Cardiovascular diseases among adults in Afghanistan: Prevalence and associated factors from a national household survey in 2018

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ABSTRACT

INTRODUCTION This study aimed to estimate the prevalence and associated factors of cardiovascular diseases (CVDs) among the national adult population in Afghanistan.

METHODS Data were analyzed from 3956 adults (aged 18–69 years) that participated in a nationally representative household survey in Afghanistan in 2018. CVDs were defined as self-reported heart attack or chest pain from heart disease (angina) or a stroke (cerebrovascular accident or incident).

RESULTS Overall, 8.8% of participants reported CVDs, 11.4% among men and 6.0% among women. In adjusted logistic regression analysis, age 45–69 years (AOR=2.06; 95% CI: 1.06–4.01), current tobacco use (AOR=1.40; 95% CI: 1.06–4.01), and raised total cholesterol (AOR=2.37; 95% CI: 1.19–4.73) were associated with CVD. In addition, in gender stratified analysis, among men, higher number of adult household members (lower economic status) (AOR=3.52; 95% CI: 1.92–6.43) and inadequate fruit and vegetable intake (<3 servings/day) were associated with CVD, while among women, urban residence (AOR=0.32; 95% CI: 0.15–0.68) and more frequent (≥3 servings/day) fruit and vegetable consumption (AOR=0.18; 95% CI: 0.03–0.99) were negatively associated with CVD.

CONCLUSIONS Almost one in ten adults in Afghanistan had a CVD, and several factors associated CVD were discovered, including older age (45–65 years), current tobacco use, raised total cholesterol, and inadequate fruit and vegetable consumption.

INTRODUCTION

Globally, 31% of all deaths were attributed to cardiovascular disease (CVDs) in 2016, including 85% due to heart attack and stroke[1]. Among older adults (aged ≥50 years) the top-ranked causes of disability adjusted life years (DALYs) were ischemic heart disease and stroke in 2019[2]. More than 75% die from CVDs in low-resources countries[1].

In the Asian region: in China 3.3% of the men and 3.6% of the women reported CVD[3] (age: 35–74 years), in India the prevalence of stroke was 2.0% (age: ≥50 years)[4], in Iran 5.3% reported coronary heart disease (CHD) (age: 20–69 years)[5], in urban areas in northern Iran 9.2% reported CHD (age: 35–70 years)[6], in rural Malaysia 4.8% had CVD (age: ≥18 years)[7], and in a community-based study in northwestern Pakistan 4.8% had a history of stroke[8]. We could not find national information on CVD in Afghanistan[9,10]. One in five persons died from CVDs in Afghanistan in 2016[11], and ischemic heart disease and stroke were among top 10 causes of premature mortality in Afghanistan[12].

Social and demographic factors associated with CVD may include increasing age and sex[5,13,14], lower socioeconomic status[6,13-15], not married[13], separated/divorced[16], ethnicity[17], and urban residence[5]. Behavioral variables associated with CVD may include, tobacco use[14,15,18], exposed to indoor passive smoking[19], physical inactivity[15,20], low or insufficient vegetable and fruit intake[20,21], psychological distress[22], and opium use[6]. Biological factors associated with CVD may include, hypertension[5-7,14-18,20], diabetes[6,7,14-18,20], obesity[6,7,14,15,18,20], lipoprotein cholesterol, and dementia[17].

This investigation aimed to estimate the prevalence and associated factors of CVDs among the national adult population in Afghanistan in 2018.

METHODS

Sample and procedure

This analysis used data from a national cross-sectional household survey in Afghanistan in 2018[23]. By using a multistage cluster approach, a nationally representative sample of individuals aged 18–69 years was generated[24]. The primary sampling units were 55 districts, followed by villages or blocks (secondary sampling units) and households (tertiary sampling units). One person from each household was randomly selected[24]. Ethical approval was obtained from the Ministry of Public Health Ethics Board in Afghanistan, and participants provided written informed consent.

Data collection followed the WHO STEPS methodology: step 1 included administration of a structured questionnaire on sociodemographic characteristics, medical history, medication use, and health risk behavior; step 2 consisted of blood pressure and anthropometric measurements; and step 3 included biochemical tests such as blood glucose and blood lipids[24].

Measures

The outcome variable, having CVDs, was defined as an affirmative response to the question: 'Have you ever had a heart attack or chest pain from heart disease (angina) or a stroke (cerebrovascular accident or incident)?[23].

Sociodemographic information included age, sex, education level, number of adult household members (as a proxy for socioeconomic status)[25], and residence (rural or urban).

Behavioral covariates included current tobacco use, daily servings of vegetables and fruit, sedentary behavior (≥8 hours/day)[26], and physical activity (low, moderate or high) based on the Global Physical Activity Questionnaire[27].

