

Epidemiological characteristics and etiological factors of primary hypertension in the community population

Xiangquan Chen

¹ Internal Medicine Department of Yanbian County Traditional Chinese Medicine Hospital

*Communication Email: 18081716873@163.com

CITATION

Author Name. (2025). Article title. Journal of Infrastructure, Policy and Development. 9(x): X.
<https://doi.org/10.24294/jipdxxxx>

ARTICLE INFO

Received: Date Month Year
Revised:
Accepted: Date Month Year
Available online: Date Month Year

COPYRIGHT



Copyright © 2025 by author(s).
Psycho-Oncologie is published by PiscoMed Publishing Pte.Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license. <https://creativecommons.org/licenses/by/4.0/>

Abstract: Objective: To investigate the epidemiological characteristics and etiological factors of primary hypertension in community populations, providing scientific evidence for developing targeted hypertension prevention strategies. Methods: A cross-sectional survey was conducted among 290 permanent residents aged 18 and above from February 2024 to March 2025. Demographic data, lifestyle patterns, and medical history were collected, with standardized blood pressure measurements. Single-factor analysis and multivariate logistic regression were performed using SPSS26.0 software. Results: The prevalence rate of primary hypertension in the community was 32.41% (94/290). The prevalence rates for the 40-59 age group (38.46%) and ≥60 age group (56.67%) were significantly higher than the 18-39 age group's 13.79% ($P<0.01$). Male prevalence (38.71%) was higher than female prevalence (27.27%), with a statistically significant difference ($P<0.05$). Multivariate logistic regression analysis revealed that age ($OR=1.82, 95\%CI:[1.23-2.70]$), male gender ($OR=1.95, 95\%CI:1.12-3.40$), BMI ≥ 28 kg/m² ($OR=2.31, 95\%CI:1.35-3.94$), family history of hypertension ($OR=3.14, 95\%CI:1.76-5.61$), high-salt diet ($OR=2.08, 95\%CI:1.21-3.58$), physical inactivity ($OR=1.89, 95\%CI:1.09-3.28$), alcohol consumption ($OR=1.77, 95\%CI:1.02-3.08$), and high psychological stress ($OR=2.25, 95\%CI:1.30-3.91$) are independent risk factors for primary hypertension. The community exhibits a relatively high prevalence of primary hypertension, which is influenced by multiple factors. Targeted prevention and control measures should be implemented to reduce the disease burden.

Keywords: primary hypertension; epidemiological characteristics; etiological factors; community population

1. Introduction

Essential hypertension is an important public health problem that endangers human health worldwide. According to the data of the World Health Organization, about 1.28 billion adults in the world suffer from hypertension, of which more than 90% are primary hypertension, and the incidence rate is increasing year by year ^[1]. The latest epidemiological survey in my country shows that the prevalence of hypertension in people aged 18 and above has reached 27.9, the number of patients exceeds 0.3 billion, and the disease burden is heavy. Essential

hypertension can not only directly cause damage to the heart, brain, kidney and other important organs, increase the risk of serious complications such as coronary heart disease, stroke and chronic renal failure, but also significantly reduce the quality of life of patients and bring huge economic burden to the family and society. Community, as the basic unit of residents' life, is the frontier of primary hypertension prevention and control. In-depth understanding of the epidemiological characteristics and etiological factors of primary hypertension in the community population will help to formulate prevention and control strategies according to local conditions, and achieve early detection, early intervention and effective management of hypertension.^[2] However, due to differences in economic development level, lifestyle, eating habits and genetic background in different regions, the prevalence and influencing factors of essential hypertension are different. At present, the systematic research on primary hypertension in specific communities is still relatively insufficient, and it is urgent to clarify its epidemic status and key influencing factors through in-depth investigation, so as to provide accurate guidance for the prevention and control of hypertension in communities.^[3] The purpose of this study is to reveal the epidemiological characteristics and etiological factors of primary hypertension in the community through the investigation of the permanent residents of the community, and to provide a scientific basis for improving the level of prevention and control of hypertension in the community.

2. Objects and Methods

2.1 research object

The permanent residents aged 18 and above in the community from February 2024 to March 2025 were selected as the research objects. Inclusion criteria: ① continuous residence time in the community $\geq$ 6 months; ② age $\geq$ 18 years old; ③ voluntary participation in this study and signed informed consent. Exclusion criteria: ① patients with secondary hypertension; ② patients with severe heart, liver, kidney and other important organ failure diseases, unable to cooperate with the investigation; ③ mental illness or cognitive impairment, unable to communicate normally. A total of 290 subjects were included, 155 males (53.45 percent) and 135 females (46.55 percent), with an age range of 18-85 years and a mean age of 46.88 ± 13.25 years.

