

Prevalence of risk factors for noncommunicable diseases in Jalalabad city, Afghanistan, evaluated using the WHO STEPwise approach

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انتشار عوامل الخطر الخاصة بالأمراض غير السارية في مدينة جلال آباد بأفغانستان، مقيّمة باستخدام أسلوب منظمة الصحة العالمية المتدرج

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الخلاصة: إن الأمراض غير السارية تشكل تحدياً متنامياً للصحة العامة. وقد هدفت هذه الدراسة إلى تقدير انتشار عوامل الخطر الشائعة بالنسبة للأمراض غير السارية بين السكان البالغين في منطقة حضرية في محافظة نانجاهار الشرقية بأفغانستان. ففي مسح - أجري عام 2013 - لعينة عشوائية من الأسر تم تعديل طريقة منظمة الصحة العالمية المتدرجة واستخدامها لجمع بيانات سكانية وسلوكية وسريية من 1200 بالغاً (61% إناث) في جلال آباد. وتم جمع عينات دم لإجراء اختبارات كيميائية حيوية. فكان انتشار زيادة الوزن/ السمنة والسكري وارتفاع الضغط 57.4% و11.4% و24.4% على التوالي. وأفاد 8% من المشاركين بأنهم مدخنو سجائر حاليون، و13.7% منهم استخدموا تشمم الفم، وكان 69.8% و19.6% قد تناولوا أقل من ثلاث حصص من الفواكه والخضار على التوالي في غضون أسبوع، وأفاد 33.5% و57.8% منهم بممارسة نشاط بدني قوي ومتوسط على التوالي. هناك حاجة إلى تدخلات تصمم خصيصاً بشأن عوامل خطر الأمراض غير السارية في المناطق الحضرية في أفغانستان.

ABSTRACT Noncommunicable diseases (NCDs) are a growing public health challenge. This study aimed to estimate the prevalence of common risk factors for NCDs among the adult population in an urban setting in the eastern province of Nangarhar, Afghanistan. In a randomized, cluster sample survey of households the WHO STEPwise method was modified and used to collect demographic, behavioural and clinical data from 1200 adults (61% females) in Jalalabad in 2013. Blood samples were collected for biochemical testing. The prevalence of overweight/obesity, diabetes and hypertension were 57.4%, 11.4% and 24.4% respectively. Among respondents, 8.0% reported being current cigarette smokers and 13.7% used mouth snuff; 69.8% and 19.6% had < 3 servings of fruits and of vegetables respectively in a week; and 33.5% and 57.8% reported vigorous and moderate physical activity respectively. Tailored interventions on risk factors of NCDs are needed in urban areas in Afghanistan.

Prévalence des facteurs de risque pour les maladies non transmissibles à Jalalabad (Afghanistan), évaluée à l'aide de l'approche STEPwise de l'Organisation mondiale de la Santé (OMS)

RÉSUMÉ Les maladies non transmissibles représentent un défi de santé publique croissant. La présente étude avait pour objectif d'estimer la prévalence des facteurs de risque courants pour les maladies non transmissibles en population adulte en milieu urbain dans la province de l'est de Nangarhar (Afghanistan). Dans une étude randomisée portant sur un échantillon en grappes de ménages, la méthode STEPwise de l'OMS a été modifiée puis utilisée pour recueillir des données démographiques, comportementales et cliniques auprès de 1200 adultes (61 % de femmes) à Jalalabad en 2013. Des échantillons de sang ont été prélevés pour des analyses biochimiques. La prévalence du surpoids/de l'obésité, du diabète et de l'hypertension était de 57,4 %, 11,4 % et 24,4 % respectivement. Parmi les répondants, 8,0 % rapportaient être des fumeurs de cigarettes actuels et 13,7 % utilisaient du tabac à priser ; 69,8 % et 19,6 % indiquaient consommer moins de trois portions de fruits et de légumes respectivement par semaine, et 33,5 % et 57,8 % déclaraient pratiquer une activité physique modérée ou intense, respectivement. Des interventions adaptées sur les facteurs de risque des maladies non transmissibles sont requises dans les zones urbaines d'Afghanistan.

