International Journal of Pharmaceutical Science Invention
ISSN (Online): 2319 – 6718, ISSN (Print): 2319 – 670X
www.ijpsi.org Volume 6 Issue 1 ǁ January 2017 ǁ PP. 01-05

Epidemiology of Hypertension among Adults in Al-Azhary Area in Khartoum-State Sudan: Community Based Study

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Abstract: *Hypertension (HT) is one of the most important risk factors in cardiovascular disease which causes early death in adults. Hypertension is a common disease associated with high mortality and morbidity. Hypertension a silent killer as it is symptomless and remains undiagnosed, and not controlled if diagnosed. This is a descriptive cross - sectional community based study was conducted in Al-Azhary area in Khartoum State-Sudan, with aim to estimate the prevalence of hypertension and to identify the possible risk factors associated with hypertension among adults. Data were collected from 303 participants (53.5% females and 46.5% males) using structured pretested questionnaire and blood pressure. The prevalence of hypertension was 19.1% (95% CI 0.61-1.93).There was no significant sex difference in the prevalence rate OR 1.09 (95% CI 0.61-1.93, P = 0.767). The results showed there was strong association between age group and hypertension (P = 0.0001), also there was statistical association between marital status, family history and hypertension positivity P.values =(0.0001 and 0.027) respectively. There was a significantly higher prevalence of hypertension among participants with diabetes, Vascular diseases and kidneys problems OR= (5.44(95% CI 1.89- 15.69, P = 0.017), 4.4(95% CI 0.86 - 2.39, P = 0.074) and 3.56 (95% CI 0.92-13.68, P = 0.05) respectively. Conclusion: one out of every five respondents of the study had hypertensive (19.1%). Age group, marital status, family history, history of (diabetes, vascular diseases and kidneys problems)were statistically significant predictors of hypertension positivity.*

Keywords: *Hypertension, prevalence, risk factors, adults, Khartoum, Sudan*

I. Introduction

Hypertension is one of the major non-communicable diseases (NCDs) in the world, which significantly contributes to the burden of cardiovascular diseases (CVDs), stroke, kidney failure, disability and premature death [1].Overall, 26.4 % of the world's adult population in 2000 had HTN and it is expected that by the year 2025, approximately 1 in 3 adults aged over 20 years will have the disease [2,3]. Hypertension is estimated to contribute to 9.4 million deaths each year worldwide. Compared with the year 2000, the number of adults with hypertension is predicted to increase by 60% to a total of 1.56 billion by the year 2025 [4,9]. Approximately 80% of deaths in low-middle income countries were due to commonest complication of HTN which is cardiovascular disease [10]. Hypertension emerges from a complex interplay of genetic, environmental and behavioral factors [5]. Globally, the overall prevalence of raised blood pressure in adults aged 18 and over was around 22% in 2014[6]. Hypertension, once rare in traditional African societies, has become a major public health problem because of high prevalence rates contrasting with low awareness, treatment and control rates [7]. In African adults the prevalence of hypertension has risen to rates similar to and sometimes exceeding that in many high income countries [8].

Prevalence of Hypertension different from country to other, previous findings showed the prevalence of hypertension was 11.8 % among population In Jazan Saudi Arabia [11]. 62.8% among adults in Abak Township Nigeria [12]. 26.4 %among the adults in Bangladesh [1]. In India the prevalence varies from 7.1% in South to 18.9% in North [13, 9]. 24.2% among adult population in Afyonkarahisar region in Turkey [14]. The prevalence was fond 25.1% among adults population in Bahir Dar city Ethiop [17]. 32% among adult population in Botswana [18]. 15% among young adults in Uganda [19] and 29.7% among population in Cameroon [20].

Hypertension in Sudan:

Sudan as other African countries which the prevalence of hypertension in increasing rates. Several studies were conducted among different groups of population. A study was conducted in four state shows the prevalence of hypertension was 15.8% among rural population [5]. Other study was carried out among population in Khartoum was show the prevalence was 18.2% [15]. The aim of this study was to estimate the prevalence of hypertension and to identify the possible risk factors associated with hypertension among adults.

II. Material and methods

Study design: A descriptive cross sectional; community based study was conducted in Al-Azhary area-Khartoum Locality- Khartoum State – Sudan

Methods of data collection:

A sample size of 303 participants were calculated using the formula, $n = N/1+N(e)^2$.Where n is the sample size, N is the population size, and e is the level of precision at Confidence Level is 95% [16].

Data were collected using the following tools:

Interviewing-questionnaire: pretested structured questionnaire used to collect socio-demographic variables such as(sex. age group, marital status, education level, occupation and family income), other variables such as physical activity, smoking, stress and history of chronic diseases such as (diabetes, renal problems, CHD and endocrine diseases).

Blood pressure measurement: was measured from the adults' right arms after the adults had been seated for 5 min. The cuff off was placed on the right arm at the level of heart. On the day of measurement three readings at intervals of 5 min and the mean of the 3 BP measurements was calculated.

