Prevalence and Associated Factors of Hypertension in Hirat City Afghanistan, 2015

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ABSTRACT: -Background: Hypertension is one of the most common causes of premature death and morbidity in both developed and developing countries. The aim of this study is to determine the prevalence of hypertension and characterize associated risk factors in an urban setting in Afghanistan.

Methods and Materials: A provincial-based cross-sectional study was conducted in May-June 2015 among 1129 adult residents of Hirat city using the World Health Organization STEP wise approach tool (WHO STEPS). A multi-stage sampling technique was used to enroll participants in the study. Socio-economic and demographic variables were collected via face to face interviews, after which blood samples were collected using a locally developed standard operating procedure (SOP). Bivariate and multivariable analyses were performed to explore the association and data were coded, entered, and analyzed with SPSS version 20 software package.

Results: A total of 1129 responses (47.4% males, 52.6% females) of 25-70 years of age were included in the analysis. The overall prevalence of hypertension was 35.6%. Mean systolic blood pressure and standard deviation (SD) was 123.4 ± 18.5 mmHg and mean diastolic blood pressure was 81.8 ± 13 mmHg. Overall, 3.6% of hypertensive participants were previously diagnosed or were under treatment. According to the multivariate logistic regression analysis, age, central obesity, general obesity and existing of diabetes mellitus were statistically significant predictors of hypertension.

Conclusion: One third of adults are suffering from hypertension while 32% were latent. Age, obesity, and diabetes were identified as risk factors. However mass screening for hypertension, health education and life style modifications are recommended.

Keywords: *prevalence, associated factors, hypertension, urban, Afghanistan*

I. INTRODUCTION

Non-communicable diseases (NCDs) are a leading cause of death worldwide [1]. About 38 million people die every year due to non-communicable disease of which more than two third occur in low and middle-income countries [2]. Hypertension (HTN), as a NCD, is a global public health problem, affecting approximately one billion people worldwide and that is predicted to increase to 1.5 billion by the year 2025 [3]. The global prevalence of HTN is approximately 30% among adults; in developed countries, prevalence is beginning to stabilize or decrease, while in the developing regions, proportions continue to rise (between 20-50%) [4,5]. According to findings and literature the common risk factors reported associated with HTN are genetics, family history, advanced age, race, obesity, physical inactivity, lifestyle, cigarette smoking, excessive salt and alcohol intake, and dietary habits [6-9]. Furthermore HTN prevalence has been reported to be 15-35% in Asia [10] 20-33% in Africa, [11] 18-22% in the USA, [12] 44% in some European countries, [12] 44% in Turkey, [6] 26.3% in Egypt, [13] 32.2% in India, [14] and 32.1% in Qatar [15].

In the Eastern Mediterranean Region (EMR), the prevalence of HTN has been estimated to be 29%, affecting approximately 125 million individuals [16]. Afghanistan is part of EMR but due to years of war and conflict, few studies conducted to estimate the burden of NCD including hypertension. According to our previously published study of chronic disease risk factors in Kabul, in a sample of individuals aged 40+, the overall prevalence of obesity, HTN, and diabetes mellitus was 31.2%, 46%, and 13.3%, respectively [17]. Furthermore another study showed that the prevalence of hypertension in Jalalabad city, an eastern province of Afghanistan, was 28.4% [18]. In neighboring countries such as Iran and Pakistan, the overall prevalence of HTN in the adult population was 23% and 26% respectively [19-20]. In addition, the Afghan Mortality Survey (AMS 2010) indicated that 35% of all-cause mortality in Afghanistan is due to non-communicable disease, particularly cardiovascular disease and cancer [21]. As of 2016, Afghanistan suffers from lack of reliable information on the burden of non-communicable disease, including HTN, due to the fact that high priority is given to infectious diseases. The purpose of this study is to estimate the burden of HTN and associated risk factors among the adult population in Afghanistan's western city, Hirat. It will provide evidence to support strategic decisions such as

resource allocation and public health interventions to reduce risk factors and decrease the burden of disease in the country.

II.   METHODS AND MATERIALS

The research team conducted a provincial cross-sectional study from May to June 2015 using the WHO STEP-wise approach [22] to estimate the prevalence and factors for non-communicable diseases in Hirat city, Afghanistan. STEPS was initiated by the WHO to establish the surveillance of risk factors for non-communicable diseases. The survey tool collects information on behavioral, physical, and biochemical measurements as a part of the core, expanded, and optional modules.

