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Research article

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Background: Pakistan lacks data on the prevalence of risk factors for common noncommunicable diseases (NCDs).

Objectives: This study aimed to determine the prevalence of risk factors for NCDs among a population-based sample in Punjab and Sindh provinces, Pakistan.

Methods: This study was conducted in 2013–2014. The NCD risk factors examined were: current daily smoking, eating fewer than 5 servings of fruits/vegetable a day, low physical activity, overweight and obesity. A total of 7 710 households were selected and 1 adult was enrolled from each household. Data were collected using the WHO STEPS instrument (Step 1 and 2), and analysed according to the STEPS statistical plan.

Results: The prevalence of tobacco use was 19.7%. The majority of the respondents (96.5%) consumed fewer than 5 servings of fruits/vegetables a day, 41.5% had a low level of physical activity, 26.3% were overweight and 14.9% were obese. The prevalence of stage I and stage II

hypertension, including those on medication, was 37% and 15.9% respectively. The prevalence of NCD risk factors differed significantly by sex and occupation (P = 0.0001) but not by age group (P = 0.118), level of education (P = 0.668) and province (P = 0.056). Only 0.6% of the sample had none of the 5 NCD risk factors while 40% had 3–5.

Conclusion: The high prevalence of NCD risk factors in Punjab and Sindh provinces is of concern. Urgent public health interventions are needed to reduce them, especially in youth and young adults.

Keywords: Hypertension, noncommunicable diseases, Pakistan, physical activity, tobacco use

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Introduction

Noncommunicable diseases (NCDs) include diabetes, hypertension, cancers, mental health disorders, arthritis, injuries and accidents (1,2). In Pakistan, NCDs are among the top 10 causes of morbidity and mortality, and it is estimated that NCDs and injuries cause 77% of age-standardized deaths (3). Diabetes, hypertension, cancers and other NCDs are common in Pakistan. According to a diabetes survey in 1994, the prevalence of diabetes in the general population was 11% (4,5), and the National Health Survey of Pakistan (NHSP) 1990–94 reported that 24% of urban and 13% of rural populations had diabetes (6). Similarly, the prevalence of pre-diabetes, hypertension and diabetes in the general population of Karachi was reported as 40%, 18% and 8% respectively (7).

Previous studies have reported the prevalence of common NCD risk factors in Pakistan. According to the NHSP, tobacco consumption was 34% in men and 12.5% in women, 24% and 14% of the urban and rural populations, respectively, were overweight, and 17.9% of the rural population had hypertension (6). A recent study in Karachi showed that 53% of the population had abdominal obesity and 45% were tobacco users (7). It is estimated that by 2025, 3.87 million premature deaths caused by NCDs will occur in Pakistan, with serious economic consequences (8).

Since the NHSP, no national survey on the prevalence of NCDs and their risk factors has been conducted in Pakistan. The STEPS survey 2013–2014 was conducted to determine the prevalence and magnitude of common NCD risk factors in 2 large provinces of Pakistan – Punjab and Sindh. This paper describes the key finding of this survey and compares the findings with local, regional and international data.

Methods

Survey instrument

The STEPS survey was conducted from November 2013 to April 2014. Data were collected on NCD risk factors using World Health Organization (WHO) STEP 1 and 2 instruments of the standard STEPS methodology (9). The NCD risk factors included in the study were: tobacco use, physical inactivity, unhealthy diet, overweight/obesity and raised blood pressure (10–12).

Target population and sample size

The target population was all men and women aged 18 years or above living in Punjab and Sindh; this covers almost 75% of the total population of Pakistan. A sample size of 7710 individuals (Punjab 4110, Sindh 3600, proportionate to population size of the province) was calculated assuming 95% precision and 5% non-response with representation of urban/rural residents and males/females based on their distribution in the province.

Sampling

A 2-stage stratified sampling approach was used in which the division (the largest administrative unit of provinces, which is followed by districts, tehsils/talukas and union councils) was selected as primary sampling units and union councils were selected as secondary sampling units. All 13 divisions of both provinces were selected, while the union councils were selected based on probability proportionate to size with the population in each union council being the measure of size. A total of 257 union councils (137 from Punjab and 120 from Sindh) were selected randomly from both rural and urban union councils. Of the selected union councils, 110 were

urban (57 Punjab and 53 Sindh) and 147 were rural (80 Punjab and 67 Sindh). In each urban union council, sample blocks of approximately 2000 people were formed using a quick count and of these, 1 block was picked randomly. From the selected block, a cluster of 150 households was counted and 30 households were selected by taking every fifth household. In rural union councils (average 4–5 villages in each union council), 1 village was selected randomly. A cluster of 150 households was marked from which 30 households were selected by taking every fifth household.