BP was measured 3 times; it was obtained by mercurial sphygmomanometer. A student was considered hypertensive if he/she had been previously diagnosed and/or on treatment or if the systolic blood pressure was ≥ 140 mm of mercury or diastolic blood pressure was ≥ 90 mm of mercury at the time of measurement (JNC-VII criteria) [17].

Data analysis: Data was processed using the Statistical Package for Social Sciences (SPSS) for WINDOW version 19. For the analysis, binomial test (Z-test) for single proportion and some non-parametric tests such as Chi-Square test was used, P. value of < 0.05 was considered statistically significant. Informed consent from the selected health care workers (HCWs) obtained.

III. Results

Three hundred and three (303) participants were enrolled in this study, 46.5% (141/303) of them were males while 53.5% (162/303) were females, 49.8% of participant in age group 15-30 while 9.3 (28/303) of them above 60 years old. 58.7% of participant were married while 41.3% unmarried. Regarding educational level 37.9% were graduate while 9.3% of them illiterate. Most of participants were poor regarding monthly income 62.7% (Table1).

Table 2 show the prevalence of hypertension among adults was 19.1% (58/303). The results show there is no different according to sex OR 1.09 (95% CI 0.61-1.93, P = 0.0767). Table 3 shows the relationship between age group, family income and educational level. The results showed there was strongly association between age group and hypertension P = 0.0001 at X^2 31.136. Table 4demonstrate the relationship between sex, marital status, smoking, family history, physical activity and stimulants and hypertension among adults. The findings show there was significant differences a cording to marital status, the prevalence rate in married (13.5%) versus unmarried (5.9%) OR 3.83 (95% CI 2.08 - 7.06, P = 0.0001), also there was statistical association between family history and positivity of hypertension OR 2.12(95% CI 1.08 - 4.13, P = 0.027). The results show there was no statistical association between positivity of hypertension and sex, smoking, physical activity and stimulants (P > 0.05).

Table 5 shows the relationship between hypertension and chronic diseases among adults. The results show the participants have diabetes status (history of diabetes) was positively associated with hypertensive OR 5.44(95% CI 1.89- 15.69, P = 0.017), also there was significant between participants have kidneys problems and hypertensive 3.56 (95% CI 0.92-13.68, P = 0.05). The results show there was a trend towards increased prevalence of hypertension among participants with Vascular disease which was not significant OR 4.4(95% CI 0.86 - 2.39, P = 0.074).

Table (1): Characteristics of study group – Al-Azhary area Khartoum State - Sudan (n=303)

Variable	Frequency	%
Gender		
Male	141	46.5
Females	162	53.5
Age group		
15-30	151	49.8
31-45	80	26.4
46-60	44	14.5
>60	28	9.3
Marital status		
Married	178	58.7
Unmarried	125	41.3
Education level		
Illiterate	28	9.3
Basic	62	20.5

Secondary	98	32.3
Graduate	115	37.9
Monthly income		
Poor	187	62.7
Average	52	17.2
High	64	21.1

Table (2) Prevalence of Hypertension by sex according to the blood pressure measurement

Gender	Blood pressure				Total		Odds	confidence interval (CI)	P. value
	Normal		Hypertensive						
	No	%	No	%	No	%			
Male	113	37.3	28	9.2	141	46.5	1.09	0.61 - 1.93	0.767
Females	132	43.6	30	9.9	162	53.5			
Total	245	80.9	58	19.1	303	100			

Table (3) Relationship between age group, family income and educational level and hypertension among adults

Variable	Blood pressure		Total	Chi- square	P. Value
	Normal	Hypertensive			
	No (%)	No (%)	No (%)		
Age group					
18-30	135(44.6)	16(5.3)	151(49.8)	31.136	0.0001*
31-45	67(22.1)	13(4.3)	80(26.4)		
46 – 60	29(9.6)	15(5.0)	44(14.5)		
>60	14(4.6)	14(4.6)	28(9.3)		
Family income/moth					
Poor	105(34.7)	21(6.9)	126(41.6)	0.876	0.648
Average	89(29.4)	24(7.9)	113(37.3)		
High	51(16.8)	13(4.3)	64(21.1)		
Educational level					
Illiterate	6 (2.0)	4(1.3)	10 (3.3)	9.319	0.173
Basic	54(17.8)	8(2.6)	62(20.5)		
Secondary	85(28.1)	13(4.3)	98(32.3)		
Graduate	100(33.0)	33(10.9)	133(43.9)		

**P-value considered significant at less than 0.05 levels*

Table (4) Relationship between sex, marital status, smoking, family history, physical activity and stimulants and hypertension among adults

Variable	Blood pressure		Total	Odds (Confidence interval) (CI)	P. Value
	Normal	Hypertensive			
	No (%)	No (%)	No (%)		
Sex					
Male	113(37.5)	28(9.2)	141(46.5)	1.09(0.61-1.93)	0.767
Female	132(43.6)	30(9.9)	162(53.5)		
Marital Status					
Married	91(30.0)	41(13.5)	132(43.7)	3.83 (2.08 - 7.06)	0.0001*
Unmarried	153(50.5)	18(5.9)	171(56.4)		
Smoking					
Yes	29(9.9)	6(2.0)	36(11.9)	0.86 (0.34 - 2.18)	0.749
No	216(71.0)	52(17.1)	268(88.1)		
Family history					
Yes	152(50.1)	45(14.9)	197(65)	2.12(1.08 - 4.13)	0.027*
No	93(30.7)	13(4.3)	106(35)		
Physical activity					
Yes	167(55.1)	35(11.6)	202(66.7)	0.62 (0.34-1.13)	0.116
No	68(25.7)	23(7.6)	101(33.3)		
Stimulants					
Yes	226(74.6)	54(17.8)	280(92.4)	1.13(0.37-3.47	0.824
No	19(6.3)	4(1.3)	23(7.6)		

