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Abstract

Background: Cases of noncommunicable (NCD) diseases are increasing in Pakistan. They are responsible for 58% of all deaths and information on the risk factors is lacking.

Aims: To determine the prevalence of diabetes, hypertension and abnormal heart rate and their risk factors in a multiethnic, low-income area of Lahore.

Methods: This was a cross-sectional study conducted in an urban settlement of Lahore in 2018–2019. Eligible participants were aged ≥ 30 years and resident in selected settlements. We used a modified World Health Organization stepwise approach to NCD risk factor surveillance (STEPS) questionnaire to collect data from a random sample of 906 residents. The modified questionnaire had a Cronbach alpha of 80.0%. Participants were interviewed in their homes and their height, weight, heart rate, and hip circumference were measured.

Results: Most of the respondents were women (64.5%). The greatest proportion of the participants were aged 30–39 years (42.4%). Of all the respondents, 40.1% had hypertension, 15.8% had diabetes and 17.0% had ischaemic heart disease. Of the risk factors examined, 68.8% of the respondents were overweight or obese, 37.0% had pre-hypertension, 13.6% used tobacco, and 1.8% used alcohol. Age was the most significant risk factor for noncommunicable diseases. Body mass index was significantly associated with diabetes in women, while family history of diabetes was significantly associated with diabetes in men.

Conclusion: The prevalence of hypertension and diabetes was higher among our study participants in Lahore than reported in the national statistics. Significant proportions of the respondents had pre-hypertension and pre-diabetes, making them vulnerable to serious complications of hypertension and diabetes.

Keywords: noncommunicable diseases, hypertension, diabetes, prevalence, risk factors, Pakistan.

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Introduction

The burden of noncommunicable diseases (NCDs) continues to rise and they have become the leading cause of morbidity and mortality globally, accounting for almost 70.0% of all the deaths worldwide (1). The leading NCDs such as diabetes, chronic respiratory disease, cardiovascular disease and cancer jointly accounted for about 79.0% of all NCD deaths all over the world in 2018 (2). The estimated number of deaths globally caused by NCDs was 26.6 million in 1990 (3), which increased to 34.5 million in 2010 and to about 40.5 million in 2016.

Because of the rapid change in lifestyle and advanced urbanization, low- and middle-income countries suffer from a great burden of NCDs (4–6). Deaths caused by NCDs in low- and middle-income countries was 78.0% in 2016. This high burden of NCDs is due to the limited number of facilities and limited resources available for this kind of diseases (3).

Pakistan is the fifth most populated country worldwide with a population of 207.7 million (7). The country is facing a double burden of communicable diseases and NCDs (8). Adoption of a sedentary lifestyle and changes in diet have resulted in a surge in NCDs in Pakistan (9). Hypertension is the most common NCD with a prevalence of 38.7%, followed by diabetes with a prevalence of 14.6% (10). The National Health Survey of Pakistan reported a diabetes prevalence of 11.0% in the general population (11). In 2013–2014, a large-scale survey was conducted in Sindh and Punjab provinces, to determine the prevalence of NCDs and risk factors using the WHO STEPS instrument (12). Hypertension was seen in 53% of the sample which is higher than other South Asian countries (12). The main factors affecting the level of hypertension in Pakistan were: lack of proper healthcare guidelines; absence of patient safety measures; drug misuse; limited public health research; lack of enforcement of policies; and limited resources (13).

Several other risk factors for common NCDs exist, the most common being obesity, pre-hypertension, use of tobacco products and poor diet. Obesity was a risk factor for hypertension and diabetes in a study conducted using WHO STEPS instrument (14), with the prevalence of obesity reported as 31.2% (14). Another study in Kathmandu reported the obesity or over-weight prevalence as 52.2% (15).

The main objective of our study was to determine the overall prevalence of common NCDs in the general population in Lahore, Pakistan. For data collection, we modified the WHO STEPS questionnaire and determined its internal validity as the secondary objective.

