

Prevalence of Hypertension among Secondary School Students in Umbada Area ‘Block 14’ in Khartoum State-Sudan

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Abstract: Hypertension is a common disease associated with high mortality and morbidity. The disease is a silent threat to the health of people. All over the world. It is the leading and most important modifiable risk factor for coronary heart disease, congestive heart failure, stroke, renal diseases and retinopathy. This is a descriptive cross-sectional school based study was conducted in Umbada area in Khartoum State-Sudan, with an objectives to estimate the prevalence of hypertension and to identify the possible risk factors associated with hypertension among secondary school students. Data were collected from 200 participants (93 males and 107 females) using structured questionnaire and blood pressure and anthropometric measurements of weight and high. The prevalence of hypertension was 11%. The results showed the hypertension more prevalent among students aged >18 years compared to those < 18 years old ($P=0.0001$). The results showed there was statistical association between hypertension smoking and physical inactivity p .values = (0.0001 and 0.040) respectively. hypertension was found more prevalent among those infected with diabetes, renal problems, coronary artery disease and endocrine diseases P .value = 0.0001.

Keywords: Hypertension, prevalence, risk factors, secondary students, Khartoum, Sudan

I. Introduction

Hypertension (HTN) is most likely the most common disease on Earth. 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 [1,2]. Hypertension emerges from a complex interplay of genetic, environmental and behavioral factors. Owing to the hereditary component of hypertension, the disorder is considered to have its origin in the childhood. Children and adolescents with high Blood Pressure (BP) tend to maintain those levels of BP in adulthood [3]. The mortality due to hypertension (HTN) was accounted to 20%–50% of all deaths and the projected number of adults who will have hypertension by 2025 is 1.56 billion [4].

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 [5]. The high prevalence of hypertension in Africa is due to both urbanization and a shift towards western habits such as smoking, unhealthy diets with excess salt and fat intake, physical inactivity and consequential increased adiposity [5,6]. The prevalence of hypertension is highest in the African Region at 46% of adults aged 25 and above, and approximately 80% of deaths in low-middle income countries were due to commonest complication of HTN which is cardiovascular disease [7].

Prevalence of Hypertension different from country to other, previous finding show the prevalence of hypertension was 4.4% among high school students in Turkey [10]. 7.1% among young adults in South India [8], 18% in Slovakia among university students [9]. 11.8% in West Bengal among undergraduate students [11]. In Jazan Saudi Arabia was found 11.8 % among population [14]. In Nigeria among students was 15.7% [15]. Hypertension in Sudan:

Several studies have indicated that, the prevalence of hypertension in Sudan with increasing rates. A study was carried out in four state shows the prevalence of hypertension was 15.8% among rural population [4]. Other study revealed the prevalence among population in Khartoum was 18.2% [12]. A study conducted among school children in Khartoum state found hypertension was 4.9% [13]. The aim of this study was to estimate the prevalence of hypertension and to identify the possible risk factors associated with hypertension among secondary school students.

II. Materials and methods

Study design: This is a descriptive cross sectional; school bases study was carried out in Umbada area – Block 14, Umbada Locality- Khartoum State

Study area: The study area it located in Umbada Locality in Khartoum state -Sudan. It is urban area locate between Kordofan State from West, Omdurman locality from East and South and Northern State from

North direction. It composed from four Administrative Units, Souq Libya, Souq Abuzayed, Souq Almashiya Alsalam and Al-Reef Algarbi Units.

II. Methods Of Data Collection

A sample size of 200 was calculated using the formula, $n = N/1+N(e)^2$ [16]. Where n is the sample size, N is the population size, and e is the level of precision at Confidence Level is 95%. Sample size came to 180. Assuming 10% non-response. From 200 participant data were collected using the following tools:

Interviewing-questionnaire: pretested structured questionnaire used to collect socio-demographic data (sex, age group, family income, and parents' education), physical activity, smoking and history of chronic diseases such as (diabetes, renal problems, CHD and endocrine diseases).

Measurements

Blood pressure: was measured from the students' right arms after the students had been seated for 5 min. The cuff 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].

Anthropometric measurement:

Weight and height, measurements were taken. Heights of the subjects were measured with an inelastic measure tape, with the subject standing on bare feet. For weight measurements, the subjects were required to stand on electronic scale with bare feet as well. Measurements were conducted by physicians, trained nurses or health assistants and all instruments were calibrated daily.