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Introduction

Morbidity and mortality due to non-communicable diseases (NCDs) continue to rise, in developing as well as developed countries (1,2). The new health goal is to reduce mortality from NCDs by 25% by 2025: the 25 by 25 goal (3). Of the total deaths attributed to NCDs globally, nearly 80% occur in low- and middle-income countries (4). Furthermore, NCDs kill at a younger age in developing countries, including those of the Eastern Mediterranean Region (EMR). In some EMR countries up to 50% of those who die from such diseases die before the age of 60 years compared with less than 10% in western Europe (5). The global economic burden of NCDs is huge (6) and disproportionately affects poorer individuals in low-income countries (7). In Afghanistan, as in other countries of the EMR, most of the costs of health care, particularly for NCDs, are paid directly by patients out-of-pocket, and therefore can be a significant burden on household budgets (8).

According to World Health Organization (WHO) estimates the age-standardized death rates in Afghanistan from all NCD were 1285 per 100 000 population for males and 952 per 100 000 for females (9). Furthermore, the Afghanistan mortality survey 2010 revealed that 33.3% of all deaths in Afghanistan were attributed to NCDs, with cardiovascular diseases, malignant neoplasms, diabetes, respiratory diseases and digestive diseases accounting for 14.0%, 7.3%, 3.7%, 1.9% and 1.8% of total NCD deaths respectively (10). Based on WHO estimates, in 2000 there were 468 000 people with diabetes in Afghanistan. This number is expected to rise to 1 403 000 in 2030, representing a nearly 3-fold increase compared with 2000 (11). In a study among men aged 15 years and older in Kabul city the prevalence of smoking was 35% (12), while in a study to identify the prevalence and

risk factors of NCDs among the older adult population (aged ≥ 40 years) in Kabul city in 2012, the prevalence of diabetes mellitus was reported to be 13.3%, obesity was 31.2% and hypertension was 46.2% (13). Finally, an assessment of the air quality of Kabul city showed that the ambient air quality in the city has deteriorated to such extent that it can be ranked among the most polluted cities in the world, a situation which potentially increases the burden of respiratory diseases and different types of cancer among humans (14).

It is believed that a large proportion of NCDs can be prevented by reducing the 4 main risk factors: tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol (6). In Afghanistan, due to competing priorities and many years of conflict, little information is available about the prevalence and risk factors for NCDs. However, facts and figures from neighbouring countries such as Pakistan and the Islamic Republic of Iran give cause for concern (15–19). Given that in Afghanistan the risk of mortality due to NCDs has overtaken that due to communicable diseases (10), there is insufficient evidence about the risk factors associated with NCDs in the country. A previous study of risk factors in Kabul city could not be generalizable to all Afghanistan with its variety of different geography, risk behaviours and cultural backgrounds. Therefore, to fill this knowledge gap the present study aimed to identify the prevalence of risk factors for chronic NCDs in the urban population of Nangarhar province (Jalalabad city).

Methods

Study design and setting

In this study we adapted and used the WHO STEPwise tool (20) to estimate the prevalence of risk factors for NCDs in an urban setting in the eastern province of Nangarhar. Jalalabad

city includes 22 districts of Nangarhar province and is also a vehicle transport hub to neighbouring provinces such as Laghman, Kunar, Nuristan, Kabul and Kapisa. The municipality organizes the city into 6 main districts and the Expanded Programme on Immunization (EPI) divides the city into 4 clusters and 20 subclusters, which are further divided by streets (areas). In this study we approached all EPI clusters and subclusters in 5 districts of the city.

Sampling

All permanent household members aged 25–65 years, including men and women who were residents of the city during the study period and gave consent to participate, were included in the study. Temporary residents (resident < 6 months) and those living in institutionalized settings or insecure areas were excluded.

Due to the unavailability of previous estimates of risk factor prevalence in this province we assumed the highest prevalence for sample size calculation (50%), 95% confidence interval (CI) and margin of error of 5%. From this we estimated 385 subjects to be included in the survey. Taking into consideration the proportion of other risk factors in similar settings, the number of subjects was increased to 600. To allow for nonresponse, cost, resources and time, without compromising the representativeness of the sample, a 2-phase cluster sampling technique was used. Finally, after taking into account the design effect ($= 2$) of cluster sampling the final sample size was increased to $(2 \times 600) = 1200$, which was reasonable for achieving the study objectives with limited resources and funding support.

