International Journal of Cardiology 176 (2014) 800–804

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Original Article

Blood pressure control rate and associated risk factors in hospitals of different grades in Chongqing, China

Xiu-Juan Jiang [a], Zhan-Lan Liu [a,c,1], Qiang She [a], Yue-Hui Ying [a], Jing Huang [a], Song-Bai Deng [a], Li-Yuan Zhou [b], Shi-Quan Ye [b], Rong Hu [a,*]

[a] Division of Cardiology, The Second Affiliated Hospital of Chongqing Medical University, Chongqing, China
[b] Division of Cardiology, People's Hospital of Santai Country, Sichuan, Province, China
[c] The Central Hospital of Xiaogan, China

ARTICLE INFO

Article history:
Received 22 July 2014
Accepted 27 July 2014
Available online 4 August 2014

Keywords:
Hospitals of different grades
Hypertension
Risk factors

ABSTRACT

Objective: The present article aimed to provide accurate estimate of the control rate of hypertension and the influencing factors in hospitals of different grades in Chongqing.
Methods: In this survey, hypertensive outpatients were recruited from 5 tertiary hospitals, 6 secondary hospitals and 5 primary hospitals in 9 districts of Chongqing from November 2011 to May 2012. Outpatients were investigated by clinical interview with BP measurement and questionnaire. Univariate analyses and logistic regression analysis was used to assess the effect of variables on control of hypertension.
Result: A total of 2742 hypertensives were studied, of which 820 were from primary hospitals, 901 from secondary hospitals and 1021 from tertiary hospitals. The total control rate for hypertensive outpatients in Chongqing was 46.0%. The control rate of the primary,secondary and tertiary hospitals were 38.7% 46.7% 51.1%. Multinomial Logistic Regression showed that the control rate was positively correlated with mastery of knowledge of hypertension, normal BMI;whereas it was positively correlated with peasantry,the dissatisfactory with doctor's manner and the distrust to doctor.
Conclusion: Blood pressure control rate of hypertensive outpatients in Chongqing was low.High BMI, peasantry, lack of knowledge of hypertension, doctors' manners, distrust to doctor were the key reasons for low BP control rate.

1. Introduction

Hypertension is a major risk factor of stroke, congestive heart failure, coronary heart disease, and renal failure [1]. Despite the advances in antihypertensive therapy during the past 3 decades, the public health burden of hypertension remains substantial. Data from the 2002 China National Nutrition and Health Survey indicated that there were nearly 200 million hypertensive individuals in China and only 6.1% of whom have their blood pressure controlled in the target levels [2], obviously lower than 27.4% in the United States [3]. According to JNC 7 (the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure), mortality from cardiovascular diseases was decreased by appropriate prevention and management for hypertension [4]. Therefore it is important to have blood pressure under control. However, few studies had assessed the blood pressure control rate among hospitals of different grades. The purpose of this study is to find out the blood pressure control rate in hospitals of different grades in Chongqing and analyze the related factors.

This cross-sectional study was conducted between November 2011 and May 2012 in 5 tertiary hospitals, 6 secondary hospitals and 5 primary hospitals in nine districts in Chongqing. A total of 2742 hypertensives were enrolled, of which 820 were from primary hospitals, 901 from secondary hospitals and 1021 from tertiary hospitals. All hypertensive outpatients who received antihypertensive treatment in the selected hospitals were considered the objects of this study excluding pregnant women and patients under 18. We collected participants' gender, age, educational qualifications, profession, blood pressure, height, weight, waist circumference, mastery of knowledge of hypertension (in the questioner, it was defined "yes" when all the options were done correctly while "no" for the rest), category of medical insurance, complications, frequency of blood pressure measurement, satisfaction for medical circumstances (including distance between home and hospital, procedure, manner of doctor, doctor's professional skill, price of drugs, environment and armamentarium, and trust to a doctor).

BP was measured by using a standardized mercury column sphygmomanometer and an appropriately sized cuff after the subject had rested for at least 5 min. Two measurements were recorded. We defined study participants with hypertension as having "controlled" BP if their SBP was <140 mm Hg and their DBP was <90 mm Hg [5]. The body mass index (BMI) threshold for obesity by Chinese Obesity Working Group

* Corresponding author. Tel.:+86 18602383637.
E-mail address: hurong_cq@163.com (R. Hu).
[1] These authors contributed equally to this work.

http://dx.doi.org/10.1016/j.ijcard.2014.07.263
0167-5273/

Table 1
Demographic and health-related factors of the Investigated hypertensives in hospitals of different grade.

