

Patient related factors for optimal blood pressure control in patients with hypertension

*Yi-Bing Wang¹, De-Gui Kong², Long-Le Ma², Le-Xin Wang^{2,3}

1. Department of Public Policy and Management, International Business College, Qingdao University, Qingdao, Shandong Province, PR China
2. Department of Cardiology, Liaocheng People's Hospital of Taishan Medical University, Liaocheng, Shandong Province, PR China
3. School of Biomedical Sciences, Charles Sturt University, Wagga Wagga, NSW 2650, Australia.

Abstract

Background: Patient related factors hindering optimal blood pressure (BP) control in patients with hypertension are unclear.

Objectives: To investigate the barriers to optimal hypertension management.

Methods: A survey on the awareness and management of hypertension was conducted in 556 patients (365 males, mean age 60.9 ± 10.1) from a rural community.

Results: Of the 556 patients who had a clinical diagnosis of hypertension, 127 (22.8%) were unaware the existence of the condition and received no therapy. In the 429 patients who were aware the presence of hypertension, 206 (48.0%) did not receive any antihypertensive medication at the time of this study. Fifty-four (12.5%) had a BP of less than 140/90 mm Hg. Only 21 (4.9%) received formal counselling or education from health professionals and 74 (17.2%) were aware of the optimal level of BP. Difficulty in accessing a specialist doctor was reported by 126 (29.4%). In 279 (65.0%), missing regular antihypertensive medications was reported in the 4-week period prior to this study. Omitting prescribed antihypertensive drugs due to the costs was reported by 169 (39.4%).

Conclusions: Inadequate counselling, lack of understanding on the disease, difficulties in accessing specialist care and poor medication adherence are the barriers to optimal BP control.

Key words: hypertension, management barriers, anti-hypertensive drugs; specialist care.

African Health Sciences 2013; 13(3): 579 - 583

Introduction

Hypertension is one of the most important cardiovascular risk factors that are associated with significant complications such as coronary artery disease, stroke or renal failure. Although almost one in third of the adults may have hypertension,¹ the awareness of this condition by the patients is low, and the control of blood pressure is generally suboptimal in rural and urban communities.²⁻⁴

Barriers to the blood pressure control appear to exist at patients, physicians and system levels. Poor knowledge of the disease and its management and poor adherence to antihypertensive drugs are well-known patient factors for suboptimal blood pressure control⁵. Poor adherence to therapeutic guidelines

and inadequate understanding of therapeutic goals are major physician-related barriers.^{5,6} Furthermore, health care system and low socio-economic status may present a barrier to blood pressure control, as high costs of screening and treatment may hinder the optimal control of hypertension among the low socio-economic group.⁷

Little is known about the barriers to the hypertension management in rural Chinese communities. The primary objective of this study was to determine the patient-related barriers to blood pressure control in a rural community in East China.

Methods

Patients

This study was approved by the Institutional Review Board of our hospital, and written consent form was obtained from all participants. Between January 2010 and May 2012, 556 hypertensive patients were interviewed for the management of hypertension. These patients were selected from those who attended the free health check clinics in our hospital

*Corresponding author:

Prof Lexin Wang
School of Biomedical Sciences
Charles Sturt University, Wagga Wagga
NSW 2678, Australia
Phone: +61 2 69332905
E-mail: lwang@csu.edu.au

after a radio and television advertisement. All patients had lived in Liaocheng City, a regional city in the south-west of Shandong Province of China, for more than five years. After obtaining medical history, a full physical examination including blood pressure measurements were conducted in all patients. An electrocardiogram and blood biochemistry tests were also performed. Information on patient's antihypertensive treatment, in particular the use of antihypertensive medications was collected.

Blood pressure was measured with the patient in a sitting position after 10 min of resting, using a mercury sphygmomanometer. Phase V Korotkoff sounds was used to determine the diastolic blood pressure.² Hypertension was defined as either systolic BP \geq 140 mm Hg or diastolic BP \geq 90 mm Hg.⁸

Interview questionnaires

The questionnaires during the interview were comprised of four categories. The first was in relation to formal education on hypertension provided by health professionals, either doctors or nursing staff during visits to hospitals or clinics since the first diagnosis of the disease. Patients were also asked whether they had sought information from social media in particular the Internet about hypertension and related cardiovascular risk factors.

