



A survey of hypertension prevalence, awareness, treatment, and control in health screening camps of rural central Punjab, Pakistan



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ABSTRACT

Hypertension is a global public health problem with increasing prevalence. There is limited updated information on the prevalence of hypertension in the Pakistani population. This is a cross-sectional study based on data collected during multiple health screening camps held at multiple locations in rural central Punjab, Pakistan in the period between 2008 and 2015. A total of 13,722 patients were included in this study. Crude prevalence of hypertension was 35.1% and age-standardized prevalence was 34.4%. Among patients with hypertension, 62.3% were aware of having high blood pressure; among these patients, 75.3% were already on treatment for hypertension. Blood pressure was controlled in 22.3% of all patients with hypertension. Among those on treatment for hypertension, blood pressure was controlled in 32.3%. Nearly one-third of patients in health screening camps of rural central Punjab had hypertension. Blood pressure control rate was poor among these patients.

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1. Introduction

Hypertension is a significant public health problem, with a worldwide prevalence of 40.8% and a control rate of 32.3% [1]. Hypertension is a major risk factor for a number of serious health conditions, including cardiovascular disease [2], cerebrovascular disease [3], and chronic kidney disease [4]. Worldwide, 9.4 million deaths are attributed to complications from hypertension, including 45% of all deaths due to coronary artery disease and 51% of all deaths due to stroke [5].

Hypertension is more common in low-income countries [1], where nearly 80% of deaths due to cardiovascular disease occur [6]. In Pakistan, two large epidemiological studies—the first based on the 1990–1994 National Health Survey [7] and the second based on rural northern areas of the country [8]—reported hypertension prevalence rates of 19.1% and 14%, respectively. However, given that the data collection occurred 15–20 years ago, these studies are not representative of the current burden of disease. Studies from other countries have demonstrated global increases in the prevalence of hypertension over time due to population growth, aging, and modifications in behavioral risks [9]. Therefore, there

is a need to provide updated data on the prevalence, awareness, treatment, and control of hypertension in Pakistan.

Punjab is the most populous province of Pakistan. Over the past 8 years, a large number of health screening camps were organized by a nephrology department of a tertiary care hospital in rural central Punjab to promote health and generate awareness among the general population regarding hypertension, diabetes mellitus, and chronic kidney disease. This study aims to provide updated data on the prevalence, awareness, treatment, and control of hypertension based on data collected during these health screening camps.

2. Methods

This is a cross-sectional study based on data collected during multiple health screening camps held at multiple locations in rural central Punjab, Pakistan in the period between 2008 and 2015. All patients older than 18 years were included in the study. The study was approved by the Institutional Review Board.

During the screening camps, a standard questionnaire was used to collect medical history from each patient. Age, sex, marital status, education, work history, smoking, alcohol intake, and physical activity level were recorded. Patients were also asked about personal and family history of hypertension, diabetes mellitus, cardiovascular disease, and chronic kidney disease. Blood pressure measurements were performed using a mercury sphygmomanometer for patients seated for 5 min with the arm positioned at heart level. Pressures were measured using manual auscultatory

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technique with the appropriate sized cuff for each patient. Blood pressure was checked twice, and then the average of the two readings was used. Height was measured on barefoot patients using a fixed stadiometer with the measurement taken to the nearest 0.1 cm. Weight was measured using a manual scale with accuracy up to 0.5 kg. Body mass index (BMI) was calculated as weight in kilograms divided by height in square meters. Healthcare professionals involved in data collection were trained beforehand to ensure consistency and accuracy.

2.1. Definitions

Hypertension was defined as a prior history of hypertension and/or medical treatment of hypertension and/or a systolic blood pressure above 140 mmHg or diastolic blood pressure above 90 mmHg at the health screening camp [10]. Awareness of hypertension among patients was defined as hypertension reported with a previous medical diagnosis of hypertension from a healthcare provider. Control of hypertension was defined as systolic blood pressure < 140 mmHg and diastolic blood pressure < 90 mmHg at the health screening camp based on Joint National Committee 8 guidelines [10]. Physical activity was defined as any self-reported aerobic activity carried out either as a dedicated activity or as part of occupation or daily routine. Smokers were defined according to categories from the United States Centers for Disease Control and Prevention, with current smokers being those adults who have smoked 100 cigarettes in their lifetime and currently smoke cigarettes every day (daily) or some days (nondaily) [11]. Alcohol use was defined as the consumption of one drink per day for a woman or two drinks per day for a man, according to The Dietary Guidelines for Americans as moderate alcohol consumption [12]. BMI was categorized according to the World Health Organization criteria [13] into obese with a BMI ≥ 30 kg/m², overweight with a BMI between 25 kg/m² and 29.9 kg/m², normal with a BMI between 18.5 kg/m² and 24.9 kg/m², and underweight with a BMI < 18 kg/m². Patients with cardiovascular disease were defined as those who self-reported a past medical history of stroke or coronary artery disease. Patients with chronic kidney disease were defined

