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Research Article

Hemodynamic Parameters in Medical Students with A History of Tachycardia and Blood Pressure Changes

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Abstract

HIV is still a major public health challenge and according to Global AIDS monitoring (2020), Nigeria ranked fourth in the world with regards to HIV burden. Nigeria has a generalized HIV epidemic with the highest HIV burden in West and Central African sub-region. The present study investigated whether social stigma, social isolation and adverse childhood experience will be associated with depression among adolescent living with HIV. Three hundred (300) females 129 and males 171 drawn from Bishop Shanahan Hospital and Faith Foundation Hospital both in Nsukka, Enugu state with the age range of 13-19 and a mean of 18.10 and (S.D=2.91) participated in the study. It was hypothesized that social stigma, social isolation and adverse childhood experience will significantly be associated with depression among adolescents living with HIV. The Kutcher Adolescent Depression Scale (KADS); Berger HIV Stigma Scale (BHIVSS); Social Isolation Scale (SIS); Childhood Trauma Questionnaire Short Form (CTQ-SF) were used to collect the data. Hierarchical multiple linear regressions were used to analyze the data collected. Result of a hierarchical multiple linear regressions shown that social stigma, social isolation and adverse childhood experience did not predict depression among adolescents living with HIV. Implications, limitations and suggestion for further studies should make use of a larger population size and cover various hospitals and ethnic groups.

Keywords: social stigma; social isolation; adverse childhood experience; depression; adolescents living with hiv/aids

Introduction

Traditionally, arterial hypertension (AH) was considered a disease of the elderly. However, modern epidemiological studies indicate a significant "rejuvenation" of the disease: recent data show a steady increase in the prevalence of high blood pressure (BP) among individuals of working age and young people. One of the most vulnerable groups in this context are university students, whose lifestyles are associated with high psychoemotional stress. Particularly alarming is the fact that AH in young people is often asymptomatic, which is why the disease remains undetected for a long period. Failure to adequately control blood pressure during this period lays the foundation for early target organ damage and the development of severe complications in the future. The importance of early detection of AH is confirmed by the results of large-scale longitudinal studies. It has been shown that the presence of even borderline hypertension or prehypertension at the age of 18-25 years is statistically significantly associated with an increased risk of developing cardiovascular events (heart attacks, strokes) and heart failure in adulthood. According to current international guidelines (ESH 2023), BP control in young people is a critical tool for reducing the global burden of cardiovascular mortality. The etiology of hypertension in modern students is multifactorial and closely linked to lifestyle and socioeconomic conditions. The aim of the work was to study the parameters of the cardiovascular system in third-year students of Grodno State Medical University (2025/2026 academic year) with a history of resting tachycardia and fluctuations (increases/decreases) in blood pressure.

Materials and Methods

The study involved 312 third-year students (232 females and 80 males) from Grodno State Medical University, Republic of Belarus, during the 2025-2026 academic year. All participants provided voluntary informed consent. A survey was conducted regarding the presence of episodes of tachycardia (resting heart rate >80 bpm and >100 bpm), as well as a history of increased or decreased BP. Response options were "Yes," "No," and "I don't know." Students who answered "I don't know" were excluded from the study. Pulse and BP were measured. BP was recorded according to WHO recommendations using a manual sphygmomanometer (the Korotkoff method). BP levels were categorized according to the 2025 European Society of Cardiology (ESC) recommendations: optimal BP:

<120/80 mmHg; normal BP: 120-129/80-84 mmHg; high-normal BP: 130-139/85-89 mmHg; high BP: ≥140/90 mmHg; low BP: <100/60 mmHg. Quantitative data are presented as median and interquartile range (25th-75th percentiles). The non-parametric Mann-Whitney U test was used for group comparisons. Qualitative features were presented as absolute values and relative frequencies (%). Categorical variables were compared using contingency tables and Pearson's chi-squared test. A p-value of less than 0.05 was considered statistically significant. Statistical data processing was performed using StatSoft STATISTICA 10.0.

The results and discussion

In young men who reported episodes of elevated BP at rest, systolic BP (SBP) values were significantly higher compared to those without such episodes: 140.0 (127.0; 145.0) mmHg and 120.0 (115.0; 130.0) mmHg, respectively (p < 0.001, Table 1). Conversely, young men with a history of low BP exhibited significantly lower SBP and diastolic BP (DBP) values: SBP was 120.0 (110.0; 120.0) vs. 128.0 (120.0; 140.0) mmHg (p = 0.007), and DBP was 70.0 (70.0; 80.0) vs. 80.0 (75.0; 85.0) mmHg (p = 0.002). Furthermore, young men with resting tachycardia (over 80 bpm) had a higher pulse compared to those without: 79.5 (75.0; 92.0) vs. 72.0 (66.0; 79.0) bpm (p = 0.001).