The second part of the questionnaire was about the patient's knowledge on hypertension, on the optimal level of blood pressure and on the consequences of uncontrolled hypertension. Patients were asked to name two or more of the hypertension-related complications, such as coronary heart disease, stroke, renal failure, or eye disease (retinopathy).

Access to health care was assessed by asking whether patients had difficulties in making regular appointments to visit a cardiologist due to the unavailability of the doctor. They were also asked if financial concerns were a factor in preventing them to see a specialist on a regular basis.

Two questions were asked to evaluate medication adherence or compliance. The first was whether patients had forgotten to take antihypertensive drugs at least on three occasions each week in the 4-week period prior to the interview. They were also asked if they had omitted antihypertensive drugs because of the costs of the medications.

Statistical analysis

Data are expressed as means + standard deviation (SD) or percentages as appropriate. Comparison of numerical data between patients who were aware and unaware of the presence of hypertension was performed with an un-paired student t test, whereas analysis of categorical data between the two groups was performed with Chi-square or Fisher's exact test. $P < 0.05$ was considered statistically significant. SPSS software was used for the statistical analysis.

Results

General findings

The general characteristics of the patients are shown in table 1. The median age of the patients was 63 years, with more males ($n=365$, 65.7%) than females ($n=191$, 34.3%). Current cigarette smokers were confined to male patients ($126/365$, 34.5%), with an overall smoking rate of 22.7% ($126/556$) of the entire patient population. Type 2 diabetes was present in 101 (18.2%) patients, and more than half of the patients (296 , 53.2%) had dyslipidaemia. In addition, 82 (14.8%) patients had a history of coronary artery disease.

Among the 556 patients, 429 (77.2%) were aware that they had been previously diagnosed with hypertension, while 127 (22.8%) patients did not know they had hypertension, although their blood pressure was $>140/90$ mm Hg on two separate measurements in our clinics.

Management of hypertension

Patients who were unaware of the presence of hypertension at the time of this study did not receive any antihypertensive therapy. Their mean systolic and diastolic blood pressure was 167.3 ± 13.2 and 90.5 ± 7.8 mm Hg, respectively, which were higher than the mean systolic (159.3 ± 11.2 mm Hg, $p = 0.001$) and diastolic (81.2 ± 5.9 mm Hg, $p = 0.017$) blood pressure in the patients who were aware of the presence of hypertension (table 2).

In patients who were aware of the hypertension, 369 (86.0%) had a systolic blood pressure of 140 mm Hg or higher, and 166 (38.7%) had a diastolic blood pressure of 90 mm Hg or higher. The total number of the patients who had a blood pressure of less than 140/90 mm Hg in this group was 54 (12.5%) (table 2). The mean systolic and diastolic blood pressure of the patients who were unaware of the presence of hypertension was 167.3 ± 13.2 and 96.0 ± 7.1 mmHg, respectively (table 2).

Table 1: General characteristics of the patients

Indices	N (n=556)	%
Mean age (years)	60.9 ± 10.1 (37-76)	-
Sex - male	365	65.7
Smoking	126	22.7
Alcohol consumption	293	52.7
Overweight/Obese (BMI > 25kg/m ²)	137	24.6
Type 2 diabetes mellitus	101	18.2
Dyslipidaemia	296	53.2
Coronary artery disease*	82	14.8
Family history of hypertension	269	48.3
Awareness of hypertension diagnosis	429	77.2

*Diagnosis was based on a documented history of myocardial infarction or percutaneous coronary intervention.

In patients who were aware of hypertension, 206 (48.0%) were not on any antihypertensive medication at the time of this study. In those who were treated with antihypertensive medications, most (161/223,

72.2%) were treated with one antihypertensive drug (table 2). None of the patients who were unaware of hypertension were treated with antihypertensive medications (table 2).