Body Mass Index: was calculated as $BMI = \text{Weight (Kg)} / [\text{Height (m)}]^2$. According to the WHO classification of BMI. Less than 18.5 consider underweight, 18.5 – 24.9 normal weight, 25 – 29.9 overweight and ≥ 30 obese. The consent was obtained from each participant in this study and he/she was informed about the purpose of the study at first

Data analysis: The collected data were reviewed, coded and analyzed using the Statistical Package of Social Sciences (SPSS) software version (20). Chi-square tests were applied to study the relationship between different variables and hypertension. P value less than 0.05 considered significant.

III. Results

Two hundred (200) participants were enrolled in this study, 46.5% (93/200) of them were males while 53.5% (107/200) were females (figure1). 70.5% of participants their ages less than 18 years while 29.5% (59/200) of them more than 18 years old (FigureII). Table 1 show the prevalence of hypertension among students was 11%. The results show there is no different according to sex ($P > 0.5$). Table 2 show the relationship between age group, family income, smoking and physical activity and hypertension. The results showed there was strongly association between age group, smoking and hypertension ($p=0.0001$). Also there was relationship between hypertension and physical activity ($p=0.040$), and there is no statistical association between family income and hypertension ($P > 0.5$).

Table 3 illustrates the prevalence of hypertension among students in relation with infected by some chronic diseases. The data shows among diabetic students 40% have hypertension. 46.7% among those have renal problems infected with hypertension, among students with coronary artery disease 25% of them have hypertension while among those have Endocrine diseases 20% of them infected with hypertension. The results show there was statistical association between hypertension and diabetes, renal problems, Arteriosclerosis and endocrine diseases ($p=0.0001$).

Figure (I): Distribution of students according to sex

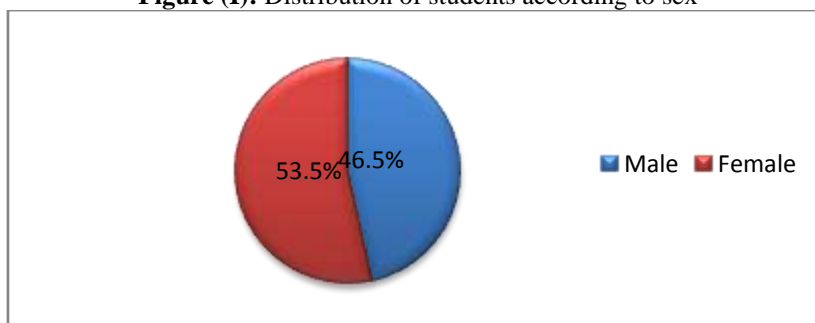


Figure (II): Distribution of students according to age groups by years

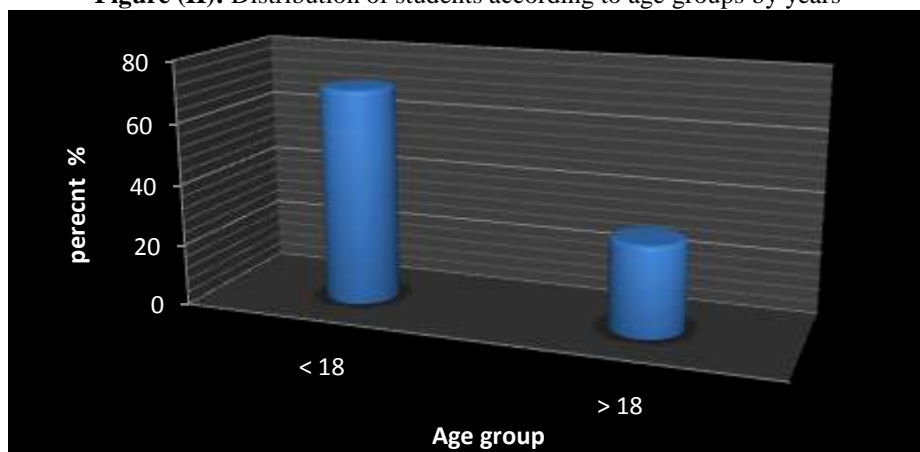


Table (1) Prevalence of Hypertension by sex according to the blood pressure measurement

