
A Comparative Study on the Characteristics and Risk Factors among Hypertensive Patients in Referral and Community Hospitals

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Abstract

Background: Hypertension is a serious global public health problem because of its high incidence and associated risks of cardiovascular and kidney disease (Van der Sande MAB, 2000). It has been listed as the leading cause of mortality and the third leading factor of disability-adjusted life years (Gao Yun, 2013).

Objective: To identify and compare hypertensive patients' risk factors, characteristics, and treatment practices in community and referral hospitals.

Methods: Patients with hypertension from community hospitals in Lanzhou city and Lanzhou university second hospital, a third-degree referral hospital, were studied in a cross-sectional survey. Data was gathered using a questionnaire, including socio-demographic information, hypertension history, risk factors, treatment practices, and anthropometric measurements. The data were analyzed by descriptive analysis and tests.

Results: The study enrolled a total of 623 hypertensive patients, with 334 (53.6%) from referral hospital and 289 (46.4%) from community hospitals. Both institutions found that age, occupation, smoking, not performing physical activities (Sport), aspirin users, and those with a history of diabetes were significantly associated with hypertension, with $P < 0.05$. The selection proportion of β -receptor blockers, CCB, and ARB in community hospitals patients was lower than that in referral hospital patients ($P < 0.05$).

Conclusion: The patients with hypertension from community hospitals are more uncomplicated in clinical condition, lesser in complication, and lower in compliance with hypertension guidelines than those from hospital referral hospital. Therefore, in the future, we should make full use of community resources, widely carry out intensive community health education on chronic diseases, including hypertension, improving lifestyle modification, and promoting regular checkups among community residents.

Keywords: Characteristics, Community Hospital, Hypertension, Risk factors, Referral Hospital

1. INTRODUCTION

Hypertension is a serious global public health problem because of its high incidence and associated risks of cardiovascular and kidney disease (Van der Sande MAB, 2000). It has been

listed as the leading cause of mortality and the third leading factor of disability-adjusted life years (Gao Yun, 2013).

In China, cardiovascular and cerebral vascular diseases are the leading causes of death, with hypertension being the most common cause. According to a national survey of hypertension prevalence in China conducted between 2012 and 2015, 23.2% of the adult population of China (those above the age of 18) had hypertension (Liu Baiting, 2019). The incidence of hypertension varies greatly across China due to the influence of diverse geographical trends as well as economic and cultural diversity. Rural individuals, for example, have a quite higher prevalence of hypertension than city dwellers in economically developed areas. In the northern region, the difference in hypertension prevalence between the city and rural areas decreased (31.6 percent vs. 31.2 percent, $P=0.505$), but in the southern region, the difference in hypertension prevalence between the city and rural regions increased (31.3 percent vs. 29.2 percent, $P=0.001$) (Liu Baiting, 2019).

Furthermore, according to a study conducted in China to determine the occurrence of hypertension among Chinese adults, 26.6% of Chinese adults had hypertension. Men were slightly more hypertensive than women (29.2% vs. 24.1%, $P= 0.001$). Hypertension prevalence was 13.0%, 36.7%, and 56.5%, respectively, among people aged twenty to fourth-four years (young people), fourth-five to sixth-four years (middle-aged people), and 65 years (older people). Hypertension was slightly more common in rural residents than in urban residents in economically developed regions (31.3% vs. 29.2%, $P= 0.001$) (Gao Yun, 2013). Therefore, it's important to identify and contrast risk factors, characteristics, and treatments available among known adult hypertensive patients in the community hospitals with Lanzhou university second hospital to help formulate and devise local community health strategies and approaches to avoid and manage risk hypertension.

In 2013, (Dong, Ge, Ren, Fan, & Yan, 2013) conducted a cross-sectional population survey in rural north-western China to investigate the prevalence, awareness, treatment, and management of hypertension among adults found that out of 3000 people, 1100 (36.7 percent) had hypertension. It was linked to being overweight or obese, being older, and having a lower educational level, showing that hypertension is on the rise in rural north-western China, but that awareness and treatment of the problem remain low, and blood pressure is poorly managed. Therefore, this study intended to identify and compare risk factors, characteristics, and therapeutic approaches among hypertensive patients in community hospitals with referral hospital.