Table 2: Comparison of the patients who were aware or unaware the presence of hypertension

Indices	Aware (n=429)	Unaware (n=127)	P value
Mean age (years)	60.2 ± 9.3	59.9 ± 10.2	0.466
Sex - male	287(66.9%)	78(61.4%)	0.287
Mean SBP (mm Hg)	159.3 ± 11.2	167.3 ± 13.2	0.001
SBP> 140 mm Hg	369(86.0%)	125 (98.4%)	0.001
Mean DBP (mm Hg)	87.9 ± 6.4	96.0 ± 7.1	0.017
DBP > 90 mm Hg	166(38.7%)	72(56.7%)	0.03
BP <140/90 mm Hg	54 (12.5%)	0 (0%)	0.001
Antihypertensive medications			
0 medication	206(48.0%)	127(100%)	0.001
1 medication	161(37.5%)	0	0.001
2 medications	62(14.5%)	0	0.001

Patient related barriers to hypertension management

The potential barriers to optimal hypertension control in patients who were aware of the presence of hypertension are listed in table 3. Only 21 (4.9%) patients received formal counselling or education from health professionals since the first diagnosis of this disease. One hundred and twelve (26.1%) patients sought information on hypertension and related cardiovascular risk factors from social media, mostly the Internet. Only 74 (17.2%) of the patients were aware of the optimal level of blood pressure, and 86 (20.0%) could name two or more major risks or complications from hypertension, such as coronary heart disease, stroke or renal failure.

The access to a specialist doctor was assessed in two aspects. Difficulties in getting an appointment to see a cardiologist was reported by 126 (29.4%) patients, and financial concerns preventing them to see a specialist was found in 176 (41.0%) patients. In 279 (65%) patients, missing regular antihypertensive medications was reported in the 4-week period prior to this study. Omitting prescribed antihypertensive drugs due to the costs was reported by 169 (39.4%) patients.

Table 3: Barriers to blood pressure control in patients who were aware of the presence of hypertension

Indices	Number of patients (n=429)
Education on hypertension	
Counselling from health professionals	21 (4.9%)
Self-education from social media	112 (26.1%)
Knowledge on hypertension	
Knowing the optimal level of BP	74 (17.2%)
Knowing two or more complications of hypertension	86 (20.0%)
Access to health care	
Difficulties in visiting a cardiologist due to the unavailability of the doctor	126 (29.4%)
Difficulties in visiting a cardiologist due to costs	176 (41.0%)
Medication compliance	
Forgetting to take the regular antihypertensive drugs in the past 4 weeks	279 (65.0%)
Omitting prescribed antihypertensive drugs due to the costs	169 (39.4%)

Discussion

The main findings of this study were: a) Approximately 23% of the patients from this rural population were unaware of the presence of hypertension, and received no antihypertensive therapy; b) In patients who were aware of the presence of hypertension, 48.0% were not using any antihypertensive medications at the time of this study, and only 12.5% achieved optimal blood pressure control; c) Less than 5% of the patients who were aware of the presence of hypertension received formal counselling on the disease from the health professionals; d) Less than 20% of the patients had adequate knowledge of the complications or therapeutic targets of hypertension; e) Poor adherence to prescribed antihypertensive medications was common; f) Financial constraints appeared to be a factor hindering doctor visits and adherence to prescribed antihypertensive drugs.

Optimal blood pressure control in hypertension patients appears to be a long-standing challenge around the world. Earlier studies showed that less than 25% of patients who were treated for hypertension achieved the target blood pressure of less than 140/90 mm Hg.^{9,10} In China, less than 5% of treated hypertensive patients had blood pressure below 140/90mm Hg.^{2,11} The proportion of patients achieved optimal blood pressure in the present study was 12.5%, which was consistent with the abovementioned reports.

The suboptimal control of blood pressure is related to a number of factors. Failure to diagnose high blood pressure in clinics and hospitals is a major cause. Our earlier study on a rural Australian

population showed that 56.7% of the patients with elevated blood pressure were unaware of the presence of hypertension³. In the present study on a rural population in China, the unawareness was 22.8%. Patients who were unaware of the hypertension received no antihypertensive therapy, and had a higher level of systolic and diastolic blood pressure than those who knew they had hypertension.

Structured education on the management of hypertension and life style modification has been shown to facilitate body weight reduction and pharmacological control of blood pressure.^{12,13} Education and counselling on the nature of hypertension and its impact on health appeared inadequate in the present study, and this may have contributed to the overall poor control of hypertension. Only 4.9% of the patients received formal counselling from health professionals, and only 20% of the patients had adequate knowledge about the risks and complications from uncontrolled hypertension.