either by the diagnosis of chronic kidney disease by a healthcare provider or by the presence of self-reported persistently abnormal renal function and/or persistent protein in urine for ≥ 3 months.

2.2. Statistical analysis

Continuous parametric variables were reported as mean \pm standard deviation; nonparametric continuous variables were reported as median with 25–75 interquartile range (IQR); and categorical variables were expressed as percentages. Age standardization was calculated using the World Health Organization standard population [14]. Multivariate logistic regression analysis was performed to determine predictors of hypertension, awareness, and control of hypertension. Predictor variables were selected according to clinical relevance (age, BMI, sex, marital status, education, work history, smoking, alcohol intake, physical activity, individual medical history of hypertension, diabetes mellitus, cardiovascular disease and chronic kidney disease, and family history of hypertension and cardiovascular disease). Age and BMI were treated as continuous variables. For multivariate analysis, all variables were included, and forward selection and likelihood ratios were used to determine the most efficient model. Both unadjusted and adjusted odds ratios for significant variables were calculated from the logistic regression analysis. All statistical analyses were performed using SPSS version 20.0 (SPSS Inc., Chicago, IL, USA). For all tests, *p* values of <0.05 were considered statistically significant.

3. Results

A total of 13,722 patients were included in this study. Crude prevalence of hypertension was 35.1% and age-standardized prevalence was 34.4%. Among patients with hypertension, 62.3% were aware of having high blood pressure; among these patients, 75.3% were already on treatment for hypertension. Blood pressure was controlled in 22.3% of all patients with hypertension. Among those on treatment for hypertension, blood pressure was controlled in 32.3%. Among all patients, 9934 patients had no comorbid conditions like diabetes mellitus, cardiovascular disease, or

Table 1
Demographic, educational, and work status of participants of health screening camps.

	All patients N = 13,722	Patients with hypertension N = 4812	Hypertensive patients with awareness of hypertension N = 3000	Hypertensive patients with control of hypertension N = 1062
<i>Age groups (y)</i>				
18–30	3440 (25.1)	546 (15.8)	328 (60.1)	196 (35.9)
31–40	3654 (26.6)	1066 (29.1)	656 (61.5)	300 (28.1)
41–50	3318 (24.3)	1414 (42.3)	908 (64.2)	254 (17.9)
51–60	1946 (14.2)	1010 (51.9)	628 (63.1)	174 (17.2)
61–70	974 (7.1)	594 (60.9)	374 (62.9)	108 (31.6)
71–80	320 (2.3)	150 (46.8)	78 (52)	26 (17.4)
>81	70 (0.5)	32 (45.7)	18 (56.2)	4 (12.5)
<i>Sex</i>				
Male	8366 (61)	2578 (30.8)	1484 (58)	518 (20.1)
Female	5356 (39)	2234 (41.7)	1506 (67.8)	544 (24.3)
<i>Marital status</i>				
Married	11,672 (85.1)	4518 (38.7)	2866 (63.4)	992 (21.9)
Unmarried	2050 (14.9)	294 (14.4)	134 (45.6)	70 (23.8)
<i>Educational status</i>				
None	4196 (30.6)	1608 (38.4)	966 (60.1)	384 (23.8)
Primary	1352 (9.9)	492 (36.4)	328 (66.6)	108 (21.9)
Secondary/high school	4188 (30.5)	1398 (33.3)	880 (62.9)	300 (21.5)
College	3986 (28.9)	1310 (32.8)	822 (62.7)	268 (20.5)
<i>Work status</i>				
Not working	6344 (46.1)	2648 (41.7)	1756 (66.3)	440 (16.6)
Working	7378 (53.8)	2162 (29.3)	1242 (57.4)	620 (28.6)

Data are presented as n (%).

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