Data were collected from 4 clusters (A–D) and 20 subclusters of the EPI. The primary sampling unit was subclusters, the secondary sampling unit was streets/areas, the tertiary sampling unit was households and the ultimate sampling unit was respondents

aged 25–65 years in the household. We could not determine how many households there were from the centre to periphery in each street and so we selected each second household until the sample fraction was completed. The interviewers were instructed to find a well-known fixed landmark or a very populated street within the boundaries of the selected location and, following the bottle rotating method, to proceed to a series of households. A household was defined as a group of people who share the same food pot (not the same roof). In each household the interviewer enumerated all persons who were eligible for our study based on the inclusion criteria. In households with more than one person meeting the eligibility criteria we used a lottery system to select the respondent for this survey. The refusal rate for participation was low (< 5%). In cases of refusal, the interviewer approached the next alternate household. This method provided an equal chance of each member of the household being selected.

Data collection

Data on demographic, behavioural and clinical variables were collected from May to June 2013 by direct interview using the WHO STEPwise instrument. For the purpose of the survey implementation, experienced data collectors (males and females) with at least 12th grade level of school education were recruited and trained. At the end of the practical fieldwork, all issues and ambiguity related to data collection were clarified.

Definitions

Anthropometric measurements (height and weight) were used to calculate body mass index (BMI). A BMI of ≥ 30 kg/m² was considered as obese, 25–30 kg/m² as overweight and 18.5–25 kg/m² as normal weight (21). A waist circumference of ≥ 94 cm for men and ≥ 80 cm for women was considered as central obesity (22).

Systolic blood pressure ≥ 140 mmHg and diastolic pressure ≥ 90 mmHg were considered as hypertension (23).

Following the interview, blood samples were collected the next morning after the respondent had fasted for 10–12 hours and were processed by laboratory technicians for serum separation. Afterwards they were shipped to the central public health laboratory in Kabul and stored at -80 °C. Later, the biochemical measurement of blood lipids and sugar were conducted. A fasting blood sugar of ≥ 126 mg/dL was considered as diabetes mellitus (24). The cut-offs for serum total cholesterol, triglycerides and low-density lipoprotein (LDL) cholesterol were 190 mg/dL, 150 mg/dL and 100 mg/dL respectively and for high-density lipoprotein (HDL) cholesterol were 40 mg/dL (men) and 50 mg/dL (women).

Ethical considerations

The study protocol was approved by the institutional review board of the Afghan Ministry of Public Health. Before the interviews and sample collection, the provincial public health directorate, the municipality and community leaders were briefed about the aims and objective of the study and all agreed with the process of data collection. After an explanation of the survey, informed consent was taken from each individual before the interview. All steps were taken to conduct the interviews in privacy and on a voluntary basis. Given the gender sensitivity in the Afghan context, female data collectors interviewed only female respondents and male data collectors interviewed only male respondents.

Data analysis

All collected data, hard and soft, were kept confidential in a locked cupboard and a password-protected computer. Data were entered in *Epi-Info*, version 7, and analysed descriptively using *SPSS*, version 20.

Results

Background demographic

A total of 1200 individuals were approached and interviewed. The proportion of males and females was 40% and 60% respectively in our study sample, compared with rates of 51% and 49% in the general population. In order to balance the sex distribution we weighted the dataset for analysis.

The mean and standard deviation (SD) age of the study participants was 39.1 (SD 11.5) years. Selected socioeconomic and demographic characteristics of the participants are shown in Table 1. About two-thirds of females and a third of male participants were illiterate and 62.0% of the participants had a monthly income < 10 000 Afghani (\$US 188). A majority (88.3%) of study participants were married. The most common occupation, particularly among men, was farming and manual work (24.3%), while 43.5% of women were housewives.

Prevalence of risk behaviours

Only 8.0% of participants reported being current cigarette smokers and 13.7% reported using mouth snuff (chewing tobacco). Reflecting cultural norms, the prevalence of cigarette smoking and chewing tobacco were very low among women; only 3 women reported using mouth snuff and 1 was a cigarette smoker.