2. MATERIALS AND METHODOLOGY

2.1. Study area and participants

From August 7th, 2020, to February 28th, 2021, the institutional-based cross-sectional survey was performed at Lanzhou University Second Hospital and five surrounding Community Hospitals. Lanzhou University Second Hospital (LUSH), founded in 1928, is a well-known hospital. After more than 80 years of construction and expansion, the hospital has evolved into a

complete medical teaching and research institution with diverse disciplines, significant faculty resources, specialized healthcare practices, and advanced medical equipment. The Ministry of Health recognized the hospital as a tertiary A-level hospital. LUSH is located on Cui Ying Men Street in downtown Lanzhou, near the base of White Pagoda Mountain and on the Yellow River's bank. LUSH has 3,500 beds and a total area of 103,333 square meters, with a service area of 281,000 square meters. It employs about 5,000 people and has 123 clinical departments as well as 98 nursing units. These indices totaled 145,000 outpatients, 90,000 inpatients, and just about 54,000 surgeries in 2016. The study population includes the patients from Lanzhou university second hospital-cardiology department and five surrounded community hospitals (adult men and women aged from 18years old and above with hypertension).

2.2. Sample size determination and sampling techniques:

The required sample size was determined using a single population proportion formula, considering the following assumptions: prevalence (P) = in a study conducted among residents over the age of 18 in suburban Lanzhou in 2017, the prevalence of hypertension was found to be 16.71 percent (Yali Fung, 2019), confidence level (CL) = 95 percent, 5 percent degree of precision, With a 10% non-response rate, the ultimate sample size should not be less than 385.

2.3. Ethical Consideration

The information given was confidential, where participation in this study was voluntary, and we didn't identify the participant's name in any reports using information obtained from this study. No information was ignored for just giving more respect to the respondents. Before starting the data collection, we requested a letter of ethical clearance and authorization for data collection from the Directorate of Research, Ethics and Consultancy in Lanzhou University Second Hospital.

2.4. Data collection techniques and procedures:

The data was collected using a standardized questionnaire related to socio-demographic data, history of blood pressure, blood pressure measurement, and other chronic diseases and risk factors. A digital sphygmomanometer was used to take blood pressure measurements. The respondent was advised to sit comfortably and relax for 5 minutes with the legs uncrossed and the right arm free of clothes before taking the measurements. Then, with the palm facing upwards, the right arm was put on the table. The proper cuff size has been chosen. At five-minute intervals, three measurements were recorded. The exact blood pressure was calculated as the average of the three values. Both identified adult hypertensive, and those who health practitioners had told that they were hypertensive in the preceding 12 months during their daily visits to health facilities made up the research sample for this interaction. They omit newly diagnosed hypertensive during the survey itself. In addition, the questionnaire was translated into Chinese and then back-translated to ensure that the translation was accurate.

2.5. Data analysis:

Microsoft Excel 2007 was used to code the data; then, for analysis, export to Statistical Package for the Social Sciences (SPSS) version 22. The findings were tabulated using descriptive

statistics such as a frequency table, and a chi-square test was used. Significant predictors of hypertension were variables with a p-value less than 0.05.

2.6. Operational definitions:

Hypertension was described as a systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg or the use of anti-hypertensive drugs prescribed by a doctor for Hypertension (Belachew Amare, 2018).

Positive smoking history: Based on the patients' historical use of manufactured or home-made tobacco.

Alcohol use: The intake of alcoholic beverages, either produced locally or imported, on a daily basis.

Overweight: Body mass index (BMI) ≥ 25 but less than 30 kg/m².

Obese Patients were confirmed obese when their BMI being above 30 kg/m².