Patients' poor adherence to prescribed antihypertensive medications has been identified as one of the main reasons for uncontrolled hypertension.^{13,14} The poor medication adherence can be due to a number of factors, such as multiple dose regimens, poor eye sights or hands disabilities in the elderly,^{13,14} or in some countries, financial constraints⁷. In the present study, 65% of the patients reported poor medication adherence in the 4-week period prior to the interviews at our clinics. Although the specific causes of poor medication adherence in our patients were unclear, affordability of the

medications played a part. In 39.4% of the patients, costs of the medications were a contributing factor for omitting the antihypertensive drugs. These results suggest that new strategies or policies need to be developed to reduce the costs of antihypertensive medications, and to ultimately improve the medication adherence.

It was important to note that 29.4% of our patients reported to have difficulties in accessing a specialist doctor due to unavailability of the doctors, and 41% reported costs were a hindering factor for the specialist visits. These results were somewhat surprising because in China in general, and in the city of Liaocheng where the study was conducted in particular, the health care system was based on a fee-for-service system, and the patients had the freedom of choosing specialist doctors at either municipal, district or community hospitals.¹⁴ Access to specialists has not been perceived as a major problem for hypertension treatment in the past. However the results of this study clearly indicate that there is a need to addressing the accessibility to specialist care, by either enhancing the availability of the specialist services, or containing the costs of these services, or both.

Conclusion

The present study has found that in the majority of the patients with hypertension from this rural Chinese community, blood pressure was poorly controlled. The reasons for the suboptimal hypertension management are multifactorial. Potential barriers are inadequate education from health professionals, limited access to specialist care and poor adherence to antihypertensive medications. New strategies or policies are required to improve the patient's accessibility to specialist services, and to reduce the financial burden associated with the management of hypertension.

References

1. Briganti EM, Shaw JE, Chadban SJ, Zimmet PZ, Welborn TA, McNeil JJ, Atkins RC. Untreated hypertension among Australian adults: The 1999–2000 Australian diabetes, obesity and lifestyle study (AusDiab). *MJA* 2003;179:135-139.
2. Wang L, Wei T. Blood pressure control in patients with hypertension: A community-based study. *Clin Exp Hypertens* 2006;28:41-46.
3. White F, Wang L, Jelinek H. Awareness and pharmacotherapy of hypertension in a rural community. *Med Princ Pract* 2009;18:261-265.
4. Schmieder RE, Goebel M, Bramlage P. Barriers to cardiovascular risk prevention and management in Germany—an analysis of the EURIKA study. *Vasc Health Risk Manag* 2012; 8:177-186.
5. Odedosu T, Schoenthaler A, Vieira DL, Agyemang C, Ogedegbe G. Overcoming barriers to hypertension control in African Americans. *Cleve Clin J Med* 2012;79:46-56.
6. Gong L. Physician-related barriers to hypertension management. *Med Princ Pract* 2004;13:282-285.
7. Wee LE, Koh GC. Individual and neighborhood social factors of hypertension management in a low-socioeconomic status population: a community-based case-control study in Singapore. *Hypert Res- Clin Exper* 2012;35:295-303.
8. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr., Jones DW, et al; Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee: Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertens* 2003; 42: 1206-1252.
9. Berlowitz, DR, Ash AS, Hickey EC, Friedman RH, Glickman M, Quadra B, Moskowitz MA. Inadequate management of blood pressure in a hypertensive population. *N Engl J Med* 1998; 339:1957-63.
10. Mancia G, Sega R, Milesi C, Cesana G, Zanchetti A. Blood-pressure control in the hypertensive population. *Lancet* 1997; 349:454-57.
11. Tao SQ, Wu XG, Duan XF, Fang WQ, Hao JS, Fan DJ, Wang WZ, Li Y. Hypertension prevalence and status of awareness, treatment and control in China. *Chin Med J* 1995; 108:483-89.
12. Wang L, Li J. Role of educational intervention in the management of comorbid depression and hypertension. *Blood Press* 2003;12:198-202.
13. Whitworth JA; World Health Organization, International Society of Hypertension Writing Group. 2003 World Health Organization (WHO)/International Society of Hypertension (ISH) statement on management of hypertension. *Hypertens* 2003;21:1983-1992.
14. Yu Y, Sun X, Zhuang Y, Dong X, Liu H, Jiang P, Yu Z, Zhang Y. What should the government do regarding health policy-making to develop community health care in Shanghai?. *Int J Health Plann Manage* 2011; 26:379-435.