

The Growing Burden of School Adolescent Hypertension in North Kordofan, Sudan, A Call for School-Based Interventions

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Dear Editor,

I am writing to highlight the issue of School Adolescent Hypertension in North Kordofan, Sudan, which call for School-Based Interventions. Hypertension has long been recognized as a major public health alarm. The occurrence of elevated blood pressure (BP) and Hypertension in children and adolescents has risen over the past decade. According to the latest WHO 2020 data, Hypertension is the third health problem in Sudan, accounting to 3.34% deaths of total (7,287 fatalities). This silent killer often goes undetected due to its lack of symptoms, particularly in low- and middle-income countries where its occurrence is increasing. The trend is closely linked to rising obesity rates, as childhood overweight and obesity are strongly associated with elevated BP and comorbidities. BP levels in childhood weakly correlate with those in adulthood, but childhood obesity shows a stronger link to adult obesity and hypertension[1] [2][3].

Globally, hypertension cases are projected to reach 1.5 billion by 2025, with Sub-Saharan Africa expected to see over 125.5 million cases reported. Africa faces a disproportionately high burden due to rapid urbanization, population growth, and aging. Concurrently, obesity has reached epidemic levels, exacerbating hypertension risks. This study aimed to assess hypertension prevalence and its risk factors among 600 healthy school adolescents (13–18 years) in El Obeid City, North Kordofan, Sudan, from July to December 2021. Using cluster sampling, data on demographics, socioeconomic status, anthropometrics, and blood pressure (per American Pediatric Association guidelines) were collected. Hypertension was defined as systolic BP ≥ 140 mmHg or diastolic BP ≥ 90 mmHg[4]. On the other hand, obesity also has reached epidemic levels in recent years and remains a global public health problem. Due to this reason, this study aimed to determine the prevalence of Hypertension and to identify its contributing factors, which would establish an effective prevention program starting from healthy school adolescence in El Obeid city, North Kordofan, Sudan. Body mass index (BMI) was calculated (kg/m^2) and categorized via CDC percentile charts[5]. Socioeconomic status was classified using the Oyedeleji Syste[6]. Ethical approval was obtained from relevant Sudanese health authorities, with informed consent from participants.

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The response rate was 243(40.5%) males and 357 (59.5%) females. We found approximately 393(65.5%) samples with high Socioeconomic status and 207(34.5%) with low socioeconomic status. Of 213 (35.5%) who reported with family with hypertension, 136(22.7%) had diabetes mellitus, 24(4.0%) had renal disease, and 38(6.3%) had a family history of Cardiac disease. The prevalence of BP using the American Academy of Pediatrics was 13 (2.2%) Stage 2 hypertension. The prevalence rates of males to females underweight were (11.1%, 5.3%), normal weight (74.9%, 77.9%), overweight (8.6%, 10.4%), and obesity (5.3%, 4.2%), respectively. Obesity rates for school adolescents in El Obeid city remain high among males. There were significant differences in hypertension between blood pressure, socioeconomic status, and BMI levels. Our study shows factors associated with hypertension were overweight (OR=10.78, P=0.001), obesity (OR=13.37, P<0.001), Family history of Hypertension (OR=1.290, P<0.001), family history of cardiac disease (OR=4.34, P=0.002), and age (OR=2.014, P=0.01) as presented in Table 1.

Table 1: Risk factors associated with hypertension using American guidelines among student in El Obeid, North Kordofan, and Sudan

Factors	S.E.	P value	Adjusted RR (95% CI)
Gender (M/F)	0.281	0.996	1.001 (0.578~1.736)
Socioeconomic level	0.287	0.438	1.250 (0.711~2.196)
BMI (Underweight)		0.000	
BMI (Normal weight)	0.684	0.183	2.490 (0.651~9.517)
BMI (Overweight)	0.744	0.001	10.780 (2.508~46.347)
BMI (Obese)	0.795	0.001	13.373 (22.816~63.501)
Family history of Hypertension	0.289	0.379	1.290 (0.732~2.272)
Family history, diabetes mellitus	0.467	0.001	0.205(0.082~0.512)
Family history of cardiac	0.477	0.002	4.343 (1.704~11.068)
Family history Renal	0.476	0.000	10.823 (4.257~27.539)
Age group (1)	0.273	0.010	2.014 (1.180~3.439)
Constant	0.745	0.000	0.026

Although the findings declare that a Family history of Hypertension or diabetes mellitus, Renal or cardiac are strongly associated with hypertension, in addition, we found a high rate of overweight and obesity, which need strong public health policies multispectral approach, especially Among healthy school adolescents in El Obeid city, North Kordofan, Sudan^[7] and available and affordable treatment options for reducing this growing burden of hypertension among healthy school adolescence students are required.

These findings underscore the critical need for systematic blood pressure monitoring and health mentorship programs for students to guide treatment selection, establish therapeutic goals, and evaluate intervention efficacy. While evidence regarding physical activity interventions remains pending, the clear association between elevated hypertension risk and adolescent obesity demands immediate policy action. Health authorities must implement comprehensive strategies to enhance health awareness, improve hypertension control, and optimize management protocols for school adolescents in El Obeid City, North Kordofan, Sudan^[7]

The high rates of overweight/obesity and familial risk factors underscore the need for multispectral public health policies, early screening, and affordable interventions. Schools should promote physical activity and health awareness to curb this epidemic.

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Author's Contributions Conceptualization:

SIM: Conceptualization, Writing –original draft; SIM: contributed in data collection, data analysis, and Writing review & editing; and YM: revising the final version for publication. Both authors read and approved the submitted version

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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