3. Results

3.1. Socio-demographic characteristics of the participants:

A total of 623 cases were selected; 334(53.6%) were referral hospital patients, and 289 cases (46.4%) were community hospital patients. In terms of gender information, there were 337 females and 286 males; many of them were in the 70years and above age group, both in Ref. Hosp vs. Comm. Hosp (33.5% vs 31.5%); Ref Hosp vs. Comm. Hosp (52.7% vs. 48.8%) were high school graduates by education; 40.1% vs. 52.9% were governmental employers; according to the annual income of all participants: 36.5% vs. 45.7% were able to earn in the range of 10,000RMB-30,000RMB per year. Age group and occupation comparison of hypertension patients from different case sources, differences were statistically significant ($P < 0.05$) while gender, education, and annual income had no statistically significant (**Table1**).

Table 1: Socio-demographic characteristics data of patients with hypertension in referral hospital and community hospital, Lanzhou-China

	Referral hospital N=334	Comm. N=289	Hosp χ^2	P
Variables	Frequency (%)	Frequency (%)		
Gender				
Male	146(43.7)	140(48.4)	1.396	0.237
Female	188(56.3)	149(51.6)		
Age				
18-49	47(14.1)	69(23.9)	11.112	0.011
50-59	58(17.4)	50(17.3)		
60-69	117(35)	79(27.3)		
70+	112(33.5)	91(31.5)		
Education				
University and above	91(27.2)	79(27.3)	1.505	0.681
High School	176(52.7)	141(48.8)		
Primary School	48(14.4)	49(17)		
Never attended	19(5.7)	20(6.9)		
Occupation				
Cadre	74(22.2)	30(10.4)	19.082	0.001
Government Employers	134(40.1)	153(52.9)		
Famer	47(14.1)	45(15.6)		
Soldier	4(1.2)	3(1.04)		
Others	75(22.4)	58(20.1)		
Annual Income				
<5000RMB	25(7.5)	20(7)	8.939	0.112
5000-10,000RMB	67(20.1)	62(21.4)		
10,000-30,000 RMB	122(36.5)	132(45.7)		
30,000-100,000 RMB	82(24.5)	55(19)		
>100,000 RMB	29(8.7)	16(5.5)		
Don't know	9(2.7)	4(1.4)		

Significant values are in Italic and bolded, p-value less than 0.05, N=number, %: percentages

3.2. Factors related to hypertension among the participants

All cases were hypertensive patients. From Referral Hospital vs. Community Hospitals, the result revealed that 44.3% vs. 47.8% had a Family history of hypertension; 38.3% vs. 27% had a history of diabetes; 33.5% vs. 25.3% were cigarette smokers. Out of all, 19.8% vs. 19.4% were drank alcohol frequently, and 66.5% vs. 74.7% had not done physical exercises. Body mass index measurement among participants from both case sources: 36.5% vs. 38.7% were overweight while 5.4% vs. 8% were obese patients; 20.1% vs. 29.4% were Aspirin users, indicates that these patients had a high risk to develop hypertension. On the investigated high analysis of the treatment of patients with hypertension, the treatment rate of referral hospital

patients was 85.6%, while community hospitals were 91%. However, in terms of treatment protocols, differences between cases from different sources were consistent.

In Chi-square test analysis: From both institutions, age, occupation, smoking, not performing physical activities (Sport), aspirin users, and those with a history of diabetes were revealed to be statistically significant factors of hypertension. (**Table 2**).

Table2: Hypertension and its risk factors among respondents in referral hospital and community hospital, Lanzhou-China

Variables	Referral hospital N=334(%)	Comm. N=289(%)	Hosp	x ²	P
Alcohol Users				0.014	0.904
No	268(80.2)	233(80.6)			
Yes	66(19.8)	56(19.4)			
Smoking				5.08	0.024
No	222(66.5)	216(74.7)			
Yes	112(33.5)	73(25.3)			
Sport				8.06	0.018
No	222(66.5)	216(74.7)			
Yes	112(33.5)	71(24.6)			
Missed	0	2(0.7)			
Family history of hypertension				2.362	0.307
No	184(55.1)	151(52.2)			
Yes	148(44.3)	138(47.8)			
Don't know	2(0.6)	0			
History of Diabetes				8.992	0.003
No	206(61.7)	211(73)			
Yes	128(38.3)	78(27)			
Use of Aspirin				7.346	0.007
No	267(79.9)	204(70.6)			
Yes	67(20.1)	85(29.4)			
BMI				2.69	0.442
Underweight	4(1.2)	2(0.7)			
Normal	190(56.9)	152(52.6)			
Overweight	122(36.5)	112(38.7)			
Obese	18(5.4)	23(8)			