**P-value considered significant at less than 0.05 levels*

Table (5) Relationship between hypertension and chronic diseases among adults

Variable	Blood pressure		Total	Odds (Confidence interval) (CI)	P. Value
	Normal	Hypertensive			
	No (%)	No (%)	No (%)		
Diabetes					
Yes	7(2.3)	8(2.6)	15(5)	5.44(1.89- 15.69)	0.0017*
No	238(78.5)	50(16.5)	288(95)		
Kidneys problem					
Yes	5(1.7)	4(1.3)	9(3.0)	3.56 (0.92-13.68)	0.05*

No	240(79.2)	54(17.8)	294(97)		
Vascular disease					
Yes	3(1.0)	3(1.0)	6(2.0)	4.4(0.86 - 2.39)	0.074
No	242(79.9)	55(18.1)	297(98)		
Colon disease					
Yes	9(3.0)	2(0.6)	11(3.6)	0.94(0.2 - 4.46)	0.934
No	236(80.5)	56(19.1)	296(96.4)		

**P-value considered significant at less than 0.05 levels*

IV. Discussion

Hypertension (HT) is one of the most important risk factors in cardiovascular disease which causes early death in adults [21]. Our study found that, the prevalence of hypertension among adults was 19.1% (95% CI 0.61-1.93) using ≥140 mmHg SBP and/or ≥ 90 mmHg DBP as cut-off point. Our finding similar with that founding among population in Khartoum 18.2% [15]. Also similar with that reported among adults in North India 18.9% [9]. Our finding was lower than that found adults; 62.8% in Nigeria [12]. 26.4 % in Bangladesh [1]. 24.2% in Turkey [14] and 25.1% Ethiop [17]. Our finding was higher than that found among rural population in Sudan 15.8% [5]. 15% among young adults in Uganda [19] and11.8 % a mong population In Jazan Saudi Arabia [11]. On sex distribution, the results show there is no different according to sex OR 1.09 (95% CI 0.61-1.93, P = 0.0767). Our finding disagrees with that recorded in Nigeria, significant sex differences was established in blood pressure distribution [22]. Also different with that found in India, the prevalence of hypertension was higher among males than females [9].

Regarding to the age group the study showed the positivity of hypertension increase with age, the prevalence reach 100% among those above 60 year and 51.7% among those in age group (46-60). The results showed there was statistical association between age group and hypertension *(P=0.0001)*. This is in line with others studies where the risks of hypertension increase with age [17, 20, 23]. The findings show the odds of developing hypertension among married was more than three - times as likely compared to unmarried OR 3.83 (95% CI 2.08-7.06). The results show there was significant association *(P= 0.0001)*. In our study, family history of hypertension was shown as one of the important risk factors for positivity of hypertension. The results statistical association with hypertension OR 2.12(95% CI 1.08 - 4.13, P = 0.027). this results consistent with other studies. A study conducted among adults in Turkey show a significant association between hypertension and positive family history has been observed [14].

Our findings revealed that, there was no association between smoking, physical activity and hypertension among students (P > 0.05). This result disagree with than found among adults in Kenya, physical activity is risk factor associated with hypertension [8]. Also different with that recorded among adults in India; tobacco use was association with hypertension [6].

The study revealed that diabetes, kidneys problems and vascular diseases were other predictors of hypertension. The results show respondents with diabetes were five-and four times more likely to have hypertension compared to those who have no history of diabetes OR 5.44(95% CI 1.89- 15.69, P = 0.017). This finding in line with that found; in Sudan among rural population diabetes and hypertension are closely interrelated [5]. Our finding similar with other studies. A study was conducted among adults in Turkey which indicated the MD consider as risk factor for development of hypertension [14]. Other study was carried out in Ethiopia showed revealed that self-reported diabetes was significant predictor of hypertension [17]. In relation to kidneys problem and hypertensive our finding found that kidneys problem is risk for hypertension 3.56 (95% CI 0.92-13.68, P = 0.05).

Regarding to vascular diseases our results show the participant have vascular diseases were almost four-and four times more likely to hypertensive than those who have not vascular diseases 4.4(95% CI 0.86 - 2.39). Our results agree with that reported among adults in Turkey [14].

V. Conclusion

The study showed one out of every five respondents of the study had hypertensive (19.1%). Age groups, marital status, family history, history of (diabetes, vascular diseases and kidneys problems) were statistically significant predictors of hypertension positivity.

Acknowledgment

We are grateful to the study participants in Al-Azhary area for the willingness for the participant in this study. We would like to thank everyone who help us in the study.

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