Prevalence of Hypertension and Its Influencing Factors among Residents Aged 15-79 in Anyang City

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Abstract

Objective To understand the prevalence and influencing factors of hypertension among residents aged 15-79 years old in Anyang City, and to provide scientific basis for formulating intervention measures.

Methods from October to November 2017, 6397 residents aged 15-79 years in Anyang City were selected by multistage stratified sampling method for questionnaire survey and physical examination.

Results the prevalence rate of hypertension was 28.24%, and the standardized rate was 28.38%; Compared with different gender, age, education level, marital status, occupation, BMI, whether central obesity, daily salt intake, smoking, drinking, sleep and other factors, there were statistically significant differences in the prevalence of hypertension (all P < 0.001), which increased with age and decreased with education level; The controllable risk factors of hypertension were overweight, central obesity, smoking, drinking, daily salt intake, sleep time, etc. The protective factors were college education level or above, knowing and answering correctly daily salt intake and standard sleep. Conclusion the prevalence rate of hypertension in Anyang residents aged 15-79 is high. Strengthening policy control, adopting the strategy of "whole population" and "high-risk population" to carry out health education and health promotion of hypertension prevention and control can effectively reduce the risk of hypertension and improve the compliance of standardized treatment and management of hypertension patients.

Keywords: hypertension; Prevalence rate; influence factor.

I. Introduction

Hypertension is one of the most common cardiovascular diseases seriously endangering human health and quality of life. It has high morbidity, mortality and disability, and is also an important risk factor for stroke, coronary heart disease and other cardiovascular and cerebrovascular diseases. Prevention and control of hypertension can significantly reduce the incidence and mortality of cardiovascular and cerebrovascular diseases, and improve the quality of life of patients [3]. Mastering the prevalence of hypertension and its influencing factors is the premise of effective prevention and control of hypertension. In order to implement the "healthy Anyang 2030" action plan of Anyang municipal government, this study carried out an epidemiological survey of hypertension among residents aged 15-79 in Anyang City from October to November 2017, and analyzed the influencing factors of hypertension, so as to provide reference for formulating appropriate prevention and control strategies.

II. Object and Method

2.1 Participants the subjects of this study were 15-79 years old permanent residents in Anyang City who lived in the survey area for more than 6 months. Linzhou city and Wenfeng District were randomly selected as rural and urban project counties (districts), and multi-stage sampling method was used for sampling. In the first stage, five townships (streets) were randomly selected according to the cluster sampling method proportional to the population size in the project counties (districts); In the second stage, two administrative villages (neighborhood committees) were randomly selected from each selected township (street) according to the cluster sampling method proportional to the population size; In the third stage, each selected administrative village (neighborhood committee) is divided into several villager / resident groups with no less than 90 households as the scale, and one villager / resident group is
selected by simple random sampling method; in the fourth stage, at least 90 households were selected from each selected villager/resident group by cluster sampling. The sample size was 5056. Considering the situation of no response and waste paper, 6397 people were investigated, 5882 people were effectively investigated, and the effective rate was 91.95%. All respondents signed informed consent.

2.2 Method

2.2.1 Questionnaire investigation
The survey was carried out with the questionnaire developed by Anyang health and Family Planning Commission and Anyang Center for Disease Control and prevention. It was conducted by face-to-face inquiry by uniformly trained investigators. The contents include personal basic information, history of hypertension, family history, lifestyle and health care.

2.2.2 Medical examination
The height, weight, waist circumference and blood pressure were measured by unified trained physical examination personnel using unified specification tools and standard methods. The height was measured with a metal column altimeter with an accuracy of 0.1 cm. The body weight was measured by electronic scale with an accuracy of 0.1 kg. Waist circumference was measured with a waist ruler, accurate to 0.1 cm. Blood pressure was measured by electronic sphygmomanometer [Omron] continuously for 3 times during sitting, with an interval of more than 1 min, and the mean value of 3 times was taken as the final measurement result. All measuring instruments meet the requirements of national metrology certification, and the measurement methods meet the requirements of the industrial standard of the people's Republic of China - human health monitoring anthropometry (WS/t424-2013).

2.3 Diagnostic criteria
Hypertension is defined as blood pressure measured three times on different days without using antihypertensive drugs, SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg. Those who have a history of hypertension and are currently using antihypertensive drugs should still be diagnosed as hypertension, although their blood pressure is lower than 140/90 mmHg. The diagnostic criteria of overweight and obesity: Overweight refers to BMI of 24.0 ~ 27.9 kg/m2, obesity refers to BMI ≥ 28.0 kg/m2 [4]; Central obesity refers to male waist circumference ≥ 85 cm or female waist circumference ≥ 80 cm [4]; The standard sleep time was 7 ~ 8 h/D, insufficient sleep time was < 7 h/D, and excessive sleep time was > 8 h/D [5].

