47%, 37.93%)	49.2%**(46.34%, 52.06%)	47.4%**(44.55, 50.25)
Coronary heart disease	2% (1.2%, 2.8%)	3.1%(2.11%, 4.09%)	7.9%**(6.36, 9.44)
Diabetes	8.8% (7.18%, 10.42%)	12.5%* (10.61% 14.39%)	23.7%**(21.27, 26.13)
Fatty liver	11% (9.21% 12.79%)	40.4%** (37.60%, 43.20%)	63.2%**(60.44, 65.96)
Gallstone	7.5% (5.99%, 9.01%)	10.4% (8.66%, 12.14%)	21.2%**(18.86, 23.54)

*compared with the normal weight group , $p<0.05$; ** compared with the normal weight group , $p<0.01$

Table 4. The relationship between diabetes and nutrition dependent diseases

	Hypertension	Hypercholesteremia	Hypertriglyceridema	Hypertriglyceridema hypercholesteremia	Hyperuricemia	Coronary heart disease	Fatty liver
202 Diabetes	105 (52%)** (45.11%, 58.89%)	12 (5.9%) (2.65%, 9.15%)	34 (16.8%) (11.64%, 21.96%)	15 (7.4%)** (3.79%, 11.01%)	18 (8.9%)** (4.97%, 12.83%)	11 (5.4) ** (2.28,8.52)	80 (39.6%)** (32.86%, 46.34%)
1601 nondiabetes	444 (27.6%) (25.41%, 29.79%)	105 6.5%) (5.29%, 7.71%)	252 (15.7%) (13.92%, 17.48%)	73 (4.5%) (3.48%, 5.52%)	204 (12.7%) (11.07%, 14.33%)	27 (1.7%) (1.07%, 2.33%)	324 (20.1%) (18.14%, 22.06%)

There is a significant difference compared with the non-diabetes group ($p<0.01$).

Table 5. The relationship between hypertension and nutrition dependent diseases

	Hypercholesteremia	Hypertriglyceridema	Hypertriglyceridema & hypercholesteremia	Diabetes	Hyperuricemia	Coronary heart disease	Fatty liver
549 persons with hypertension	37 (6.7%)	97 (17.7%)	40 (7.3%)**	105 (19.1%)**	93 (16.9%)**	29 (5.3%)**	167 (30.4%)**
1263 persons without hyperten-sion	80 (6.3%)	189 (15%)	48 (3.8%)	97 (7.7%)	129 (10.2%)	9 (0.7%)	237 (18.8%)

There is a significant difference compared with the no-hypertension group ($p<0.01$).

Table 6. The result of bone density measured

Age	Male			Female			Total		
	Normal (%)	Osteoporosis (%)	Reduced (%)	Normal (%)	Osteoporosis (%)	Reduced (%)	Normal (%)	Osteoporosis (%)	Reduce (%)
0～44	54	6 (6.7)	30 (33.3)	16	4 (9.3)	23 (53.5) **	70 (52.6)	10 (7.5)	53 (39.8)
45~59	378	49 (9.9)	70 (14.1)	149	33 (13.4) **	65 (26.3) **	527 (70.8)	82 (11.0)	135 (18.1)
60～	435	65 (12)	43 (7.9)	94	72 (32.9) **	53 (24.2) **	529 (69.4)	137 (18)	96 (12.6)
total	867 (26.7)	120 (10.6)	143 (12.7)	259 (50.9)	109 (21.4) **	141 (27.7) **	1126 (68.7)	229 (14)	284 (17.3)

There is a significant difference compared the male group (p<0.01).

males, and it increases with age. As bone fracture happens easily in osteoporosis people, and the symptom of osteoporosis is latent, only when fracture happens, is the osteoporosis found and diagnosed in many middle-aged and old people. Therefore, much attention should be paid to osteoporosis for the middle-aged and the old, and prevention measures and treatment of osteoporosis should be carried out as early as possible.

2. Correlated analysis of nutrition dependent diseases

Overweight/obesity

Overweight/obesity is a chronic metabolic disease that is caused by multiple factors. [6] Table 3 displays that there are significant differences in the rates of hypertension , hyperlipidemia and fatty liver (p<0.01) and in the rate of diabetes (p <0.05) between the overweight and the normal weight groups; there are significant differences in the rates of hypertension , hyperlipidemia,, coronary heart disease, diabetes, fatty liver, and gallstone between the obesity and the normal weight groups (p<0.01), with the rate of fatty liver being the highest (63.2%) among all the diseases, followed by hypertension and hyperlipidemia. This result is coincident with that reported in resent years in China.

Hypertension

Hypertension, the most common cardiovascular disease, is a common issue all over the world, with a high incident. It causes high rates of disablement and death, also result in complications of heart, brain, kidney and is the main risk factor for coronary heart disease, stroke, and early death. The incidence of hypertension increases with age, generally after 35 years, and is higher in men than in women at the age of under 60 years, but higher in women than in men at the age of over 60. [7] It is shown in table 4 that the rate of hypertension increases with age and reaches the peak after 60 years in both sexes, but higher in females than in males aged over 60 years, and there is a significant difference in ages of 70 -80 between male and female (p<0.01), which is coincident with that reported in most literatures. Table 5 shows that have obviously higher the incidences of hypertriglyceridema, hypercholesteremia, diabetes, hyperuricemia, coronary heart disease, and fatty liver are higher in the people with hypertension than in the people without hypertension, while single hypertriglyceridema or hypercholesteremia has no significant difference between them. We consider that this difference may result from multiple factors that interact with each other.

Diabetes

Recently, more and more scholars notice that insulin resistance is the main factor to cause not only diabetes but also obesity, hypertension, coronary heart disease and hyperlipoidemia. Table 4 shows that the prevalence rates of hypertension, hypertriglyceridema, hypercholesteremia, coronary heart disease, and fatty liver are all higher in the people with diabetes than in the people without diabetes. Therefore, effective prevention and treatment of diabetes can decrease the incidences of the diseases mentioned above. A prospective study on diabetes from England reported in Britain, the rate of hypertension is 1.5~2.5 times higher in people with diabetes than in the patients without diabetes, and the disease occurs 10 years ahead in age and the death rate of the disease has obviously increased. It is considered that the high rate of hypertension in people with diabetes may be related with family heredity. In our investigation the results show that among all the diseases the rate of hypertension is highest in diabetes patients (52%), which is in accordance with the report mentioned above. So it is very important for diabetes patients to diagnose and treat hypertension as early as possible.

Conclusion

The results of our investigation indicate that the health and nutrition status of public officials of Chongqing City is not that optimistical. Overnutrition is the main problem. We consider that propaganda and public education on the knowledge of nutritional sciences should be launched to instruct citizens to have scientific and rational diet and healthy lifestyle in order to prevent and decrease nutrition dependent diseases. Our research only studied the the public nutrition and health status in middle-aged and old people in chongqing city. So if the results can be extrapolated to other populations still needs other studies.

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