Biological variables included measured body mass index (BMI, kg/m^2) classified as: <18.5 underweight, 18.5–24.4 normal weight, 25–29.9 overweight, and ≥30 obese[28]. Hypertension was defined as systolic blood pressure ≥140 mmHg and/or diastolic ≥90 mmHg or if the participant was on antihypertensive medication[29].

Diabetes was defined as: fasting plasma glucose level ≥7.0 mmol/L (126 mg/dL); or using insulin or oral hypoglycemic drugs; or having a history of diagnosis of diabetes[30]. Raised total cholesterol was defined as fasting total cholesterol ≥5.0 mmol/L or currently on medication for raised cholesterol[30].

Statistical analysis

Descriptive statistics were used to provide the distribution of sociodemographic and health information of the sample, for both sexes and gender stratified. Unadjusted and adjusted logistic regression was applied to estimate predictors (sociodemographic and health variables) of CVDs for both sexes and multivariable logistic regression for assessing predictions of CVDs among males and females, separately. Taylor linearization methods were applied in statistical procedures accounting for sample weight and multi-stage sampling. Only complete cases were included in the analysis, and significance was set at $p<0.05$. Statistical procedures were done using STATA software version 14.0 (Stata Corporation, College Station, TX, USA), and considering the complex study approach.

RESULTS

Descriptive characteristics

The sample consisted of 3956 adults (aged 18–69 years), with a median age of 35 years (interquartile range: 24–60), and 51.9% were male. The majority (61.1%) had no formal education, 47.4% were living with five or more adult household members, and 57.8% lived in urban areas. Two in five participants (40.3%) were physically inactive, 44.0% engaged in sedentary behavior, 26.2% currently consumed tobacco and 59.8% had low consumption of vegetables and fruit (≤1 servings/day). The mean BMI of respondents was 25.3 kg/m^2, 29.2% had hypertension, 9.2% diabetes, and 18.0% raised total cholesterol. The overall proportion of CVDs was 8.8%; 6.0% among females and 11.4% among males (Table 1).

Table 1. The characteristics and prevalence rate of CVD in Afghanistan, STEPS survey 2018 (N=3956)

Characteristics (number of missing data)	Sample	Cardiovascular disease (3)		
		All	Male	Female
	n (%)	n (%)	n (%)	n (%)
All	3956 (100)	293 (8.8)	184 (11.4)	109 (6.0)
Age (years) (32)				
18–29	1498 (45.4)	54 (6.2)	40 (10.3)	14 (1.8)
30–44	1176 (32.2)	95 (8.6)	49 (9.5)	46 (7.7)
45–69	1250 (22.4)	142 (14.3)	93 (16.4)	49 (12.0)
Education level (3)				
None	2225 (61.1)	177 (9.7)	85 (15.1)	92 (6.5)
≤Primary	681 (15.8)	48 (7.1)	38 (7.7)	10 (5.7)
≥Secondary	1047 (23.1)	68 (7.5)	61 (9.0)	7 (1.8)

Continued

Table 1. Continued

Characteristics (number of missing data)	Sample	Cardiovascular disease (3)		
		All	Male	Female
	n (%)	n (%)	n (%)	n (%)
Adult household members (3)				
<5	2080 (52.6)	139 (7.5)	75 (5.9)	64 (9.4)
≥5	1873 (47.4)	154 (9.6)	109 (15.2)	45 (3.9)
Residence (1)				
Rural	1877 (42.2)	111 (9.5)	68 (8.9)	43 (10.1)
Urban	2078 (57.8)	182 (8.3)	116 (13.2)	66 (2.9)
Fruit/vegetable intake (daily servings)				
≤1	2523 (59.8)	192 (7.9)	100 (8.5)	92 (7.4)
2	925 (28.9)	78 (11.4)	64 (15.2)	14 (4.4)
≥3	508 (11.3)	23 (6.6)	20 (12.0)	3 (1.1)
Physical activity (36)				
Low	1489 (40.3)	105 (6.0)	50 (10.1)	55 (4.6)
Moderate	644 (17.9)	44 (8.1)	31 (7.8)	13 (8.6)
High	1787 (41.8)	141 (11.8)	100 (13.1)	41 (8.3)
Sedentary behavior (hours/day) (24)				
<8	2201 (56.0)	155 (10.4)	105 (12.1)	49 (7.9)
≥8	1731 (44.0)	135 (7.2)	75 (10.5)	60 (4.6)
Current tobacco use (3)				
No	3083 (73.8)	201 (7.0)	111 (9.1)	90 (5.7)
Yes	870 (26.2)	92 (13.8)	73 (14.3)	19 (9.7)
Hypertension (40)				
No	2723 (70.8)	157 (6.9)	101 (9.0)	56 (4.4)
Yes	1193 (29.2)	134 (13.5)	81 (18.0)	53 (9.6)
Type 2 diabetes (309)				
No	3239 (90.8)	214 (8.5)	132 (11.4)	82 (5.2)
Yes	408 (9.2)	53 (14.4)	37 (17.4)	16 (12.3)
Raised cholesterol (248)				
No	3001 (82.0)	201 (7.6)	133 (9.5)	68 (5.0)
Yes	707 (18.0)	72 (15.4)	39 (26.6)	33 (9.3)
Body mass index (kg/m^2), mean±SD	25.3±5.9	26.1±5.6	25.0±4.4	24.9±6.3

