

Knowledge of Risk Factors for Hypertension among University Students in Northwestern Tanzania: A Cross-Sectional Study

Peter Masikini¹, Irene Constantine², Stanley Mwita^{2*}

¹Department of Internal Medicine, Catholic University of Health and Allied Sciences, Mwanza, Tanzania

²Department of Pharmaceutics and Pharmacy Practice, Catholic University of Health and Allied Sciences, Mwanza, Tanzania

Email: *stanleymwita@gmail.com

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Abstract

Introduction: Obesity, excessive alcohol use, cigarette smoking, a lack of physical activity, stress, and an unhealthy diet are modifiable risk factors linked to hypertension. Non-modifiable risk factors for hypertension include older age and a family history of hypertension. The purpose of this study was to assess university students' knowledge of hypertension risk factors. **Methods:** This was a cross-sectional study conducted at St. Augustine University of Tanzania. A pre-tested, semi-structured questionnaire was used to collect data. Out of a total score of eight, a score of four or more was considered good knowledge, and a score of less than four was considered poor. All sociodemographic characteristics were included in logistic regression to calculate the adjusted odds ratio. **Results:** A total of 390 undergraduate students participated in this study. Most of the participants 266 (68.2%) identified stress as a risk factor for hypertension. The median (IQR) knowledge score was 2 (2 - 3). Overall, only 43 (11.0%) of the participants had good knowledge of risk factors for hypertension. However, none of the sociodemographic factors were associated with a good level of knowledge of risk factors for hypertension. **Conclusion:** Our findings highlight poor knowledge of modifiable and non-modifiable risk factors for hypertension among university students in northwestern Tanzania. Only stress and older age were known by more than half of the students as risk factors for hypertension. To reduce the burden of hypertension, it is crucial for prevention and control programs to target improving university students' knowledge of risk factors for hypertension.

Keywords

Knowledge, Risk Factors, Hypertension, University Students, Tanzania

1. Introduction

One of the leading risk factors for cardiovascular disease (CVD) and death is high blood pressure (systolic blood pressure of 140 mm Hg and/or diastolic blood pressure of 90 mm Hg) [1]. Globally, 1.39 billion adults were estimated to have hypertension in 2010, and the prevalence was higher in low- and middle-income countries (LMICs) [2]. By 2025, it is anticipated that more than 125 million people in Sub-Saharan Africa (SSA) will have hypertension [3]. According to research, the prevalence of hypertension in Tanzania's population ranges from 29.3% to 33.5% [4] [5].

Obesity, excessive alcohol use, cigarette smoking, a lack of physical activity, an unhealthy diet high in saturated fats and salt, and stress are modifiable risk factors linked to hypertension [6]. Non-modifiable risk factors for hypertension include older age and a family history of hypertension. Strokes, heart failure, and chronic kidney disease (CKD) are just some of the complications of hypertension that have been identified as one of the leading causes of death in SSA [7]. Social determinants such as urbanization, housing, and income raise the risk of developing and advancing noncommunicable diseases (NCDs), such as hypertension [8].

Prevention strategies, greater awareness, early detection, appropriate treatment, and precise blood pressure control are part of a comprehensive strategy to reduce mortality and morbidity attributable to hypertension [9]. Prevention strategies include increasing the general population's awareness of the risk factors for hypertension [10]. Previous studies have reported poor knowledge of risk factors for hypertension in the general population [11] [12] [13] [14]. However, there hasn't been much prior research done on university students. The purpose of this study was to assess university students' knowledge of hypertension risk factors.

2. Methods

2.1. Study Design

This was a cross-sectional study conducted in May 2021.

2.2. Study Setting and Population

This study was conducted at the St. Augustine University of Tanzania (SAUT) Mwanza campus. The university is in the northwestern part of Tanzania, in the Nyamagana district, which is one of the seven districts of the Mwanza Region. The campus has about 14,780 students and extends over 600 acres in the Nyegezi-Malimbe area, 10 kilometers south of Mwanza City. Lying 4 kilometers off the main Mwanza-Shinyanga road on the shore of Lake Victoria [15]. The campus has six faculties, namely: the faculties of law, social sciences, engineering, business administration, education, and mass communication. Male and female undergraduate students who were 18 years of age or older and registered at the university made up the population of this study.

2.3. Sample Size and Sampling Procedure

The sample size of study participants was obtained by using the Taro Yamane

formula of 1967.