From each selected household, names and ages of all members (male/female) who were 18 years or more were entered in a personnel digital assistant which then randomly selected 1 individual using the Kish method (13).

Data collection

Data were collected using the standard STEPS 1 and 2 instruments; all core and expanded modules of STEPS 1 were included while for STEP 2, only core modules were used. In addition, the optional modules of tobacco policy and injury were also included (14). The questionnaire was adapted to local needs, translated into Urdu, the national language, and back-translated into English for verification. After pilot-testing and making further refinements, the Urdu version of the questionnaire was uploaded on the personnel digital assistant. The consent form and report forms were also translated into Urdu. For clarity, show cards and charts were used as described in the country report (15).

Data collection teams comprised an enumerator, interviewers (male and female) and a supervisor who were trained on the questionnaire and physical measurements. Each team visited the assigned union councils and followed the household and individual selection criteria as described above. The selected individual was interviewed and their height (cm), weight (kg), waist circumference (cm) and blood pressure (BP) (systolic and diastolic) were measured. Height and weight were measured using SECA stadiometer 213 (SECA, Germany) and SECA 874 weighing machines (SECA, Germany) respectively, and body mass index (BMI) was calculated. Waist circumference was measured at the umbilicus level using a measuring tape. Blood pressure was measured in sitting position using BOSO digital apparatus (BOSO, Germany). Three readings were taken and their average was used. For female participants, both interview and measurements were done by the female interviewer.

Ethical considerations

Ethical clearance for the survey was given by the National Bioethics Committee, Pakistan. Provincial health directorates were informed prior to the survey. Written informed consent was taken from all participants. For participants who could not read, the interviewer read the consent

form to them and took their consent.

Data analysis

All data were transferred from the personnel digital assistant to the computer and converted into an Excel sheet which was checked, cleaned and transferred to Epi Info, 3.5.1. Data were analysed using the WHO STEPS statistical plan. Standard WHO definitions were used to define low physical activity (

The chi-squared test was used to determine the association between the prevalence of NCD risk factors (current daily smoking, consumption of fewer than 5 servings of fruits/vegetable a day, low physical activity, overweight and obesity) and demographic characteristics and province. A P-value

Results

A total of 7366 individuals were enrolled. Overall response rate was 95.5%, which was 96.8% in Punjab and 93.6% in Sindh. The demographic characteristics of study participants are given in Table 1 . The majority of the participants were women (57.2%). About 40% had no formal education or had not completed primary school and 62.8% were unpaid (housewives, students, retirees and unemployed people).

Table 2 shows NCD risk factors according to socioeconomic characteristics. The overall prevalence of tobacco use was 19.7% (95% CI: 18.0–21.3%); 13.9% (95% CI: 12.4–15.3%) smoked tobacco and 6.9% (95% CI: 5.7–8.0%) used smokeless tobacco. Among men, 27.8% smoked tobacco and 9.9% used smokeless tobacco; among women, 4.2% smoked tobacco and 4.7% used smokeless tobacco. Figure 1 shows the types of smoking and smokeless tobacco products used. Most tobacco smokers used cigarettes (68%), followed by cigars (29%). As regards smokeless tobacco, 60% used snuff by mouth and 23% chewed tobacco.

Among smokers, 91.4% (95% CI: 89.2–93.6%) were daily smokers and the mean age at starting smoking was 22.1 years. The prevalence of exposure to second-hand smoke at home and in the workplace was 27.3% (95% CI: 25.6–28.9%) and 16.5% (95% CI: 14.8–18.1%) respectively. Men were more exposed to second-hand smoke in the workplace, 30.7% (95% CI: 27.4–34.0%) compared with 7.2% (95% CI: 5.7–8.7%) for women.