Characteristic	Primary hospitals (n = 820)	Secondary hospitals (n = 901)	Tertiary hospitals (n = 1021)	Total (n = 2742)	P
Age [n (%)]					**0.028**
65 or below	353 (43.0)[a]	397 (44.1)	498 (48.8)[b]	1248 (42.2)	
65 above	467 (57.0)	504 (55.9)	523 (51.2)	1494 (41.1)	
Gender [n (%)]					6.076
Male	368 (44.9)	429 (47.6)	429 (42.0)	1226 (44.7)	
Female	452 (55.1)	472 (52.4)	592 (58.0)	1516 (55.3)	
Educational qualification [n (%)]					**0.000**
Senior high school below	764 (93.2)	568 (63.0)	565 (55.3)	1897 (69.2)	
Senior high school or above	56 (6.8)	333 (37.0)	456 (44.7)	845 (30.8)	
Medical insurance [n (%)]					**0.000**
Social medical insurance	56 (6.8)	689 (76.5)	859 (84.1)	1604 (58.5)	
Rural cooperative medical insurance	764 (93.2)	212 (23.5)	162 (15.9)	1138 (41.5)	
Occupation [n (%)]					**0.000**
Peasantry	634 (77.3)	146 (16.2)	99 (9.7)	879 (32.1)	
Others	186 (22.7)	755 (83.8)	922 (90.3)	1863 (67.9)	
Measuring blood pressure 3 times per week or more [n (%)]	116 (14.1)	478 (53.1)*	533 (52.2)#	1127 (41.1)	**0.000**
Mastery of knowledge of hypertension [n (%)]	56 (6.8)	366 (40.6)*	426 (41.7)#	848 (30.9)	**0.000**
Complications [n (%)]	287 (35.0)	440 (48.8)	672 (65.8)	1399 (51.0)	**0.000**

There was statistical significance between [a] and [b] only. There was no statistical significance between * and #.

was: 18.5 ≤ BMI < 24.0 kg/m^2 as normal, 24.0 ≤ BMI < 28.0 kg/m^2 as overweight and BMI ≥ 28.0 as obese [6]. Central obesity was defined as waist circumference (WC) > 85 cm in males and WC > 80 cm in females based on the cut-off recommended by Chinese Obesity Working Group [6].

EpiData 3.1 was used to establish a database. PASW18.0 (SPSS) was used for related statistical data analysis. The demographic factors of the investigated patients were summarized using a descriptive statistical statistics. Prevalence and frequencies were expressed as percentages. Chi-square tests were used for establishing relationship between the categorical variables. Multivariate logistic regression analyses were used to identify significant determinants of blood pressure control rate. Results derived from the logistic regression model were shown as odds ratio (OR) and 95% confidence interval (CI). All values of P < 0.05 were considered as statistically significant.

The demographic characteristics, health-related factors in hospitals of different grades are shown in Table 1. The rate of patients of old age (65-years-old above) from the primary hospitals was higher than that from the tertiary hospitals. The rate of those with educational qualification of senior high school or above, covered by medical insurance, with complications increased incrementally from the primary hospitals to the tertiary hospitals. The control rate of peasantry decreased incrementally from the primary hospitals to the tertiary hospitals. The mastery of hypertensive knowledge and the frequency of blood pressure self-measurements of the secondary and tertiary hospitals are higher than

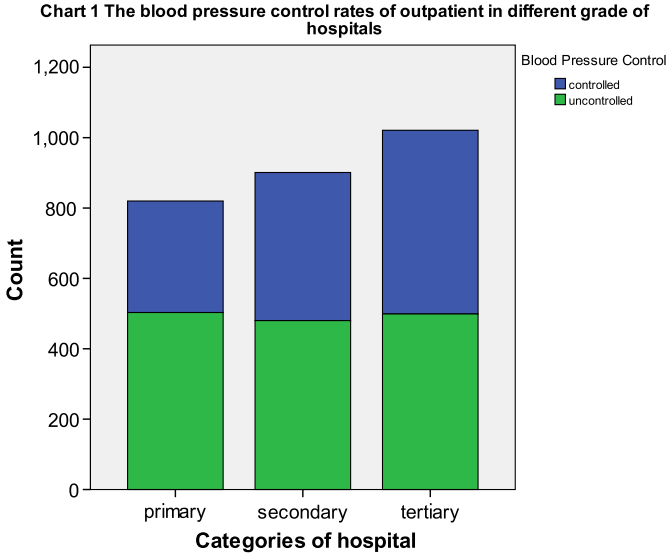

Fig. 1. The blood pressure control rates of outpatient in different grade of hospitals.

Table 2
Univariate analyses of demographic and health factors related to blood pressure control of investigated hypertensives.

Characteristic	Number (n = 2742)	(%)	Blood pressure controlled		P
			Number	(%)	
Age					0.563
65 or below	1248	45.5	581	46.6	
65 above	1494	54.5	679	45.4	
Gender					0.736
Male	1226	44.7	559	45.6	
Female	1516	55.3	701	46.2	
Educational qualification					**0.000**
Senior high school below	1897	69.2	817	43.1	
Senior high school or above	845	30.8	443	52.4	
Medical insurance					**0.000**
Social medical insurance	1604	58.5	825	51.4	
Rural cooperative medical insurance	1138	41.5	435	38.2	
Occupation					**0.000**
Peasant	879	32.1	317	36.1	
Others	1863	67.9	943	50.6	
Measuring blood pressure 3 times per week or more					**0.000**
Yes	1127	41.1	592	52.5	
No	1615	58.9	668	41.4	
Mastery of knowledge of hypertension					**0.000**
Yes	848	30.9	466	55.0	
No	1894	69.1	794	41.9	
Complications					0.246
Yes	1399	51.0	658	47.0	
No	1343	49.0	602	44.8	
BMI					**0.003**
Normal	1290	47.0	634	49.1	
Overweight*	1107	40.4	487	44.0	
Obese#	345	12.6	139	40.3	
WC					0.107
Normal	1297	47.3	617	47.6	
Central obesity	1445	52.7	643	44.5	

There was no statistical significance between* and #.