Study Setting:

Hirat is a province in western border of Afghanistan and the study conducted in urban setting of the province (Hirat City). The 2015 Expanded Programme for Immunization (EPI) list of clusters was used as the sampling frame. Using multi-stage cluster sampling, in the first stage we conventionally and randomly selected 16 out of 60 EPI cluster. In the second stage, from each selected cluster five areas (Called Area/Guzar) were randomly selected, and finally the overall sample of 1200 households distributed among these selected area according to the proportion to the size of household number in each cluster / areas. Taking into account the number of households in each area, the households were selected using systematic random sampling. Inclusion criteria included: ages 25-70 (adult population, as outlined in WHO survey tool), city residents during study period, and consent to participate. Exclusion criteria included: temporary residents (less than six months) and those living in institutionalized settings or in unsafe areas were excluded from the study.

Study Population:

Initially the purpose of the study shared with community representatives and later on the team approached16 clusters and five areas of EPI. Our primary sampling unit (PSU) was clusters, secondary sampling units (SSU) were streets/areas, tertiary sampling units (TSU) were households, and ultimate sampling units (USU) were respondents more than 25 years of age in the household. The interviewer was instructed to find the masjid as a fixed landmark or a very populated street within the boundaries of the selected location and, following the bottle rotating rule, proceed to series of households. The survey team were consist of male and female to observe the cultural sensitivity of society.

Measures:

The WHO STEPS was used to collect demographic, socio-economic, clinical, and behavioral data via face-to-face interviews. Weighing scales and tension tape were used to measure body weight and height. A body mass index (BMI, hereafter reported without units) ≥ 30 kg/m2 was considered as obese, 25-29.9 was considered as overweight, and 18.5-24.9 was considered normal weight [23]. A waist circumference ≥ 94 cm for men and ≥ 80 cm for women was considered as central obesity [24]. Cuff type sphygmomanometers were used to measure systolic and diastolic blood pressure (BP) thrice with five minutes between each measurement at a sitting or lying position by our trained surveyors. Systolic blood pressure levels ≥ 140 mmHg and/or diastolic pressure levels ≥ 90 mmHg were considered hypertensive [25]. HTN in this study was defined as having a previous diagnosis of HTN or having a BP of HTN status. Blood samples were collected and processed by lab technicians under supervision of the lab coordinator. After shipment of samples to the Central Public Health Laboratory (CPHL) in Kabul, they were stored at -80°C until glucose measurement was completed. For enhancing quality of data close monitoring carried out throughout all processes.

Statistical Considerations:

Epi Info version 7[26] were used for data entry and analyses were performed using IBM SPSS software version 20 [27]. As data regarding risk factor prevalence in this province were not available, we assumed the highest prevalence and 95% confidence interval and band of error of 5%. To balance considerations of non-response rate, cost, resources, and time without compromising the representativeness of the sample, a two-phase cluster sampling technique was used. The sample size was calculated to be able to determine the effect of risk factors on non-communicable diseases. The resulting sample size was 1,200. Participants with missing main data and specimen were excluded from the final analysis, which incorporated 1,129 participants. Chi-square and logistic regression was used to examine the association of relevant variables at univariate and multivariate levels.

Ethical consideration:

For this study a general approval was given by the institutional review board (IRB) of the Ministry of Public Health and informed consent was taken from each individual before the interview. The results of physical and biochemical measurements communicated to required participants and the confidentiality of the information

gathered was maintained. All blood samples were stored under -80°C in CPHL after completing biochemical measurements for further testing. It is planned to conduct further biochemical studies over the samples which is stored in CPHL.

III.   RESULTS

Descriptive Analysis:

A total of 1,129 adults (47.4% males, 52.6% females) of 25-70 years of age were surveyed. The average age of this sample was 41.5 ± 13.1 years. The overall prevalence of HTN was 35.6% among the age group of 25-70 years. Mean systolic blood pressure and standard deviation (SD) was 123.4 ± 18.5 mmHg and ranged from 80 to 196.7 mmHg. Mean diastolic blood pressure was 81.8 ± 13 mmHg and ranged from 40 to 140 mmHg. Overall, 3.6% of hypertensive participants were previously diagnosed or were under treatment for HTN, which is very low and could be due to latent HTN or asymptomatic HTN. More than half of the respondents (54%) were illiterates, and 82.7% of participants had a monthly income < 10 000 Afghanis (USD146). Majority of the study participants were married (85.8%), while more than 80% of women were housewives. (Refer to Table 1 for details on demographic variables). The mean height, weight, and waist circumference were 162 cm, 66.6 kg, and 87 cm respectively. The mean and SD of body mass index was 25.4 ± 5.3 kg/m2. Descriptive statistics demonstrated that 5.6% were current smokers and half of smokers had duration of 10 years or more while twice of that (10.8%) were mouth snuff users. Around 45% of respondents reported to use liquid oil for cooking in their kitchen. As we had data on number of days per week that research participants consumed fruit (average number of fruit servings per day), these data were categorized as dichotomous by using a cutoff point of three days per week. Eighty three percent ate fruits less than 3 days per week and 71.4% ate vegetables three days per week. On average the subjects were taking fruits 2.14 days per week and vegetables 2.89 days per week. These variables have been described in Table 2. The study demonstrates that 10% of respondents were employed at jobs that required vigorous physical activity and 21.6% at moderate levels of physical activity. The proportions of pathophysiological factors potentially associated with HTN were diabetes (9.9%), overweight (31.8%), obesity (15.8%), and central obesity (52.3%). The biochemical measurements findings show the mean and SD total triglycerides, cholesterol, HDL, LDL, and fasting blood sugar were 155.3 ± 61.6, 180.7 ± 47, 45.2 ± 10, 104.5 ± 38.2, and 92.3 ± 86.2 mg/DL, respectively.

Inferential Analysis:

Initially bivariate analysis was conducted in which hypertensive status increased incrementally with age with the highest prevalence in age group of 55 years and over old (Table 3). Furthermore, this association of age and hypertension was statistically significant. The findings showed no significant association of sex and hypertension. Those who were illiterate were 1.6 times (95% CI: 1.2 – 2.1) at greater risk for developing HTN. We found significant associations between the level of income and with hypertension with Odds ratio of 1.6 (95% CI: 1. – 2.5). Use of snuff was also significantly associated with hypertension (OR=1.56, 95%CI: 1 – 2.28). Smoking habits and diet were not significantly associated with HTN. Overweight and obesity were significantly associated with HTN (overweight OR = 2.79, 95% CI: 1.40 – 5.58), (obesity OR = 5.52, 95% CI: 2.69 – 11.32). Central obesity was also significantly associated with hypertension. Those who were HTN had 3.74 (95% CI: 2.49 – 5.36) times higher odds of being diabetic compared with normal blood pressure. We did not find any significant relationship between level of blood lipids and hypertension in after doing analysis (Table 4). Multivariate analysis (Table 5) demonstrated that older age (more than 40 years) (AOR = 3.05, 95% CI: 2.34 – 3.98), general obesity (AOR = 1.96, 95% CI: 1.36 – 2.83), , central obesity (AOR = 1.76, 95% CI: 1.33 – 2.34), diabetic status (AOR = 1.75, 95% CI: 1.10 – 2.97), and diabetes mellitus (AOR = 0.35, 95% CI: 0.23 – 0.55) were independently associated with HTN.

IV.   DISCUSSION

Basically this is one of the few published studies on HTN prevalence in Afghanistan. The findings suggest that HTN, which affected more than one third of this sample, is a growing public health challenge in the urban setting of Hirat. However, compared with other regions, it was higher than Kabul and Jalalabad cities [17-18]. Female were slightly more than male in our study while the level of hypertension was not different. However the difference in level of hypertension is reported by other studies [20, 28] therefore additional studies are needed to test this hypothesis. Results show 5.6% of respondents were daily smokers while double that number (10.8%) were mouth snuff users. It could be due to the low cost of snuff as compared to cigarettes. However both had no association at multivariate level with hypertension. Physical activity and a diet rich in vegetables being protective factors against HTN were not associated with hypertension which could be due to poverty and using similar food by various groups. In addition, obesity and diabetes were found to be independent risk factors for HTN in this study, which is supported by previously published studies [30-32].Results of this study, a baseline understanding of HTN prevalence in the region could be established for Hirat, while further studies and public health programs can be established to compare rates in other geographic settings and evaluate interventions. Screening individuals over the age of 40 is recommended based on findings

of this study for urban settings of Afghanistan. Furthermore, prevention strategies should focus on risk factors for metabolic syndrome, such as obesity and diabetes. Due to the government's focus on communicable diseases, lesser emphasis is given to non-communicable disease such as hypertension [33]. However lately it has come to focus of government [34]. Change in lifestyle at individual level supported by formal health programs could result in reduction of diseases in future. Screening at primary level could control hypertension and reduce risk because afflicted feel no discomfort until medical crisis such as heart attack, the rupture of a blood vessel in the brain or a stroke - strikes. As a consequence, high blood pressure is often called the silent killer [35] and require regular checking.