Parameter	Episodes of Elevated BP		p-value
	No (n=50)	Yes (n=17)	
SBP, mmHg	120.0 (115.0; 130.0)	140.0 (127.0; 145.0)	<0.001
	Episodes of Low BP		
	No (n=55)	Yes (n=13)	
SBP, mmHg	128.0 (120.0; 140.0)	120.0 (110.0; 120.0)	0.007
DBP, mmHg	80.0 (75.0; 85.0)	70.0 (70.0; 80.0)	0.002
	Episodes of Tachycardia (>80 bpm)		
	No (n=23)	Yes (n=18)	
Pulse, bpm	72.0 (66.0; 79.0)	79.5 (75.0; 92.0)	0.001

Table 1: Blood pressure and pulse in male students (GrSMU, 2025/2026) based on history of elevated blood pressure episodes and tachycardia, Me (25%; 75%)

In female students, those with a history of elevated BP also showed higher SBP values: 120.0 (110.0; 130.0) vs. 110.0 (105.0; 120.0) mmHg (p = 0.038, Table 2). Tachycardia in girls was also associated with significantly higher pulse values at the time of examination (p < 0.001).

Parameter	Episodes of Elevated BP		p-value
	No (n=155)	Yes (n=44)	
SBP, mmHg	110.0 (105.0; 120.0)	120.0 (110.0; 130.0)	0.038
	Episodes of Tachycardia (>80 bpm)		
	No (n=128)	Yes (n=85)	
Pulse, bpm	74.0 (68.0; 82.0)	83.0 (76.0; 88.0)	<0.001
	Episodes of Tachycardia (>100 bpm)		
	No (n=128)	Yes (n=85)	
Pulse, bpm	77.0 (70.0; 83.5)	88.0 (81.0; 94.5)	<0.001

Table 2: Blood pressure and pulse in male students (GrSMU, 2025/2026) based on history of elevated blood pressure episodes and tachycardia, Me (25%; 75%)

In young men with a history of elevated BP, the prevalence of the "High BP" category was significantly higher than in those without such episodes: 55.56% and 8.0%, respectively. Additionally, for students with a history of elevated BP, the combined frequency of "Optimal" and "Normal" BP categories was lower compared to students without these episodes: 22.2% and 66.0%, respectively (p < 0.001, Table 3).

Episodes of Elevated BP	n	Low BP	Optimal BP	Normal BP	High-normal BP	High BP
No	50	2.0% (n=1)	18.0% (n=9)	48.0% (n=24)	24.0% (n=12)	8.0% (n=4)
Yes	18	5.56% (n=1)	0.0% (n=0)	22.22% (n=4)	16.67% (n=3)	55.56% (n=10)

Table 3: History of elevated blood pressure and distribution of blood pressure categories among male students (GrSMU, 2025/2026), % (n)

In young men who reported episodes of low BP, the frequency of the "Low BP" category was higher than in those without such history: 15.38% and 0.0%, respectively. Notably, in students with a history of low BP, the "High BP" category was completely absent (0.0%), whereas it was present in 25.45% of students without such episodes (p = 0.002, Table 4).

Episodes of Low Blood Pressure	n	Low BP	Optimal BP	Normal BP	High-normal BP	High BP
No	55	0.0% (n=0)	12.73% (n=7)	30.91% (n=17)	30.91% (n=17)	25.45% (n=14)
Yes	13	15.38% (n=2)	15.38% (n=2)	61.54% (n=8)	7.69% (n=1)	0.0% (n=0)

Table 4: History of low blood pressure and distribution of blood pressure categories among male students (GrSMU, 2025/2026), % (n)

In female students with a history of elevated BP, no statistical difference was found in the distribution of BP categories compared to those without such episodes. However, in girls who reported a history of low BP, the frequency of the "Low BP" category was significantly higher: 15.18% vs. 3.30% in those without such episodes (p = 0.001, Table 5).

Episodes of Low Blood Pressure	n	Low BP	Optimal BP	Normal BP	High-normal BP	High BP
No	91	3.30% (n=3)	27.47% (n=25)	40.66% (n=37)	17.58% (n=16)	10.99% (n=10)
Yes	112	15.18% (n=17)	42.86% (n=48)	21.43% (n=24)	11.61% (n=13)	8.93% (n=10)

Table 5: History of low blood pressure and distribution of blood pressure categories among female students (GrSMU, 2025/2026), % (n)

Thus, among both male and female students, a history of high or low BP episodes is associated with significant differences in the current distribution of BP categories compared to students without such a history.

Conclusions

1. Both male and female students with a history of blood pressure fluctuations and tachycardia exhibit significant differences in current hemodynamic parameters compared to those without such episodes. This is manifested by higher systolic blood pressure in students with a history of elevated blood pressure, lower systolic and diastolic blood pressure in young men with a history of low blood pressure, and higher heart rate values in students of both sexes reporting resting tachycardia.

2. A history of elevated blood pressure in young men is characterized by a significantly higher prevalence of the "High blood pressure" category during examination. Furthermore, both male and female third-year students at GrSMU with a history of low blood pressure episodes show a higher prevalence of the "Low blood pressure" category.

3. Identifying episodes of blood pressure changes through student interviews can be a valuable screening tool, contributing to the earlier initiation of primary prevention for arterial hypertension.

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