Of the total sample, 14.9% (95% CI: 13.4–16.5%) were obese and 26.3% (95% CI: 24.8–27.8%) were overweight (Table 2); 11.3% (95% CI: 10.0–12.7%) were underweight (BMI

One third of the participants had been advised by their doctors to eat fruits or vegetables, and reduce salt and fat in their diet. Similarly, a quarter had been advised to quit tobacco, exercise and maintain a healthy body weight. Based on self reports, 2.7% (95% CI: 2.1–3.2%) and 1.0% (95% CI: 0.7–1.3%) had been diagnosed with diabetes and high cholesterol levels respectively in past 12 months. Similarly, 6.3% (95% CI: 5.3–7.3%) reported experiencing chest pain from heart disease or stroke in the past 12 months.

Table 3 shows the prevalence of stages I and II hypertension (including and excluding those on medication) by province, sex and age group. Stage I was defined as systolic blood pressure > 140 mmHg and diastolic blood pressure > 90 mmHg. Stage II was defined as systolic blood pressure > 160 mmHg and diastolic blood pressure > 100 mmHg. The use of medications was self-reported. The overall prevalence of stage I and II hypertension was 37.0% (95% CI: 34.9–39.0%) and 15.9% (95% CI: 14.5–17.3%) respectively including those who were currently on medication.

Table 4 shows the combined risk factors for NCDs according to sex and age group. Only 0.6% of the participants had none of the risk factors; 40% had 3–5 and 59.3% had 1–2 risk factors which differed significantly according to age group (P = 0.02).

The magnitude of the burden of NCD risk factors in Pakistan is shown in Table 5 . A prevalence of 96.5% with low fruits/vegetable consumption represents 101.01 million Pakistanis, while 46.1% with a low level of physical activity equates to 48.2 million of the population, and 26.3% overweight represents 27.5 million of the population.

Discussion

This was the first national NCD survey for Pakistan which was done in 2 large provinces (Punjab and Sindh) using WHO STEPwise methodology. Key findings were high tobacco consumption, low physical activity and low consumption of vegetables and fruits. Similarly, the majority of the participants were either overweight or obese. The magnitude of the burden of NCDs showed that millions of people in Pakistan have NCD risk factors. Only 0.6% of our sample had none of the 5 main risk factors. Stage I hypertension was 37% while stage II hypertension was 15.9%

Tobacco use

Almost one fifth of the population (19.7%) used tobacco, which is similar to the 19.1% reported for people 18 years and above in Pakistan in the recent Global Adult Tobacco Survey (GATS)

(18–20). The consistency in the results of both surveys may be due the same period of data collection, i.e. 2014. Another survey on tobacco use in youth (Global Youth Tobacco Survey) among 13–15-year-olds reported tobacco use in 10.7% of school students (13.3% for boys and 6.6% for girls) (21). The use of smokeless tobacco was 6.9% in our STEPS survey while it was 7.7% in the GATS (19,20). This difference might be due to the fact that the GATS sample was drawn from 2 different provinces – Khyber Pakhtunkhwa and Baluchistan – and the use of smokeless tobacco such as naswar was high in Khyber Pakhtunkhwa. In young people, smokeless tobacco consumption was slightly lower than adults (21).

Tobacco smoking was lower in Pakistan than some nearby countries: 31% in Nepal (22), 44% in Bangladesh (23) and 30% in Myanmar (24). A possible reason for this may be that the prevalence of tobacco in Pakistan is reported to be decreasing as a result of various steps taken by the government (19).

Low physical activity

The prevalence of low physical activity was high in our survey, 46%, compared with global population estimate of 23% reported in the global NCD report (Figure 2) (25). Compared with nearby countries, low physical activity was more prevalent in Pakistan than Sri Lanka (25%) (26), Bangladesh (38.6%) (23) and India (42%) (27). The high prevalence of low physical activity might be due to an increase in urbanization in the country and changing lifestyles which may differ between countries. People are switching to more indoor activities such as playing games on mobile phones and the computer, and watching television. There is a need to create awareness among the community about the benefits of physical activity. It is possible that the questions asked about different types of physical activity do not truly describe the situation in urban and rural areas where, for example, people may be engaged in carrying or lifting heavy loads, and digging or construction work. Generally these activities (work) are carried out by people living in or coming from rural areas compared with urban areas.