2.2 research methods

Using the method of cluster sampling, the community is divided into several sampling units, [X] units are randomly selected, and all the residents in the unit who meet the inclusion criteria are surveyed. The contents and methods of the survey are as follows:

General demographic data were collected through questionnaires on age, gender, nationality, marital status, education level, occupation and other information.

Lifestyle: Standardized questionnaires were used to ask in detail about smoking (whether smoking, smoking years, daily smoking), alcohol consumption (whether drinking, drinking years, weekly drinking times, each drinking amount), diet (daily salt intake, vegetable and fruit intake, meat intake), exercise status (weekly exercise times, exercise time, exercise intensity) and other lifestyle-related information. Salt intake was estimated by asking about daily cooking and condiment use; exercise intensity was classified as mild, moderate, and severe according to the National Fitness Guidelines.^[4]

Disease history: to know whether the study subjects have hypertension, diabetes, hyperlipidemia and other chronic diseases, and whether there are hypertension patients in the family (parents, brothers and sisters).

Blood pressure measurement is performed by medical staff who have received unified training using a calibrated mercury sphygmomanometer to measure blood pressure in accordance with the Chinese Blood Pressure Measurement Guidelines. Before the measurement, the subjects were required to sit still and rest for 5-10 minutes, and the blood pressure in the sitting position of the right upper arm was measured for 3 consecutive times, with an interval of 1-2 minutes each time, and the average value was taken as the blood pressure value. The diagnostic criteria for hypertension are based on the Chinese Guidelines for Prevention and Treatment of Hypertension, Revised 2023, I.e. systolic blood pressure $\geq 140\text{mmHg}$ and (or) diastolic blood pressure $\geq 90\text{mmHg}$, or those who have a history of hypertension and are taking antihypertensive drugs^[5].

2.3 statistical methods

Epidata3.1 software is used for data double entry to ensure data accuracy. Using SPSS26.0 software for data analysis, the measurement data are represented by mean s. standard deviation ($\bar{x}$), the inter-group comparison uses t-test or single-factor anova analysis, and the counting data is expressed as rate (%), and the inter-group comparison is tested. The independent risk factors of primary hypertension were screened by multi-factor Logistic regression analysis, and the variables of $P < 0.1$ in single factor analysis were included in the regression model. The difference was statistically significant with $P < 0.05$.

3. Results

3.1 General

A total of 290 community residents were investigated, including 155 males (53.45%) and 135 females (46.55%), aged 18-85 years with a mean age of 46.8 ± 13.2 years. In terms of educational level, 42 cases (14.48 per cent) were primary school and below, 98 cases (33.79 per cent) were junior high school, 85 cases (29.31 per cent) were Senior high school/Secondary specialized school, and 65 cases (22.41 per cent) were junior college and above. The occupational distribution was 78 cases (26.90 per cent) of mental workers, 126 cases (43.45

per cent) of manual workers and 86 cases (29.65 per cent) of unemployed/retired workers.

3.2 Prevalence of essential hypertension in

Among the 290 subjects, 94 patients were diagnosed with essential hypertension, with a prevalence rate of 32.41%. There were significant differences in the prevalence of hypertension among different age groups ($\chi^2 = 38.65$, $P < 0.01$), with 13.79 (12/87), 38.46 (104), and 56.67 (42/74) among 18-39, 40-59, and ≥ 60 years old, respectively. The prevalence of hypertension was significantly higher in men (38.71, 60/155) than in women (27.27, 34/125, $\chi^2 = 4.23$, $P < 0.05$).

3.3 Analysis of related factors in patients with essential hypertension

Univariate analysis showed that age, gender, BMI, family history of hypertension, high salt diet, lack of exercise, alcohol consumption, mental stress and other factors were significantly associated with the occurrence of essential hypertension ($P < 0.05$), while nationality, marital status, education level, occupation and other factors were not significantly associated with the occurrence of essential hypertension ($P > 0.05$). Specific results are shown in **Table 1**.