Among the respondents 69.8% reported consuming < 3 servings of fruits in a week and 19.6% < 3 servings of vegetables in a week (Table 2). Solid oils were used for cooking in the kitchen by 58.0% of respondents and liquid oils by 42.0%. Vigorous and moderate levels of physical activity were reported by 33.5% and 57.8% of respondents respectively.

Prevalence of overweight and obesity

The mean height, weight and BMI of the sample were 161.4 cm, 69.3 kg and 26.8 kg/m² respectively. The mean systolic

Table 1 Frequency distribution of demographic characteristics of the study participants

Variable ^a	Females		Males		Total	
	No.	%	No.	%	No.	%
Age (years)						
25–34	211	39.7	248	43.5	459	41.7
35–44	190	35.8	96	16.8	286	26.0
45–54	95	17.9	117	20.5	212	19.3
55+	35	6.6	109	19.1	144	13.1
Residence						
District 1	54	9.2	144	23.6	198	16.6
District 2	118	20.2	21	3.4	139	11.6
District 3	186	31.8	92	15.1	278	23.3
District 4	65	11.1	296	48.6	361	30.2
District 5	162	27.7	56	9.2	218	18.3
Educational level						
Illiterate	514	88.3	276	45.9	790	66.8
Primary/unofficial education	32	5.5	133	22.1	165	13.9
Secondary school	30	5.2	133	22.1	163	13.8
University and above	6	1.0	59	9.8	65	5.5
Monthly income (Afghanis^b)						
≤ 10 000	280	47.9	465	76.1	745	62.0
10 000–20 000	18	3.1	25	4.1	43	4.0
≥ 20 000	34	5.8	1	0.2	35	3.0
Refused	252	43.2	118	19.4	370	31.0
Work status						
Government employee	18	3.1	113	18.6	131	11.0
Private business	1	0.2	101	16.7	102	8.6
Farmer/manual worker	3	0.5	286	47.2	289	24.3
Working in house	517	88.8	0	0.0	517	43.5
Unable to work/retired	2	0.3	101	16.7	103	8.7
Refused	41	16.7	5	0.8	46	3.9
Marital status						
Single	32	5.5	66	10.8	98	8.3
Married	514	88.0	534	87.7	1048	88.3
Other	32	5.5	8	0.2	40	3.4

^aMissing values in some categories; ^b\$US 1 = 57 Afghanis at the time of the study.

blood pressure was 121.8 mmHg and the mean diastolic blood pressure was 78.8 mmHg.

As shown in Table 3, overall 57.4% of study participants were either overweight or obese. Overweight and obesity were more common among women as compared with men (66.8% versus 49.7%). Furthermore, 56.6% of respondents had central obesity based on waist circumference (excluding pregnant women).

Prevalence of hypertension and diabetes mellitus

Among the participants 24.4% had high blood pressure. The prevalence of diabetes mellitus (fasting blood sugar ≥ 126 mg/dL) was 11.4% and was higher among women than men (13.4% versus 9.4%).

Overall 52.8% of respondents had high serum total cholesterol (≥ 190 mg/dL), 24.5% had low LDL cholesterol (≤ 100 mg/dL), 21.4% had high

HDL cholesterol and 68.6% had high triglyceride level (≥ 150 mg/dL).

Discussion

In contrast with the attention given to communicable diseases by the government and its partners in Afghanistan, the current survey focussed on the identification of common risk and protective factors for NCDs (25,26). According to

Table 2 Frequency distribution of behavioural risk factors for noncommunicable diseases among the study participants