V.   ACKNOWLEDGEMENTS

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Table 1: Frequency distribution of demographic characteristics of the study participants (N=1129)							
Variables	**Categories**	**Female**		**Male**		**Total**	
		N	**%**	**N**	**%**	**N**	**%**
Age							
	25-34	227	38.2	172	32.1	399	35.3
	35-44	164	27.6	124	23.2	288	25.5
	45-54	120	20.2	100	18.7	220	19.5
	55+	83	14	139	26	222	19.7
Level of Education							
	Illiterate	394	66.7	213	40	607	54
	Primary and unofficial	154	26.1	226	42.4	380	33.8
	Secondary school	28	4.7	45	8.4	73	6.5

	High school and over	15	2.5	49	9.2	64	5.7
Work Status							
	Official Employees	32	5.7	68	16.5	100	10.2
	Private Business	2	0.4	87	21.1	89	9.1
	Worker/Farmer	5	0.9	179	43.3	184	18.8
	Jobless	11	1.9	40	9.7	51	5.2
	Housework	460	81.4	1	0.2	461	47.1
	Unable to work	55	9.7	38	9.2	93	9.5
Monthly Income in AFN							
	Less than 10000	250	81.4	204	84.3	454	82.7
	More than 10000	57	18.6	38	15.7	95	17.3
Marital Status							
	Single	16	2.7	37	7	53	4.7
	Married	486	82.1	478	90	964	85.8
	Widow/Widower	77	13	6	1.1	83	7.4
	Divorced	0	0	1	0.2	1	0,1
	Refused	13	2.2	9	1.7	22	2

Table 2: Frequency distribution of behavioral risk factors for noncommunicable diseases among the study participants (N=1129)							
Variables	**Categories**	**Female**		**Male**		**Total**	
		N	**%**	**N**	**%**	**N**	**%**
Cigarette Smoking Status							
	No	559	95.2	496	93.4	1055	94.4
	Yes	28	4.8	35	6.6	63	5.6
Duration of smoking in years (not equal to above due to non-response or ex smoking)							
	< 10 years	21	56.8	32	44.4	53	48.6
	10 - 20 years	9	24.3	28	38.9	37	33.9
	≥ 20 years	7	18.9	12	16.7	19	17.4
Mouth Snuff Status							
	No	566	97.3	428	80.5	994	89.2
	Yes	16	2.7	104	19.5	120	10.8
Fruit serving (days per week)							
	< 3	430	79.6	440	86.6	870	83
	≥ 3	110	20.4	68	13.4	178	17
Vegetables serving (days per week)							
	< 3	354	63.9	408	79.5	762	71.4
	≥ 3	200	36.1	105	20.5	305	28.6
Type of Kitchen Oil							
	Liquid	265	45.1	238	45.2	503	45.2
	Solid	207	35.3	173	32.8	380	34.1
	Both	113	19.3	108	20.5	221	19.8
	Refused	2	0.3	8	1.5	10	0.9
Vigorous Physical Activity							

No	547	92.7	457	86.2	1004	89.6
Yes	43	7.3	73	13.8	116	10.4
Moderate Physical Activity						
No	451	76.4	426	80.7	877	78.4
Yes	139	23.6	102	19.3	241	21.6
Pedal or bicycle for 10 Minutes per day						
No	511	86.9	254	47.8	765	68.4
Yes	77	13.1	277	52.2	354	31.6
Reclining/siting (hours per day)						
< 3	174	32.3	235	45.8	409	38.9
≥ 3	364	67.7	278	54.2	642	61.1

1,2 One serving is amount of fruits or vegetables taken once, 3 Physical activity in ten minutes caused high heart beats or respiration, 4 Physical activity in ten minutes caused moderate heart beats or respiration

Table 3: Bivariate analysis of bio demographic and socio-economic factors and hypertension among study participants in Hirat city, Afghanistan