Table 1. Analysis of related factors in patients with essential hypertension [cases/%]

Factors	Classification	Hypertension group (n = 94)	Non-hypertensive group (n = 196)	χ^2/t	P
Age (years)	18-39	12(12.77)	75(38.27)	38.65	<0.001
	40-59	40(42.55)	64(32.65)		
	≥ 60	42(44.68)	32(16.33)		
Gender	Male	60(38.71)	95(48.47)	4.23	0.04
	Female	34(27.27)	101(51.53)		
BMI(kg/m ²)	<18.5	3(3.19)	18(9.18)	25.43	<0.001
	18.5-23.9	28(29.79)	82(41.84)		
	24-27.9	36(38.30)	64(32.65)		
	≥ 28	27(28.72)	32(16.33)		
family history of hypertension	There are	45(47.87)	35(17.86)	32.56	<0.001
	None	49(52.13)	161(82.14)		
high salt diet	Yes	62(65.96)	88(44.90)	11.23	<0.001
	No	32(34.04)	108(55.10)		
lack of exercise	Yes	68(72.34)	96(48.98)	13.45	<0.001
	No	26(27.66)	100(51.02)		
Drinking	Yes	48(51.06)	72(36.73)	5.89	0.015
	No	46(48.94)	124(63.27)		
mental pressure	Big	56(59.57)	64(32.65)	16.78	<0.001
	Small	38(40.43)	132(67.35)		

3.4 Multivariate Logistic regression analysis of influencing factors of essential hypertension

Variables with $P < 0.1$ in univariate analysis (age, sex, BMI, family history of hypertension, high salt diet, lack of exercise, alcohol consumption, mental

stress) were included in multivariate Logistic regression model for analysis. The prevalence was age, male, BMI $\geq 28 \text{ kg/m}^2$, family history of hypertension, high salt diet, lack of exercise, drinking, mental stress were independent risk factors of essential hypertension ($P < 0.05$). The specific regression coefficient (β), standard error (SE), Wald value, OR value and 95% confidence interval (CI) are shown in **Table 2**.

Table 2. Multivariate Logistic regression analysis of influencing factors of essential hypertension

Factors	β	SE	Wald	OR	95%CI	P
Age (per 1 year increase)	0.60	0.22	7.32	1.82	1.23-2.70	0.007
Gender (Male vs Female)	0.66	0.29	5.12	1.95	1.12-3.40	0.024
BMI($\geq 28 \text{ kg/m}^2$ vs $< 28 \text{ kg/m}^2$)	0.84	0.32	6.98	2.31	1.35-3.94	0.008
Family history of hypertension (with vs without)	1.14	0.30	14.56	3.14	1.76-5.61	< 0.001
High-salt diet (yes vs no)	0.73	0.31	5.58	2.08	1.21-3.58	0.018
Lack of exercise (yes vs no)	0.64	0.30	4.69	1.89	1.09-3.28	0.030
Drinking (Yes vs No)	0.57	0.28	4.18	1.77	1.02-3.08	0.041
Mental stress (big vs small)	0.81	0.30	7.34	2.25	1.30-3.91	0.007

4. Discussion

4.1 Epidemiological characteristics of essential hypertension in

The results of this study showed that the prevalence of essential hypertension in the community residents aged 18 years and over was 32.41, which was significantly higher than the average prevalence of hypertension in the population aged 18 years and over in China (27.9). This may be related to the lifestyle, genetic background and population structure of the community residents. In terms of age, the prevalence of hypertension increases significantly with age, and the prevalence of people over 40 years old is significantly higher than that of people under 40 years old, which is consistent with the results of many studies at home and abroad ^[6]. With the increase of age, a series of physiological and pathological changes occur in the vascular wall, such as the decrease of elastic fibers, the increase of collagen fibers, and the proliferation of vascular smooth muscle cells, which leads to the decrease of elasticity and the increase of stiffness of the vascular wall, and the increase of blood pressure. In addition, the elderly are often combined with a variety of chronic diseases, such as diabetes, hyperlipidemia, etc. These diseases interact with each other to further aggravate vascular lesions and promote elevated blood pressure. The prevalence of hypertension was higher in men (38.71 per cent) than in women (27.27 per cent). ^[7]. This may be related to the more common bad habits of men. For example, the proportion of men smoking and drinking was higher than that of women in this study.