Significant values are in Italic and bolded, p-value less than 0.05, N=number, %: percentages.

3.3. Analysis of the treatment of hypertension among hypertensive patients in referral hospital and community hospitals:

The treatment rate of hypertensive patients in referral hospital was 85.6%, while that in community hospitals was 91%. However, the difference was statistically significant between cases from both institutions (P<0.05) in terms of the treatment plan. Western Medicine treatment

plans accounted for the most important proportion of patients in the two groups. The frequency of anti-hypertensive drugs used in referral hospital patients with hypertension from high to low was: CCB class, β - receptor blockers, Diuretics, ACEI, ARB while the frequency of hypertensive drugs among community hospitals patients from high to low was as follows: CCB, Diuretics, β -receptor blockers, ACEI then ARB. In general, CCB is the first choice for patients with hypertension, followed by β - receptor blockers, Diuretics, ACEI, ARB, and others. There was a significant disparity in the choice of anti-hypertensive drugs between referral hospital and community hospitals patients except for ACEIs and others ($P > 0.05$). The selection proportion of β - receptor blockers, CCB, and ARB in community hospitals patients was lower than that in referral hospital patients ($P < 0.05$, see **Table 3**).

Table 3: The use of Anti-hypertensive drugs in patients with hypertension from both institutions (%).

Variables	Referral hospital n=286(%)	Comm. n=263(%)	Hosp χ^2	P
ACEIs			0.571	0.450
No	256(89.5)	230(87.5)		
Yes	30(10.6)	33(12.5)		
ARBs			5.687	0.017
No	271(94.8)	259(98.5)		
Yes	15(5.2)	4(1.5)		
B-receptor blocker			15.859	0.000
No	177(61.9)	204(77.6)		
Yes	109(38.1)	59(22.4)		
Calcium Channel Blocker			11.906	0.001
No	142(49.7)	169(64.3)		
Yes	144(50.3)	94(35.7)		
Diuretics			12.11	0.001
No	245(85.7)	194(73.8)		
Yes	41(14.3)	69(26.2)		
Others			2.787	0.095
No	275(96.2)	259(98.5)		
Yes	11(3.8)	4(1.5)		

4. Discussion

Hypertension was defined as a systolic blood pressure of 140 mmHg or diastolic blood pressure of 90 mmHg, or the use of anti-hypertensive medicines, according to the World Health Organization and International Society of Hypertension diagnostic guidelines. The 2002 National Survey on Nutritional and Health Status of Residents showed that China's prevalence rate of hypertension was 18.8%. It is estimated that there were 1.6 billion people with hypertension in our country, which is an increase of 31% compared with 1991 (Wang, Zhang, Wang, Liu, & Wang, 2014). However, in China, the rate of hypertension awareness, treatment, and management was extremely poor, the prevention method and cure of hypertension were challenging.

Guidelines for the management of hypertension in China: The avoidance and treatment of hypertension require a shift in mindset and approach, moving away from the patient as the center of attention. From large hospitals to community-centered, the regulation, interventions, outcomes, and experience of hypertension prevention and treatment into community practice suggest that shared understanding, poor management, and unsatisfactory control of hypertension merit great attention because hypertension is the main threat factor for cardiovascular disease. The preliminary analysis of this investigation suggests that community hypertensive patients compared with hospital hypertension patients, the proportion of patients with a family history of hypertension, tobacco users, diabetes mellitus, and overweight patients were lower than that of hospital patients. It was suitable for early comprehensive prevention and management of hypertension.