Variable ^a	Female		Male		Total	
	No.	%	No.	%	No.	%
Cigarette smoking status						
No	541	99.8	515	85.0	1056	92.0
Yes	1	0.2	91	15.0	92	8.0
Duration of smoking: current and ex-smokers (years)						
< 10	0	0.0	60	44.8	60	43.8
10–20	3	100.0	47	35.1	50	36.5
≥ 20	0	0.0	27	20.1	27	19.7
Mouth snuff use status						
No	542	99.4	455	74.6	997	86.3
Yes	3	0.6	155	25.4	158	13.7
Fruit servings (days per week)^a						
< 3	401	73.3	369	66.4	770	69.8
≥ 3	146	26.7	187	33.6	333	30.2
Vegetable servings (days per week)^b						
< 3	151	26.4	81	13.3	232	19.6
≥ 3	422	73.6	527	86.7	949	80.4
Type of kitchen oil						
Liquid	370	68.4	105	17.8	475	42.0
Solid	171	31.6	484	82.2	655	58.0
Vigorous physical activity^c						
No	306	57.5	452	74.5	758	66.5
Yes	226	42.5	155	25.5	381	33.5
Moderate physical activity^d						
No	192	36.8	242	47.8	434	42.2
Yes	330	63.2	264	52.2	594	57.8
Pedal or bicycle for 20 min daily						
No	502	95.8	246	40.7	748	66.3
Yes	22	4.2	359	59.3	381	33.7
Sitting (h/day)						
< 3	296	66.7	359	63.3	655	64.8
≥ 3	148	33.3	208	36.7	356	35.2

^aMissing values in some categories; ^bOne serving is amount of fruits or vegetables taken once; ^cPhysical activity for 10 min causing high increase in heart rate or respiration; ^dPhysical activity for 10 min causing moderate increase in heart rate or respiration.

our findings two-thirds of the adults of Jalalabad city were suffering from overweight or obesity. A study conducted in Kabul city found a higher prevalence of obesity, which might be due to the older age group studied (13). Our findings on obesity are consistent with global and large-scale studies in other parts of the world (27–29). Although no information from Afghanistan is available to assess the trends of obesity, it is likely that the economic condition of urban

citizens is improving. Moreover, cultural norms in Afghanistan mean that being overweight and obese is perceived as healthy and people are not generally interested in losing weight.

The prevalence of hypertension (28.4%) and diabetes mellitus (11.4%) in our study suggests that the country has already entered an epidemic of NCDs, which requires strengthening efforts for control and prevention. In an earlier study in Kabul city the prevalence

of hypertension and diabetes (46.0% and 13.7% respectively) were higher than in the current study, perhaps due to cultural differences and to the older age groups sampled in that study (13). Our findings can be compared with those of a study in the Islamic Republic of Iran, which is a neighbouring county to Afghanistan. A systematic analysis of studies from 1996 to 2004 estimated that the overall prevalence of hypertension in the population age groups

Table 3 Frequency distribution of clinical risk factors for noncommunicable diseases among the study participants

Variable ^a	Females		Males		Total	
	No.	%	No.	%	No.	%
BMI (kg/m²)^b						
Underweight	16	3.2	61	10.1	77	7.0
Normal weight	150	30.0	244	40.3	394	35.6
Overweight	155	31.0	205	33.8	360	32.5
Obesity I	102	20.4	69	11.4	171	15.5
Obesity II	47	9.4	18	3.0	65	5.9
Obesity III	30	6.0	9	1.5	39	3.5
Central obesity (missing=133)						
No	166	34.5	294	50.7	460	43.4
Yes	315	65.5	286	49.3	601	56.6
Blood pressure^c						
Normotensive	143	25.0	252	41.7	738	62.6
Pre-hypertensive	258	45.2	235	38.9	105	8.9
Hypertensive	170	29.8	117	19.4	335	28.4
Elevated blood sugar^d						
No	497	86.6	541	90.6	1038	88.6
Yes	77	13.4	56	9.4	133	11.4
Total cholesterol (mg/dL)						
< 190	256	44.7	296	49.7	552	47.2
≥ 190	317	55.3	300	50.3	617	52.8
LDL cholesterol (mg/dL)						
< 100	126	22.0	160	26.8	286	24.5
≥ 100	446	78.0	437	73.2	883	75.5
HDL cholesterol (mg/dL)						
< 40 (M); < 50 (F)	518	88.7	420	78.6	938	78.6
≥ 40 (M); ≥ 50 (F)	66	11.3	190	21.4	256	21.4
Triglycerides (mg/dL)						
< 150	194	33.9	173	29.0	367	31.4
≥ 150	378	66.1	424	71.0	802	68.6

^aMissing values in some categories; ^bUnderweight < 18.5 kg/m², normal weight 18.5–24.9 kg/m², overweight 25–29.9 kg/m², obesity I 30–34.9 kg/m², obesity II 35–40 kg/m², obesity III > 40 kg/m²; ^cSystolic/diastolic blood pressures: normotensive 120/80 mmHg, pre-hypertensive 120–140/80–90 mmHg, hypertensive ≥ 140/≥ 90 mmHg; ^dFasting blood sugar ≥ 126 mg%.