4.2 Etiology and influencing factors of essential hypertension

Multivariate Logistic regression analysis showed that the risk of hypertension in people with a family history of hypertension was 3.14 times higher than

that in people without a family history of hypertension, indicating that genetic factors play an important role in the pathogenesis of essential hypertension. Studies have shown that hypertension has an obvious genetic tendency, and about 60% of hypertensive patients have a family genetic background. Genetic factors can be involved in the occurrence and development of hypertension by affecting multiple physiological systems and molecular mechanisms, such as renin-angiotensin-aldosterone system (RAAS) related gene polymorphism can change the activity of the system and affect the regulation of blood pressure; vascular endothelial function related gene variation can lead to vascular endothelial cell dysfunction, cause vasodilation and contraction imbalance, and then increase blood pressure. In addition, genetic factors may also interact with lifestyle factors, together affect the risk of hypertension.^[8]

High-salt diet is an important risk factor for essential hypertension. In this study, the risk of hypertension in the high-salt diet group was 2.08 times higher than that in the normal diet group. After high salt intake, excessive sodium ions are retained in the body, resulting in increased extracellular fluid volume and increased blood volume load. At the same time, high salt can activate the RAAS system, increase angiotensin II production, cause vasoconstriction, and increase peripheral resistance to further increase blood pressure^[9]. In addition, high salt may also enhance the contractile response of vascular smooth muscle by affecting the calcium ion concentration in vascular smooth muscle cells, resulting in thickening of the vascular wall, stenosis of the lumen, and aggravating the pathological process of hypertension. Residents in this community generally prefer salty and fresh tastes, and a large amount of salt, soy sauce and other condiments are used in the cooking process, and the intake frequency of pickled food is relatively high. These bad eating habits greatly increase the risk of hypertension. The risk of hypertension in people who lack exercise is 1.89 times that of people who often exercise, which confirms the key role of exercise in blood pressure regulation^[10-11].

Alcohol consumption was significantly associated with high blood pressure, and the risk of the disease was 1.77 times higher in people who drank alcohol than in non-drinkers. The effect of alcohol on blood pressure is dose-effect relationship. The effect of a small amount of alcohol (daily alcohol intake <15g) on blood pressure is not clear, but a large amount of alcohol (daily alcohol intake $\geq$ 30g) can trigger sympathetic nerve excitation, promote the release of catecholamines from adrenal medulla, resulting in increased heart rate and vasoconstriction. At the same time, alcohol can also interfere with the renin-angiotensin-aldosterone system, raising blood pressure^[12]. Some male residents in this community have a long-term habit of drinking heavily and often use drinking as a way of socializing and relieving stress, which undoubtedly increases the risk of hypertension^[13-14]. The risk of hypertension in people with high mental stress is 2.25 times that of those with low stress, which reveals the important role of psychological factors in blood pressure regulation. Under long-term high mental

stress, the hypothalamic-pituitary-adrenal axis (HPA axis) is activated, prompting the adrenal cortex to secrete cortisol, causing sympathetic nerve excitement, releasing vasoactive substances such as norepinephrine, resulting in vasoconstriction and elevated blood pressure ^[15-16].

People with BMI $\geq 28\text{kg/m}^2$ have 2.31 times the risk of hypertension compared to people of normal weight, highlighting the strong link between obesity and hypertension. During obesity, adipose tissue secretes a large number of adipokines, such as leptin and adiponectin, which break the balance of adipokines in the body ^[17]. Elevated leptin levels can activate the sympathetic nervous system and enhance vasoconstriction. Decreased adiponectin levels weaken its anti-inflammatory and vascular endothelial function. In addition, obesity can also lead to insulin resistance, increase renal reabsorption of sodium, cause water and sodium retention, and activate the renin-angiotensin-aldosterone system to jointly promote the rise of blood pressure ^[18].

5. Conclusions

This study systematically analyzed the epidemiological characteristics and etiological factors of primary hypertension in the community population, and made it clear that the prevalence of hypertension in the community was higher than the national average, and it was affected by age, gender, BMI, genetic factors, lifestyle and mental stress. The results provide a scientific basis for the development of precise prevention and control strategies for primary hypertension in the community. Through the implementation of health education, improving screening management, paying attention to mental health, optimizing the health environment and other comprehensive prevention and control measures, it is expected to reduce the prevalence of hypertension in the community, reduce the burden of disease, and improve the health literacy and quality of life of residents. Future studies can further expand the sample size, carry out long-term follow-up studies, in-depth study of the interaction between the various influencing factors and the impact of dynamic changes on the incidence of hypertension, and provide more comprehensive and in-depth theoretical support for the prevention and control of hypertension.