In terms of the treatment of hypertension, the choice of drugs is the key, "Chinese Hypertension Guidelines" recommends diuretics, beta-blockers, ACEI, ARB, CCB, which can be used as the starting drug and maintenance of anti-hypertensive treatment. The study found that high blood pressure patients in referral hospital had the highest proportion of CCB drug selection (50.3%), while in the community hospitals, patients were 35.7%. The proportion of CCB, β -receptor blockers, Diuretics, ACEI, and ARB, were all lower in community hospitals patients than those in a referral hospital; it indicates that community patients' medication is not standardized needs further training. It also reflects that the primary medical workers' study and implementation of hypertension guidelines still need improvement. And the nonstandard use of hypertension medication in community patients will eventually lead to a low community hypertension control rate.

CCB drugs were the most selected drugs in this survey, with a utilization rate of 43.4%. CCB has the following advantages: It has a better effect on elderly patients. High sodium intake did not affect the outcome of hypotension. Non-steroidal anti-inflammatory drugs (NSAIDs) did not interfere with anti-hypertensive use. It can be used in patients with diabetes, coronary heart disease, or peripheral vascular disease. The study confirmed that CCB as the first choice of active blood pressure control regimen significantly reduced cardiovascular and cerebrovascular disease events, especially stroke long-term treatment has an anti-atherosclerosis effect. Therefore, domestic scholars proposed that the combination regimen based on calcium antagonists is suitable for treating hypertension in China (Sun Shangwen & Shujian, 2012).

Diuretics, as traditional anti-hypertensive drugs, are inexpensive and can effectively reduce the incidence of cardiovascular events and mortality in patients with hypertension. ALLHAT Research (Rahman et al., 2005) Showed that the thiazide diuretic (clothione) and CCB (amlodipine) and the ACEI (Lisinopril) and other new hypertension drugs are similar; diuretics lower systolic blood pressure even more than CCB and ACEI. Thus, JNC-7 (Chobanian et al., 2003) thiazide diuretics can be used single-handedly or in combination with other drugs in most uncomplicated hypertensive patients. The WHO International Hypertension Association also recommends that low-dose diuretic drugs be the first choice for hypertension treatment (Organization & Group, 2003). Although China's guidelines for hypertension do not recommend

diuretics as the first choice for hypertension, But some experts pointed out that China's economic level is relatively toward the back, for the greater part of patients with hypertension in China, if there is no need to use other drugs indications, low-dose thiazide diuretics can be used as the treatment of the first choice(Yan Lin, 2006). However, the proportion of diuretic choice was found at the third place in the community hospitals and referral hospital hypertensive patients (20.04%), suggesting that the current rate of diuretic prescription use is inadequate. The reason is that doctors and patients are worried about the side effect of diuretics (electrolyte disorders, hyperlipidemia, hyper uric acid, etc.). Meanwhile, the promotion of new drugs by pharmaceutical companies is also a significant factor.

5. Conclusion

As we conclude, the community hypertensive patients compared with referral hospital patients with a single clinical situation, less complication, and hypertensive drugs are not standard characteristics. Therefore, in the future, we should make full use of community resources, widely carry out intensive community health education on chronic diseases including hypertension, improving lifestyle modification, and promoting regular checkups among community residents. There are more cases in referral hospital than in community hospitals in this study. The research results needed to be expanded and further analyzed to provide a scientific basis for the prevention, control, and treatment in the community.

6. LIMITATION

The study's design and environment were its limitations. Because it was an institution-based cross-sectional survey with no explanation of the cause-effect link, the total prevalence of hypertension might have been increased.

7. Abbreviations:

ACEI: Angiotensin-Converting Enzyme Inhibitors

ARB: Angiotensin II Receptor Blockers

BMI: Body Mass Index

BP: Blood Pressure

CCB: Calcium Channel Blocker

CL: Confidence Level

DBP: Diastolic Blood Pressure

LUSH: Lanzhou University Second Hospital

SBP: Systolic Blood Pressure

SPSS: Statistical Package for the Social Sciences

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