Fruit and vegetable consumption

In the present study, 96.5% of our sample consumed fewer than 5 servings of fruits and vegetables per day. Consumption of fruits and vegetables was also low in Bangladesh (93%) (23) and Sri Lanka (82.4%) (26). In India, these figures range from 76% to 99% in different states (27). In high-income countries like Qatar, 91% of the population consumed fewer than 5 servings of fruits and vegetables a day (28). The low consumption of fruits and vegetables might be due to the cultural context as people prefer fatty diets that include foods like samosas, pakoras (fried snack) and sweets. Fruits and vegetables are important for a healthy diet as they provide vitamins, minerals, fibre and phytochemicals. Many studies have shown that an adequate daily intake of fruits and vegetables results in a lower risk of chronic disease, especially heart diseases (29), diabetes and cancers (30,31). Therefore, there is a need to educate the community about the health benefits of eating fruits and vegetables.

Hypertension

Hypertension was seen in 53% of our sample; 37% had stage I hypertension and 15.9% stage II hypertension, which is higher than reported for India and Bangladesh (23,27). These figures are lower than those reported from Palau, Micronesia region (55% stage I and 21% stage II hypertension) (32), and comparable to Malawi (stage I) (32%) (33) and Nepal (25.7%) (22). The high prevalence of hypertension is likely related to unhealthy diets and low physical activity as discussed above.

Limitations

The study was conducted in 2 large provinces of Pakistan (Punjab and Sindh) which are home to 75% of the Pakistan population. However, the findings cannot be generalized to the other 2 provinces (Khyber Pakhtunkhwa and Baluchistan) or the regions (Federal, Azad Jammu Kasmir, Gilgit Baltistan and Federal Administered Tribal Areas) because of socioeconomic and cultural differences.

Conclusions

The poor situation of NCD risk factors in Pakistan – increasing trends of tobacco consumption, physical inactivity, unhealthy diet, overweight and obesity – demands urgent public health interventions. Lack of awareness among the public about NCD risk factors, cheap availability of cigarettes, weak implementation of anti-tobacco laws, and absence of a national NCD policy are some of the key factors responsible for the growing burden of NCDs in the country. Interventions are needed to increase the intake of fruits and vegetables and the amount of exercise taken, especially in youth and young adults, and rigorously implement tobacco control legislation. To control NCDs, different stakeholders, including departments of health, education, sports, environment and media, need to work together to plan more physical activities in educational institutions and raise awareness through media about the importance of a healthy diet in youth and adults.

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Prévalence des facteurs de risque pour les maladies non transmissibles chez l'adulte : principaux résultats d'une enquête STEPS au Pakistan

Résumé

Contexte : Le Pakistan ne dispose pas de données sur la prévalence des facteurs de risque pour les maladies non transmissibles (MNT) courantes.

Objectifs : La présente étude visait à déterminer la prévalence des facteurs de risque de MNT dans un échantillon de la population des provinces du Penjab et de Sindh.

Méthodes : L'étude a été menée entre 2013 et 2014. Les facteurs de risque des MNT examinés étaient les suivants : tabagisme quotidien, moins de cinq portions de fruits et légumes par jour, activité physique réduite, surcharge pondérale et obésité. Un total de 7710 ménages a été sélectionné et un adulte de chacun d'entre eux a participé à l'étude. Les données ont été recueillies à l'aide de l'outil STEPS de l'OMS (STEP 1 et 2), et analysées conformément au plan statistique mis au point dans le cadre de cette enquête STEPS.

Résultats : La prévalence du tabagisme était de 19,7 %. La majorité des répondants (96,5 %) consommaient moins de cinq fruits et légumes par jour, 41,5 % avaient une activité physique réduite, 26,3 % étaient en surpoids et 14,9 % étaient obèses. La prévalence de l'hypertension de stade 1 et 2, dont les personnes sous traitement médicamenteux, était de 37 % et de 15,9 % respectivement. La prévalence des facteurs de risque pour les MNT différait significativement selon le sexe (p = 0,0001) et la profession (p = 0,0001), ce qui n'était pas le cas pour le groupe d'âge (p = 0,118), le niveau d'éducation (p = 0,668) et la province (p = 0,056). Seul 0,6 % de l'échantillon ne présentait aucun de ces cinq facteurs de risque, tandis que 40 % en présentaient entre trois et cinq.

Conclusion : La forte prévalence des facteurs de risque pour les MNT dans les provinces du Penjab et de Sindh, est préoccupante. Des interventions de santé publique sont requises de toute urgence afin de réduire ces facteurs de risque, notamment chez les jeunes et les jeunes adultes.

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