$n = N;$

$1 + N(e^2);$

$N =$ Population size (14,780);

$e =$ Margin of error (0.05);

$n =$ Sample size (390).

The minimum sample size of study participants obtained was 390 undergraduate students. Convenient sampling was used to recruit study participants.

2.4. Data Collection Procedure

A pre-tested semi-structured questionnaire, which included both open-ended and closed-ended questions, was adopted from a study conducted by Shaikh *et al.* [16] and adjusted according to the current study objectives and settings. The self-administered questionnaire was comprised of two sections, which included questions on socio-demographics and knowledge of risk factors for hypertension.

2.5. Assessment of Knowledge

Participants responded “yes” or “no” to indicate whether they knew if the following factors were risk factors for hypertension: history of hypertension in the family, unhealthy diet, stress, sedentary lifestyle, excessive alcohol consumption, cigarette smoking, obesity, and older age. Knowledge scores were calculated for each participant based on the number of options selected. Participants received 1 point for each “yes” response and 0 for each “no” response about knowledge. Knowledge scores ranged from 0 to 8. Out of a total score of eight, a score of four or more was considered good knowledge, and a score of less than four was considered poor. This was validated by three experts in the areas of public health, epidemiology, and internal medicine.

2.6. Data Analysis

The information gathered was coded and analyzed with SPSS (Statistical Package for Social Sciences) version 22. Frequencies, percentages, and the median (interquartile range) were used to assess participants’ knowledge of hypertension risk factors. The differences between socio-demographic data and knowledge of risk factors were assessed using the chi-square test. P-values of less than 0.05 were considered statistically significant. All sociodemographic characteristics were included in logistic regression to calculate the adjusted odds ratio (aOR).

2.7. Ethical Consideration

Ethical clearance was granted by the joint Catholic University of Health and Allied Sciences/Bugando Medical Center Research and Ethical Committee (ethical clearance no. 1820/2021). Permission to conduct this study was sought from the Vice Chancellor of SAUT. Participants were asked for their consent prior to data collection. To ensure confidentiality, no participant names were recorded.

3. Results

A total of 390 undergraduate students from SAUT University participated in this study. Females represented 214 (54.9%) of the respondents. Most of the students interviewed, *i.e.*, 245 (62.8%), were aged between 19 and 23 years. The majority of study participants, *i.e.*, 329 (84.4%), were Christians, and 339 (86.9%) were single (**Table 1**).

Table 1. Social Demographic data of study population (N = 390).

Variable	Frequency (n)	Percentage (%)
Gender		
Female	214	54.9
Male	176	45.1
Age (Years)		
19 - 23	245	62.8
24 and above	145	37.2
Religion		
Christianity	329	84.4
Muslim	61	15.6
Marital status		
Single	339	86.9
Married	51	13.1

Knowledge of Risk Factors for Hypertension

Most of the participants (266, 68.2%) identified stress as a risk factor for hypertension. Older age, sedentary lifestyle, obesity, and excessive alcohol use were identified by 202 (51.8%), 112 (28.7%), 103 (26.4%), and 57 (14.6%) of the students, respectively. The median (IQR) knowledge score was 2 (2 – 3) (**Table 2**).

Table 2. Knowledge of risk factors and complications for hypertension.

Variable	Frequency (n)	Percentage (%)
Risk factors		
Family history of hypertension	33	8.5
Unhealthy diet	37	9.5
Stress	266	68.2
Sedentary lifestyle	112	28.7
Excessive alcohol use	57	14.6
Cigarette smoking	38	9.7
Obesity	103	26.4
Older age	202	51.8

Table 3 presents the association between knowledge of risk factors and demographic characteristics. Overall, only 43 (11.0%) of the participants had good knowledge of risk factors for hypertension. However, none of the sociodemographic factors were associated with a good level of knowledge of risk factors for hypertension.

Table 3. Association between knowledge of risk factors and demographic characteristics.