LDL = low-density lipoprotein; HDL = high-density lipoprotein; M = males; F = females.

30–55 and > 55 years were around 23% and 50% respectively (30). The national prevalence of diabetes in the Islamic Republic of Iran among 25–65 year-olds in 2005 was 7.7%, higher among females than males (8.3% versus 7.1%) (15). These figures show a lower prevalence of hypertension and diabetes compared with Afghanistan, which is probably due to the Islamic Republic of Iran's more advanced public health programmes. In Punjab province in Pakistan, another neighbouring country, the prevalence

of diabetes was reported to be 12.1% in males and 9.8% in females (16). The overall prevalence of hypertension in Karachi, Pakistan was 26%, with a difference between males and females (34% versus 24%). Age analysis revealed that the prevalence of hypertension increased with age and that people with hypertension were 5.6 times more likely to be over 35 years of age (17).

Health education campaigns in our country should be tailored to cover the principal risk factors. Vigorous and

moderate physical activity are protective factors against obesity as well as other NCDs but are not being practised to recommended levels. Better community awareness and the establishment of sport centres and jogging areas, which are lacking in urban settings, particularly for women, should be encouraged and discussed with the relevant sectors. Men are at greater risk of NCDs than are women, which is not a modifiable risk factor and could be due to genetic differences. Sex differences in risk factors

were also demonstrated in Karachi in Pakistan (27).

Based on our findings the prevalence of cigarette smoking and tobacco snuff use was much higher among men than women, probably due to the cultural unacceptability of these practices for women. The sex differences in smoking patterns are similar to other studies (31,32), but due to a scarcity of previous studies, comparisons of snuff use are not possible.

Chronic NCDs such as diabetes, obesity and hypertension tend to occur as a combined syndrome in the adult population. The presence of diabetes and obesity, either central or general, affect blood pressure levels and need to be considered as a comorbidity while managing other problems. These findings are supported by another study of the same design in Kabul city on an older population (13). That study hypothesized that the population of this urban setting was entering a critical state of NCDs, while little attention was being given to the issue. Interventions are needed to target a group of risk factors rather than just one or two factors.

There were some limitations to our study. The first limitation was financial constraints, which prevented listing of the households before the survey and necessitated approaching the

community and selecting the households directly. Secondly, the provision of free blood pressure measurements and laboratory tests might have encouraged more patients with hypertension and diabetes to participate in the study, which might have caused an overestimation of the prevalence of these diseases. The third limitation, which is common to all studies in Afghanistan is the poor security situation which forced us to exclude a district from our study.

Despite these limitations this study has provided some useful baseline information for policy development and the design of interventions. The study demonstrated the impact of NCDs such as diabetes, blood pressure and obesity on a population already burdened by communicable and vaccine-preventable diseases. The findings can contribute towards the formulation of more advanced, nationwide studies.

Conclusion and Recommendations

During the previous decade, the greatest priorities in Afghanistan were communicable diseases, malnutrition, vaccination and maternal and child health care. Therefore, minimal efforts have been carried out to reduce risk factors for

NCDs within the population. The NCD unit has recently been established in the Ministry of Public Health and we recommend strengthening the department and preparing for a nationwide survey using the WHO STEPwise approach to surveillance in order to obtain a more complete picture of the risk of NCDs in the country. NCD surveillance should be an integrated part of primary health care, with systems for screening for asymptomatic hypertension and diabetes and staff training on identification and management of NCD risk factors. Finally, in close collaboration with other sectors such as the ministries of education, higher education, justice, trade, women's affairs and media, steps should be taken to promote healthy lifestyles and practices among the population of Afghanistan and to facilitate any necessary legislation.

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