2.4 Statistical analysis
Epidata3.1 was used for data entry and consistency test, SPSS 24.0 was used for data analysis, chi square test and logistic regression model were used to analyze the related risk factors of hypertension, and the test level was improved α = 0.05. The prevalence of hypertension was standardized according to the 2018 China Statistical Yearbook [6].

III. Result

3.1 General information
A total of 5882 residents aged 15-79 were investigated, including 2960 males (45.73%) and 3192 females (54.27%); There were 2915 urban residents (1315 males and 1600 females) and 2967 rural residents (1375 males and 1592 females). The average age was 43.46±26 years old.

3.2 Prevalence of hypertension in Anyang City (Table 1)
The prevalence rate of hypertension was 28.24% (1661/5882) and the standardized rate was 28.38% (270393/952893). Among them, the prevalence rate of hypertension in urban residents was 29.09% (848/2915), and the standardized rate was 30.26% (288324/952893), which was higher than that in rural residents (27.40% (813/2967), and the standardized rate was 26.32% (250791/952893) = 2.071, >0.05). Compared with different gender, age, education level, marital status, occupation, body mass index (BMI), waist circumference, smoking, drinking and other factors, there were statistically significant differences in the prevalence of hypertension (all < 0.001), and there was an upward trend with the increase of age and a downward trend with the increase of education level. Compared with different occupations, the highest prevalence rate of hypertension was 61.93% among retirees and the lowest
was 1.91% among school students, while the prevalence rate of hypertension in business service industry (13.16%) and professional and technical personnel (14.91%) was lower than that in agriculture, forestry, animal husbandry and fishery production personnel (31.55%) and production equipment operators (35.81%). However, there was no significant difference in family history of hypertension (> 0.05).

Daily salt intake

Table 1 prevalence of hypertension among residents aged 15-79 in Anyang City

| features                              | hypertension | Non hypertension | Prevalence of hypertension (%) | \(g_{two}\) | \(P\)  |
|---------------------------------------|--------------|-----------------|---------------------------------|-------------|--------|
| urban and rural city                  | 848          | 2067            | 29.09                           | 2.071       | 0.150  |
| countryside                          | 813          | 2154            | 27.40                           |             |        |
| Gender                                | 895          | 1795            | 33.27                           | 61.955      | 0.000  |
| female                               | 766          | 2426            | 24.00                           |             |        |
| Age <30                               | 100          | 1464            | 6.39                            | 1119.898    | 0.000  |
| 30~                                   | 418          | 1708            | 19.66                           |             |        |
| 50~                                   | 795          | 860             | 48.04                           |             |        |
| 70~                                   | 348          | 189             | 64.80                           |             |        |
| degree of education                   |              |                 |                                 |             |        |
| Primary school and below              | 463          | 560             | 45.26                           | 289.178     | 0.000  |
| junior middle school                  | 719          | 1802            | 28.52                           |             |        |
| High school / technical secondary school / Technical School | 383 | 1042 | 28.52 | 26.88 |
| College or bachelor degree or above   | 96           | 817             | 10.51                           |             |        |
| marital status                        |              |                 |                                 |             |        |
| unmarried                             | 53           | 827             | 6.02                            | 340.418     | 0.000  |
| Cohabitation or married               | 1447         | 3270            | 30.68                           |             |        |
| Divorce, widowhood, separation        | 161          | 124             | 56.49                           |             |        |
| Occupation                            |              |                 |                                 |             |        |
| Production personnel of agriculture, forestry, animal husbandry and fishery | 525 | 1139 | 31.55 | 586.575 |
| Production equipment operators        | 111          | 199             | 35.81                           |             |        |
| Business, service industry            | 72           | 475             | 13.16                           |             |        |
| Personnel of government organs, enterprises and institutions | 60 | 191 | 23.90 | |
| Professional and technical personnel  | 78           | 445             | 14.91                           |             |        |
| Other workers                         | 163          | 638             | 20.35                           |             |        |
| School Students                       | 6            | 308             | 1.91                            |             |        |
| Unemployed / domestic retirement      | 293          | 609             | 32.48                           |             |        |
| BMI <24                               | 579          | 2418            | 19.32                           | 260.249     | 0.000  |
| 24-28                                 | 717          | 1327            | 35.08                           |             |        |
| ≥28                                   | 365          | 476             | 43.40                           |             |        |
| Central obesity                       |              |                 |                                 |             |        |
| yes                                   | 476          | 2360            | 16.78                           | 354.583     | 0.000  |
| no                                    | 1185         | 1861            | 38.90                           |             |        |
| Daily salt intake                     |              |                 |                                 |             |        |
| Know and answer correctly             | 336          | 1102            | 23.37                           | 28.839      | 0.000  |
| Knowing the wrong answer              | 55           | 156             | 26.07                           |             |        |
| I don't know                          | 1270         | 2963            | 30.00                           |             |        |
| Smoking status                        |              |                 |                                 |             |        |
| Smoking every day                     | 293          | 651             | 31.04                           | 98.759      | 0.000  |
| Non daily smoking                     | 69           | 177             | 28.05                           |             |        |
| I used to smoke, but now I don't      | 154          | 140             | 52.38                           |             |        |
| Never                                 | 1145         | 3253            | 26.03                           |             |        |
| Drinking (last 12 months)             |              |                 |                                 |             |        |
| 30I had a drink in a few days         | 341          | 648             | 34.48                           | 23.400      | 0.000  |
| 30I had a drink two days ago          | 137          | 345             | 28.42                           |             |        |
| Not yet                               | 1183         | 3228            | 26.82                           |             |        |
| Family history                        |              |                 |                                 |             |        |
| yes                                   | 862          | 2103            | 29.07                           | 2.051       | 0.152  |
| no                                    | 799          | 2118            | 27.39                           |             |        |
3.3 Comparison of different characteristics of residents aged 15-79 with or without hypertension in Anyang City (Table 2) compared with non hypertensive residents, the age, BMI, waist circumference and daily smoking of residents aged 15-79 with hypertension were higher, while the sleep time was less, and the differences were statistically significant (< 0.01). P