Variable	Poor n (%)	Good n (%)	P - value	aOR (95% CI)
Gender				
Female	199 (88.8)	24 (11.2)	0.895	1.07 (0.55 – 2.06)
Male	157 (89.2)	19 (10.8)		
Age (Years)				
19 - 23	213 (86.9)	32 (13.1)	0.095	0.55 (0.26 – 1.15)
24 and above	134 (92.4)	11 (7.6)		
Religion				
Christianity	293 (89.1)	36 (10.9)	0.903	1.04 (0.44 – 2.47)
Muslim	54 (88.5)	7 (11.5)		
Marital status				
Single	305 (88.7)	39 (11.3)	0.591	0.87 (0.04 – 1.90)
Married	42 (91.3)	4 (8.7)		

4. Discussion

This study assessed knowledge of risk factors for hypertension among university students in northwestern Tanzania. About 11.0% of students demonstrated a good level of knowledge. However, all four demographics, *i.e.*, gender, age, religion, and marital status, were not associated with a good level of knowledge. Only stress and older age were mentioned by more than half of the study participants.

Insufficient knowledge of the risk factors for hypertension among university students was also reported in previous research. This finding is contrary to the results of a study conducted in India by Maral *et al.*, which reported that 62.6%, 54.8%, and 68.3% of students correctly identified obesity, smoking, and an unhealthy diet as risk factors for hypertension. The difference between the current study and the Indian study could be attributed to the inclusion of postgraduate and medical sciences students in the Indian study [17].

Although infectious diseases remain prevalent worldwide, nations that have limited resources are experiencing a shift in their disease burden from primarily infectious diseases to NCDs [18]. The transition may be attributed to changes in lifestyle, *e.g.*, physical inactivity. Hypertension has been associated with a sedentary lifestyle [19] [20]. Young adults' risk factors for hypertension have not been thoroughly investigated, and epidemiologically transitioning countries' public

awareness of hypertension is abysmal. According to the findings of a systematic review by Castro *et al.*, a significant percentage of university students spend more time sedentary than other young adults do [21]. In the current study, more than half of the students (71.3%) were not aware of sedentary lifestyles as a risk factor for hypertension. This finding is similar to that of a study done in Iraq by Maatook *et al.* (70.3%) [22] and higher than that reported by Shaikh *et al.* in the United Arab Emirates (UAE) (52.7%) [16].

Stress increases sympathoadrenal activity, increases the secretion of norepinephrine and epinephrine, and enhances vascular tone, thereby causing hypertension [23]. Common causes of stress among university students are academic pressure, family expectations, romantic relationships, and peer pressure [17]. Over 67% of students who participated in this study knew that stress is a risk factor for hypertension. This is similar to the results reported by Shaik *et al.* (75.5%) [16]. Moreover, according to epidemiological and clinical studies, heavy alcohol use (more than 30 grams of ethanol per day) has been linked to an increased risk of hypertension [24]. Less than one-quarter of the current study participants mentioned excessive alcohol consumption as a risk factor for hypertension. This finding is consistent with that reported by Maatook *et al.* [22].

Since they are a part of the community and will eventually create families, university students' understanding of the risk factors for NCDs—and hypertension in particular—is essential to spreading this knowledge throughout society. Our findings suggest that, aside from stress, most university students would not attempt to avoid the other five modifiable risk factors for hypertension: obesity, smoking, eating an unhealthy diet, living a sedentary lifestyle, and excessive alcohol consumption. Efforts and prevention strategies to minimize the burden of hypertension in the community should focus on changing lifestyles and addressing these modifiable factors.

On the other hand, the present study also assessed students' knowledge of two non-modifiable risk factors for hypertension (family history of hypertension and age). The non-modifiable risk factors of hypertension are those that cannot be controlled or changed, but awareness of these risk factors is important for prevention. Adolescents with a family history of hypertension have an increased risk of hypertension than those without [25]. Furthermore, the risk of developing hypertension increases with age and is higher in older people [26]. Only 8.5% of the current study participants knew that family history of hypertension was a risk factor, while 51.8% correctly identified older age as a risk factor for hypertension.

The interpretation of our findings should consider the potential limitations of the present study. This research was conducted at one university only. Therefore, our findings are not generalizable to all Tanzanian universities. Because there is no standardized instrument available to assess knowledge of risk factors for hypertension in our population, we used existing literature to design our questionnaire. However, the questionnaire used in this study was validated by

three experts, and it was pretested for acceptability and relevance.

5. Conclusion

Our findings highlight poor knowledge of modifiable and non-modifiable risk factors for hypertension among university students in northwestern Tanzania. Only stress and older age were known by more than half of the students as risk factors for hypertension. To reduce the burden of hypertension, it is crucial for prevention and control programs to target improving university students' knowledge of risk factors for hypertension.

Competing Interests

The authors declare that they have no competing interests.

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