Associations with CVDs

In adjusted logistic regression analysis showed that age 45–69 years (AOR=2.06; 95% CI: 1.06–4.01), current tobacco use (AOR=1.40; 95% CI: 1.06–4.01) and raised total cholesterol (AOR=2.37; 95% CI: 1.19–4.73) were associated with CVD (Table 2). In addition, in gender stratified analysis, among men, higher number of adult household members (lower economic status) (AOR=3.52; 95% CI: 1.92–6.43) and inadequate fruit and vegetable intake (<3 servings/day) were associated with CVD, while among women, urban residence (AOR=0.32; 95% CI: 0.15–0.68) and more frequent (≥3 servings/day) fruit and vegetable consumption (AOR=0.18; 95% CI: 0.03–0.99) were negatively associated with CVD (Table 3).

Table 2. Associations with cardiovascular disease in both sexes in Afghanistan, STEPS survey 2018 (N=3626)

Variable	OR (95% CI)	p	AOR (95% CI)[a]	p
Age (years)				
18–29 (Ref.)	1		1	
30–44	1.43 (0.84–2.42)	0.187	1.27 (0.74–2.16)	0.385
45–69	2.52 (1.71–3.70)	<0.001	2.06 (1.06–4.01)	0.034
Sex				
Female (Ref.)	1		1	
Male	2.03 (0.89–4.65)	0.093	1.69 (0.66–4.31)	0.272
Education level				
None (Ref.)	1		1	
≤Primary	0.71 (0.34–1.49)	0.369	0.56 (0.27–1.22)	0.145
≥Secondary	0.76 (0.43–1.34)	0.344	0.62 (0.33–1.15)	0.130
Adult household members				
<5 (Ref.)	1		1	
≥5	1.30 (0.77–2.22)	0.328	1.52 (0.85–2.71)	0.156
Residence				
Rural (Ref.)	1		1	
Urban	0.87 (0.42–1.80)	0.699	1.00 (0.51–1.99)	0.999
Fruit/vegetable intake (daily servings)				
≤1 (Ref.)	1		1	
2	1.50 (0.89–2.52)	0.127	1.32 (0.82–2.10)	0.248
≥3	0.82 (0.32–2.24)	0.689	0.80 (0.31–2.01)	0.626
Physical activity				
Low (Ref.)	1		1	
Moderate	1.39 (0.61–3.17)	0.436	1.21 (0.50–2.93)	0.675
High	2.12 (1.13–3.97)	0.020	2.03 (0.92–4.42)	0.078
Sedentary behavior (hours/day)				
<8 (Ref.)	1		1	
≥8	0.67 (0.34–1.31)	0.239	0.67 (0.30–1.49)	0.325
Current tobacco use				
No (Ref.)	1		1	
Yes	2.12 (1.21–3.73)	0.009	1.40 (1.06–4.01)	0.034
Hypertension				
No (Ref.)	1		1	
Yes	2.12 (1.07–4.18)	0.030	1.71 (0.87–3.35)	0.117
Type 2 diabetes				
No (Ref.)	1		1	
Yes	1.81 (0.81–4.04)	0.147	1.30 (0.59–2.83)	0.514
Raised cholesterol				
No (Ref.)	1		1	
Yes	2.22 (1.01–4.91)	0.047	2.37 (1.19–4.73)	0.014
Body mass index (kg/m^2)	0.99 (0.95–1.04)	0.746	0.97 (0.91–1.02)	0.243

OR: odds ratio. AOR: adjusted odds ratio. CI: confidence interval. aVariables included those with p<0.2 in univariate analysis.