Table 2 Comparison of different characteristics of hypertension among residents aged 15-79 in Anyang City

| Hypertension | Age (years) | BMI (kg/m²) | Waist circumference (CM) | Smoking volume (cigarettes / day) | Sleep time (hours / day) |
|--------------|-------------|-------------|--------------------------|----------------------------------|-------------------------|
| yes          | 56.25±ten point nine nine | 25.52±three point six four | 86.81±eight point seven eight | 3.02±seven point one six | 7.33±zone four zero |
| no           | 38.51±eleven point seven two | 23.69±three point five three | 80.91±eight point nine five | 2.40±six point one one | 7.60±two zero |

| t        | 40.289 | 17.703 | 22.848 | 3.105 | -6.897 |
| P        | 0.003  | 0.000  | 0.000  | 0.002 | 0.000  |

3.4 Logistic regression analysis on the influencing factors of hypertension among 15-79 residents in Anyang City (Table 3) multivariate unconditional logistic regression analysis was conducted with the prevalence of hypertension among 15-79 years old residents in Anyang City as the dependent variable (0 = no, 1 = yes) and the factors with P < 0.05 in univariate analysis as the independent variable. The results showed that male, age ≥ 30 years old, BMI 24 and above, central obesity, daily smoking, drinking more than 3 times a week, insufficient or too long sleep, and ignorance of daily salt intake were the risk factors for hypertension among residents aged 15-79 years old in Anyang City, while those with college education or above, knowing and answering correctly the daily salt intake, and having no knowledge of daily salt intake were the risk factors for hypertension among residents aged 15-79 years old in Anyang City.Standard sleep is a protective factor for hypertension among residents aged 15-79 in Anyang City.

Table 3 multivariate logistic regression analysis on Influencing Factors of hypertension among residents aged 15-79 in Anyang City, Henan Province