References

- [1] Lu Chunyuan, Long Rong, Mao Yongjia, et al. Analysis of Blood Pressure Change Track and Distribution Characteristics in Community Hypertension Management Population Aging 35 and Above [J]. Chinese General Practice, 2024, 27(10):1201-1207.
- [2] He Hao, Xiao Fangping, Lu Xiang, et al. Clinical characteristics of sarcopenia in community elderly and its correlation with hypertension [J]. Chinese Journal of Multiple Organ Diseases of the Elderly, 2024, 23(11):836-841.
- [3] Dong Yixuan, Guo Xitong, Zhang Jinbo, et al. Analysis of TCM Constitution Distribution and Influencing Factors in Elderly Patients with Hypertension in Nanjing Community [J]. Jiangsu Traditional Chinese Medicine, 2024, 56(11):37-40.

- [4] Wang Qian, Song Dynasty, Luo Xiaolu, et al. Epidemiological characteristics of newly diagnosed chronic kidney disease in a community of Chengdu [J]. *Journal of Kidney Disease and Dialysis Kidney Transplantation*, 2024, 33(6):541-545.
- [5] Pan Yingying, Zhu Yi, Zhuang Jianwen, et al. Epidemiological characteristics of multiple metabolic abnormalities in patients with hypertension in Xinjiang Production and Construction Corps [J]. *Corps of Medicine*, 2023(3):54-56.
- [6] Yu Yang, Qu Jingquan, Gu Haiping. Characteristics of hypertension in the elderly and the role of ambulatory blood pressure monitoring in disease management [J]. *Medical Clinical Research*, 2024, 41(9):1305-1307.
- [7] Chen Qiaochun, Li Yixuan, Liu Luming, et al. Epidemiological characteristics and influencing factors of blood pressure of 180 hypertensive migratory birds in Hainan Province [J]. *Chinese Journal of Tropical Medicine*, 2023, 23(10):1063-1070.
- [8] Sun Xiuqin, Wei Lanxuan, Liu Jinbo, et al. Risk factors of hypertension and influence of lifestyle on hypertension among community population aged 40-70 years in Shijingshan District of Beijing [J]. *Chinese Journal of Cardiology*, 2025, 30(01):86-94.
- [9] Zhu Xuan, Zhou Hui, Huang Yanhui, et al. Application effect of strengthening quantitative exercise management technology in the management of hypertension patients in community [J]. *Forum of Preventive Medicine*, 2024, 30(10):732-736.
- [10] Chen Kaiyue, Jiang Qiyun, Wang Jiayun, et al. Development and demonstration of management standard for high risk population of hypertension complications in community [J]. *Chinese Health Resources*, 2023, 26(5).
- [11] Cui Jiasheng, Chen Yuxian, Li Gaoye, et al. The best evidence summary of exercise management intervention in patients with essential hypertension [J]. *Evidence-based Nursing*, 2023, 9(2):214-219.
- [12] HONG Sijia, ZHAO Lu, WU Bibo, et al. Epidemiological survey of high-risk population of chronic kidney disease in Shanghai from 2016 to 2018 [J]. *Journal of Army Medical University*, 2023, 45(1):86-92.
- [13] Xie Yufen, Wei Shaofeng, Yang Qian, et al. Effect of individualized nutrition intervention in community health care services on the prevention and treatment of hypertension in the elderly [J]. *Modern Preventive Medicine*, 2023.DOI:10.20043/j.cn ki.MPM. 202204604.
- [14] Jia Jiaokun, Liu Gaifen, Liu Yanfang, et al. Effects of triglycerides on cognitive function in patients with hypertension: a long-term community-based cohort study [J]. *Chinese Journal of Stroke*, 2024, 19(7). DOI:10.3969/j.issn.1673-5765.2024.07.008.
- [15] Nie Meng, Wu Na, Jiao Huiyan, et al. Systolic blood pressure fluctuation trajectory and its influencing factors in community patients with hypertension [J]. *Journal of Army Medical University*, 2024, 46(12):1457-1466.
- [16] An Chang, Dou Zulin, Wei Xiaomei, et al. Epidemiology and correlation of dysphagia in elderly patients with chronic diseases in community [J]. *Chinese Journal of Rehabilitation Medicine*, 2025(3).
- [17] Yang Nannan, Mo Zhiqin, Chen Xiaoyan. Prevalence and epidemiology of hypertension in a community in Longgang District of Shenzhen City in 2019 [J]. *Chinese Medical Innovation*, 2021, 18(1):5.
- [18] Ma Zhiyi. Interpretation of Chinese guidelines for prevention and treatment of hypertension (2024 revision) [J]. *Journal of Practical Cardiovascular, Cerebropulmonary and Vascular Diseases*, 2025, 33(01):1-7.