Table 3. Associations with cardiovascular disease among men and women in Afghanistan, STEPS survey 2018 (N=3626)

Variable	Male		Female	
	AOR (95% CI)	p	AOR (95% CI)[a]	p
Age (years)				
18–29 (Ref.)	1		1	
30–44	0.87 (0.50–1.49)	0.604	7.42 (1.93–28.38)	0.004
45–69	1.52 (0.54–4.25)	0.423	8.01 (2.76–23.24)	<0.001
Education level				
None (Ref.)	1		1	
≤Primary	0.44 (0.19–1.00)	0.050	1.24 (0.39–3.92)	0.713
≥Secondary	0.52 (0.25–1.04)	0.065	0.43 (0.05–3.50)	0.432
Adult household members				
<5 (Ref.)	1		1	
≥5	3.52 (1.92–6.43)	<0.001	0.58 (0.25–1.35)	0.205
Residence				
Rural (Ref.)	1		1	
Urban	1.69 (0.73–3.53)	0.223	0.32 (0.15–0.68)	0.003
Fruit/vegetable intake (daily servings)				
≤1 (Ref.)	1		1	
2	1.93 (1.24–2.99)	0.003	0.42 (0.13–1.37)	0.151
≥3	1.60 (0.77–3.36)	0.209	0.18 (0.03–0.99)	0.047
Physical activity				
Low (Ref.)	1		1	
Moderate	1.05 (0.34–3.25)	0.934	1.58 (0.45–5.61)	0.476
High	2.18 (0.86–5.52)	0.101	1.69 (0.65–4.38)	0.283
Sedentary behavior (hours/day)				
<8 (Ref.)	1		1	
≥8	0.90 (0.36–2.25)	0.815	0.71 (0.39–1.26)	2.40
Current tobacco use				
No (Ref.)	1		1	
Yes	1.24 (0.50–3.10)	0.637	0.98 (0.32–3.09)	0.977
Hypertension				
No (Ref.)	1		1	
Yes	1.76 (0.93–3.35)	0.082	1.83 (0.65–5.15)	0.250
Type 2 diabetes				
No (Ref.)	1		1	
Yes	1.20 (0.41–3.69)	0.737	1.80 (0.47–6.87)	0.390
Raised cholesterol				
No (Ref.)	1		1	
Yes	3.06 (1.58–5.62)	<0.001	1.89 (0.82–4.33)	0.132
Body mass index (kg/m^2)	1.01 (0.94–1.09)	0.775	0.96 (0.89–1.02)	0.101

AOR: adjusted odds ratio. CI: confidence interval. aVariables included those with p<0.2 in univariate analysis.

DISCUSSION

In this population-based national study among adults in Afghanistan in 2018, the prevalence of CVD (8.8%) was higher than in China (3.5%)[3], Malaysia (4.8%)[7], Nepal (2.0%)[21] and Thailand (1.6%)[3]. Public health interventions are urgently needed in Afghanistan to prevent and manage CVDs[31,32].

In line with former results[5,13,14], increasing age (45–69 years) increased the odds of CVD. Unlike some previous investigations[5,13,14], this study did not find significant sex differences in the prevalence of CVD. Previous research[5,6,13-15] found an association between lower socioeconomic status, and urban residence, with CVD, while this study did not show such associations, for both sexes. However, among men, lower economic status (more adult household members) was positively associated with CVD, and among women, urban residence was negatively associated with CVD.

In line with past research[14,15,18], current tobacco use increased the odds of CVD. Of the stroke related risk factors, tobacco use represents the most urgent challenge for Afghanistan, since its use is high and common across gender and regions[9]. In a meta-analysis of studies, the importance of smoking as an independent risk factor for stroke was confirmed[33]. Consistent with previous findings[20,21], we found among men and women that low or insufficient vegetable and fruit intake was associated with CVD. Contrary to expectation[15,20], physical inactivity was in this study not significantly associated with CVD. It is possible that participants after having been diagnosed with CVD increased their physical activity.

Consistent with findings[5-7,14-18,20], this survey showed an association between raised total cholesterol, and in univariate analysis hypertension, with CVD. High rates of total cholesterol were also found in the general population in Afghanistan suggesting high propensity for ischemic stroke in this population[9]. Unlike some studies[6,7,14-18,20], this analysis did not find significant associations between higher BMI, and diabetes, and CVD.

Strengths and limitations

Some of the variables assessed in this study were by self-report, including the outcome variable CVDs. However, previous research comparing hospital diagnosed and self-reported CVD, found self-reported CVD to be valid[34]. Another limitation was the cross-sectional design of the study, which hinders making causative conclusions. The prevalence of CVD is this survey was probably underestimated, since only survivors of CVD were included[31]. Furthermore, more details of the CVD type, time of CVD diagnosis and other relevant variables, such as psychological distress, were not assessed and should be part of future research.

CONCLUSIONS

Almost one in ten Afghan adults had CVD. Several associated factors for CVDs, such as older age (45–65 years), current tobacco use, raised total cholesterol, and inadequate fruit and vegetable consumption, were identified, which can be targeted in public health interventions. Local health systems need to be strengthened and mass education programs initiated.

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DATA AVAILABILITY
The data supporting this research are available from the following source: https://extranet.who.int/ncdsmicrodata/index.php/catalog/782

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