| Factor                | Reference group | B       | Standard error | Wald      | P       | OR      | OR 95% confidence interval |
|-----------------------|-----------------|---------|----------------|-----------|---------|---------|----------------------------|
| Gender                | female          | male    | -0.325         | 0.073     | 19.566  | 0.000   | 0.723                      | 0.626, 0.835            |
|                      | Age segment     | < 30    | 0.758          | 0.138     | 30.072  | 0.000   | 2.134                      | 1.628, 2.798            |
|                      |                 | 50 ~    | 1.861          | 0.143     | 170.041 | 0.000   | 6.433                      | 4.863, 8.510            |
|                      |                 | 70 ~    | 2.488          | 0.176     | 200.322 | 0.000   | 12.033                     | 8.527, 16.982           |
| Marriage              | Cohabitation    | unmarried | 0.156         | 0.188     | 0.690   | 0.406   | 1.169                      | 0.809, 1.690            |
|                      | or married      |          |                |           |         |         |                            |                           |
|                      | Separation, divorce, widowhood | 0.449  | 0.235          | 3.654     | 0.056   | 1.567   | 0.989                      | 2.483                   |
| Culture               | Primary school and below | 0.022 | 0.095          | 0.054     | 0.817   | 0.978   | 0.812                      | 1.179                   |
|                      | High school / technical school / Technical School | 0.083 | 0.113          | 0.539     | 0.463   | 1.086   | 0.871                      | 1.355                   |
|                      | College or bachelor degree or above | 0.494 | 0.165          | 9.017     | 0.003   | 0.610   | 0.442                      | 0.842                   |
| occupation            | Production personnel of agriculture, forestry, animal husbandry and fishery | -0.103 | 0.159          | 0.423     | 0.515   | 0.902   | 0.661                      | 1.231                   |
|                      | Production equipment operators | -0.681 | 0.174          | 15.253    | 0.000   | 0.506   | 0.359                      | 0.712                   |

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The results showed that the prevalence rate of hypertension was 28.24%, and the standardized rate was 28.38%. It was higher than that in Henan Province (24.89%, 15-74 years old, 2012), higher than that in China (27.8%, 23.2%, over 18 years old, 2015), higher than that in Xingtai City, Hebei Province (19.0%, over 15 years old, 2013) [9] and Hainan Province (24.05%, over 18 years old, 2017) [10]. It was lower than the prevalence of hypertension in Hefei (35.3%, over 15 years old, 2013) [11] and Shijingshan District (36.1%, 2015) [12], similar to that in Gansu Province (27.73%, 2013) and Guizhou Province (28.78%, over 15 years old, 2015). It is suggested that the prevalence of hypertension in Anyang City is at a high level.

There was no significant difference in the prevalence of hypertension between urban and rural areas in Anyang City. The results were consistent with those in Hefei city and Xingtai City, suggesting that the gap between rural and urban areas was narrowing. [11][9]

Compared with different gender, age, education level, marital status, occupation, body mass index (BMI), waist circumference, daily salt intake, smoking, drinking and other factors, there were statistically significant differences in the prevalence of hypertension (all < 0.001), and there was an upward trend with the increase of age and a downward trend with the increase of education level. Logistic regression analysis showed that male, age ≥ 30 years old, BMI 24 and above, central obesity, daily smoking, drinking more than 3 times a week, insufficient or too long sleep, and unknown daily salt intake were risk factors for hypertension in Anyang residents aged 15-79 years old. College education and above were protective factors for hypertension in Anyang residents aged 15-79 years old. It is consistent with the research results of other provinces and cities, which may be related to the better self-care awareness of the people with college education or above, suggesting that health education is of great significance for the prevention and control of hypertension. [9-14]
Compared with different occupations, the highest prevalence rate of hypertension was 61.93% in retirees and the lowest was 1.91% in school students, which was mainly related to age. There was no significant difference in the prevalence rate of hypertension with or without family history (> 0.05), which was inconsistent with previous studies. It may be that people with family history of hypertension received relative attention in the publicity and education of hypertension prevention and control, and achieved good results in prevention and control. It is suggested that it is an important way to prevent and control the increase of the prevalence of hypertension to strengthen the publicity of hypertension related prevention and control knowledge for the whole population. $P^{10-14}$

Therefore, according to the survey on hypertension prevention and control work, the following suggestions are put forward: (1) It is still necessary to integrate hypertension prevention and control into the local medical and health service system and formulate corresponding policies, including team building, resource allocation, supervision and assessment, etc; (2) The strategy of "whole population" and "high-risk group" was adopted to carry out health education on prevention and treatment of hypertension. The residents with risk factors of hypertension, especially those over 30 years old, with central obesity and bad habits such as smoking, drinking and high salt diet, were given health education and health promotion. To reduce the risk of hypertension, we should promote them to develop a good lifestyle and behavior habits, and carry out necessary interventions around salt reduction, oil control, weight control, smoking cessation and alcohol restriction; (3) At the same time, through regular physical examination, strengthen screening and other early detection, through regular follow-up and other ways to promote the self-management ability of patients with hypertension, advocate the compliance of standardized treatment and management, so as to effectively control hypertension.

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