Variables	Categories	Normotensive	Hypertensive	Odds Ratio	CI 95% LL	CI 95% UL
Age in years						
	25 - 34	321 (80.5)	78 (19.5)	1	Reference	
	35 - 44	199 (69.1)	89 (30.9)	1.841	1.295	2.616
	45 - 54	122 (55.5)	98 (44.5)	3.306	2.299	4.753
	55 and over	85 (38.3)	137 (61.7)	6.633	4.597	9.571
Sex						
	Female	381 (64.1)	213 (35.9)	1	Reference	
	Male	346 (64.7)	189 (35.3)	0.977	0.766	1.247
Level of education						
	Illiterate	361 (59.5)	246 (40.5)	1.63	1.27	2.1
	Literate	365 (70.6)	152 (29.4)	1	Reference	
Monthly income (Afghanis)						
	≤ 150USD	304 (67)	150 (33)	1	Reference	
	≥ 150USD	53 (55.8)	42 (44.2)	1.606	1.024	2.518
Snuff Use						
	No	652 (65.6)	342 (34.4)	1	Reference	
	Yes	66 (55)	54 (45)	1.56	1.064	2.287
Smoking						
	No	679 (64.4)	376 (35.6)	1	Reference	
	Yes	43 (68.3)	20 (31.7)	0.84	0.487	1.449
Fruits serving days per week						
	< 3 days	573 (65.9)	297 (34.1)			
	≥ 3 days	109 (61.2)	69 (38.8)	1.221	0.876	1.703
Vegetables serving days per week						
	< 3 days	507 (66.5)	255 (33.5)	1	Reference	
	≥ 3 days	187 (61.3)	118 (38.7)	1.255	0.953	1.652
Strong Physical Activity						

	No	651 (64.8)	353 (35.2)	1	Reference	
	Yes	70 (60.3)	46 (39.7)	1.212	0.817	1.797
Moderate Physical Activity						
	No	570 (65)	307 (35)	1	Reference	
	Yes	149 (61.8)	399 (35.7)	1.146	0.854	1.539
Sedentary lifestyle in hours daily						
	< 3 hours	264 (54.5)	145 (35.5)	1	Reference	
	≥ 3 hours	420 (65.4)	222 (34.6)	0.962	0.742	1.248

Table 4: Bivariate analysis of pathophysiologic factors and hypertension among study participants in Hirat city Afghanistan

Variables	Categories	Normotensive	Hypertensive	OR	CI 95% LL	CI 95% UL
Basic Mass index						
	Underweight	49 (81.7)	11 (18.3)	1	Reference	
	Normal weight	376 (70.9)	154 (29.1)	1.824	0.924	3.602
	Overweight	220 (61.5)	138 (38.5)	2.794	1.405	5.558
	Obese	79 (44.6)	98 (55.4)	5.526	2.695	11.329
Table Salt						
	No	533 (62.4)	321 (37.6)	1	Reference	
	Yes	169 (70.7)	239 (29.3)	0.688	0.504	0.939
Central Obesity (pregnant excluded)						
	No	407 (73.5)	147 (26.5)	1	Reference	
	Yes	320 (55.7)	255 (44.3)	2.206	1.718	2.834
Diabetes Mellitus						
	No diabetic	687 (67.6)	330 (32.4)	1	Reference	
	Diabetic	40 (35.7)	72 (64.3)	3.747	2.491	5.636
Total Cholesterol						
	<190 mg/dL	524 (64.9)	524 (35.1)	1	Reference	
	≥ 190 mg/dL	203 (63.2)	118 (36.8)	1.073	0.82	1.403
Low Density Lipoprotein (LDL)						
	<100 mg/dL	385 (64.6)	211 (35.4)	1	Reference	
	≥100 mg/dL	342 (64.2)	191 (35.8)	1.019	0.798	1.301
High Density Lipoprotein (HDL) borderline 40 mg/dL for male and 50mg/dL for female						
	<40 and 50	385 (64.4)	213 (35.6)	1	Reference	
	≥40 and 50	342 (64.4)	189 (35.6)	0.999	0.783	1.275
Triglycerides						
	<150 mg/dL	413 (66.5)	208 (33.5)	1	Reference	
	≥150 mg/dL	314 (61.8)	194 (38.2)	1.227	0.961	1.567

Table 5: Multivariable analysis of risk factors and hypertension among study participants in Hirat city Afghanistan

Variables	Categories	Adjusted Odds Ratio	CI 95% LL	CI 95% UL	P Value

Age					
	< 40 years	1	Reference		
	> 40 years	3.055	2.343	3.982	PV< 001
Obesity General					
	No	1	Reference		
	Yes	1.965	1.362	2.834	PV< 001
General Obesity					
	No	1	Reference		
	Yes	1.767	1.333	2.342	PV< 001
Diabetes Mellitus					
	No	1	Reference		
	Yes	0.359	0.233	0.555	PV< 001