Methods

Study design and setting

This was a cross-sectional study carried out in urban settlements of Union Councils 120 and 122 of Lahore, Punjab from September 2018 to September 2019. Union councils are the fifth tier of government in Pakistan; each union council has 13 elected members or councilors. The two union councils were selected from Shalamar and Gulberg zones.

Study sample

The minimum sample size calculated was 882 using the WHO sample size calculator with 95% confidence interval (CI) and 49.0% as the prevalence of NCDs in Pakistan (10).

We used a two-stage cluster sampling method to collect data. The union councils were the primary unit. Blocks were the secondary units and were made up of about 2000 houses in the

two union councils. One block was randomly selected from each union council. We started with a randomly selected household within the block and then selected every fifth house in that block. Eligibility criteria were: age ≥ 30 years and resident in these union councils. Exclusion criteria were: refusal to participate; self-reported severe comorbid conditions with life expectancy of less than 1 year; or other self-reported serious conditions likely to interfere with study participation or with the ability to complete the study (e.g. terminal cancer, HIV or tuberculosis). All eligible individuals present in each household were interviewed. If any individual declined to participate, the whole household was excluded and the next household was selected.

Data collection

Data were collected through face-to-face, door-to-door interviews with all the eligible participants. The WHO STEPS questionnaire, modified to suit the setting with more detailed items excluded, was used to collect the data. The modified version was developed in English. Data were collected by nurses and doctors trained to conduct the interviews and complete the questionnaires. If any data were later found missing, the household was revisited to complete the information.

The demographic information collected was age, sex, marital status, educational level and occupation. A few response categories were changed for some variables. The other sections of the WHO STEPS questionnaire were limited to basic information such as consumption of tobacco, alcohol, fruits and vegetables, and intensity of physical activity (mild, moderate or intense). Physical characteristics (height, weight, heart rate and hip circumference) were measured by trained nurses (male and female). Information on history of hypertension, diabetes, stroke and ischaemic heart disease (chest pain, angina and shortness of breath) was also collected. A few items on history of raised blood pressure, diabetes, raised cholesterol and cardiovascular disease were included in the modified version.

Statistical analysis

Data analysis was done using SPSS, version 26. Socioeconomic and demographic factors were cross-tabulated with age group and sex. The chi-square test or Fisher's exact test was used to evaluate significant differences.

The reliability of the questionnaire was assessed and the Cronbach alpha determined was 80%. We used exploratory factor analysis to assess the internal structure of the questionnaire. Principal component analysis was used with varimax rotation. Factors with Eigen values > 1.0 were extracted.

The prevalence of the main NCDs was determined and the association between various risk factors and common NCDs was examined.

Ethical considerations

The study was approved by the institutional review board of Shalamar Institute of Health Sciences (SMDC/IRB/11-12/140). Verbal consent was obtained before entering any household and written consent was obtained before starting the interview.

Results

Data were collected from 906 participants who lived in Union Councils 120 and 121. The internal reliability of 34 items was 80% using Cronbach alpha. These items were related to tobacco use, dietary pattern, physical activity, raised blood pressure and physical measurements. With regard to history of NCDs, 38.2% (346/906) of the participants had a family history of high blood pressure, 41.9% (380/906) had a family history of diabetes and 7.9% (72/906) had a history of stroke. With regard to the risk factors, 68.8% (623/906) of the sample was overweight or obese, 37.0% (335/906) had pre-hypertension, 13.6% (123/906) were tobacco users, 5.6% (51/906) had pre-diabetes and 1.8% drank alcohol regularly (16/906). The prevalence of hypertension, diabetes and ischaemic heart disease was 40.1% (363/906), 15.8% (143/906) and 17.0% (154/906), respectively. The prevalence of ischaemic heart disease was the same in male and female respondents.

The greatest proportion of the participants were in the age group 30–39 years (42.5% [385/906]), and 64.5% (584/906) were female (Table 1). Age was significantly associated with sex (P Table 1).

With regard to the internal structure of the questionnaire, the Kaiser–Meyer–Olkin measure of sampling adequacy and the Bartlett test of sphericity had values of 0.49 and 1248.07, respectively, (P