Gender	Blood pressure				Total		Chi - Square	P. value
	Normal		Hypertensive		No	%		
	No	%	No	%				
Male	80	86	13	14	93	46.5	1.575	0.209
Females	98	91.6	9	8.4	107	53.5		
Total	178	89	22	11	200	100		

Table (2) Relationship between age group, family income, smoking and physical activity and hypertension among students

Variable	Blood pressure				Total		Chi - Square	P. value
	Normal		Hypertensive		No	%		
	No	%	No	%				
Age group							13.850	0.0001
< 18	133	94.3	8	5.7	141	70.5		
>18	45	76.3	14	23.7	59	29.5		
Family income/moth							1.337	0.720
Poor	75	88.2	10	11.8	85	42.5		
Average	84	88.4	11	11.6	95	47.5		
High	19	95	1	5	20	10		
Smoking							37.168	0.0001
Yes	9	47.4	10	52.6	19	9.5		
No	169	93.4	12	6.6	181	90.5		
Physical activity							4.210	0.040
Yes	152	91	15	9	167	83.5		
No	26	78.8	7	21.2	33	16.5		

Table (3) Relationship between hypertension and chronic diseases among students

Variable	Blood pressure				Total	
	Normal		Hypertensive		No	%
	No	%	No	%		
Diabetes						
Yes	3	60	2	40	5	2.5
No	175	79.4	20	20.6	195	97.5
Renal problems						
Yes	8	53.3	7	46.7	15	7.5
No	170	91.9	15	8.1	185	92.5
Coronary artery disease						
Yes	6	75	2	25	8	4
No	172	89.6	20	10.4	192	96
Endocrine diseases						
Yes	4	80	1	20	5	2.5
No	174	89.2	21	10.8	195	97.5

$X^2 = 29.453$

$P .value = 0.0001$

IV. Discussion

Hypertension, defined as a systolic blood pressure equal to or above 140 mm Hg and diastolic blood pressure equal to or above 90 mm Hg, it causes 9.4 million deaths due to its complications worldwide [7].

In this study, the findings indicate that, the prevalence of hypertension among secondary students was 11%. Our findings similar with that recorded in Jazan Saudi Arabia and West Bengal which was found 11.8 % [11,14]. Our findings were lower than that found in Sudan among rural population and population in Khartoum 15.8 and 18.5% respectively [4, 12]. In Slovakia among university students 18% [9]. In Nigeria among students was 15.7% [15]. Our finding was higher than that found in Khartoum State among school children 4.9% [13]. In Turkey among high school students 4.4% [10]. In South India among young adults 7.1% [8].

The results showed the prevalence of hypertension among males and females was not statistically differences ($P>0.05$). our findings similar with that recorded in Nigeria among students hypertension was not significantly associated with male sex [15]. this result disagree with that found among rural population in Sudan [4].

The study showed, higher frequencies of hypertension among students aged more than 18 years 23.7 % compare to 5.7% among those aged less than 18 years. The results showed there was statistical significant ($P= 0.0001$). this results agree with mentioned among high school students in Turkey[10].

Our findings revealed that, there was strong association between smoking and hypertension among secondary students ($P= 0.0001$). this finding in line with that mentioned among university students in Slovakia, cigarette smoking which may be the main cause of a high prevalence of hypertension [9].

Regarding to physical activity, our results showed there was statistical relationship between hypertension and physical inactivity ($p=0.040$), this results agree with that mentioned among university students in Slovakia, significant association was analyzed in hypertension and physical inactivity ($p < 0.001$) [9]. Also agree with that found among adolescents in Kancheepuram district in India, there was association between hypertension and inactivity [3].

In this study diabetes, renal problems, coronary artery disease and endocrine diseases as predictors of hypertension, Analysis showed there was statically significant with hypertension ($P=0.001$). this findings in line with that found; in Sudan among rural population diabetes and hypertension are closely interrelated [4]. Also agree with that mentioned by Lago, he said diabetes is a strong factor associated with coronary artery disease and potentiates the risk of vascular and renal complications if co-exist with hypertension [18].

V. Conclusion

The study showed, the prevalence of hypertension among secondary students was 11%. Age group more than 18 years, smoking and physical inactivity consider risk factors for hypertension. Also diabetes, renal problems, coronary artery disease and endocrine diseases as predictors of hypertension among students.

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