UNIVERSITY FOR DEVELOPMENT STUDIES

PREVALENCE OF HYPERTENSION AND ITS ASSOCIATED FACTORS AMONG UNDERGRADUATE NURSING AND MIDWIFERY STUDENTS OF THE UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE CAMPUS

ASANTE EMMANUEL

(UDS/CHD/0004/20)

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THESIS SUBMITTED TO THE DEPARTMENT OF SOCIAL AND BEHAVIOURAL CHANGE, SCHOOL OF PUBLIC HEALTH, UNIVERSITY FOR DEVELOPMENT STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PHILOSOPHY DEGREE IN COMMUNITY HEALTH AND DEVELOPMENT

MAY, 2022

DECLARATION

Declaration by student

I Emmanuel Asante, hereby declare that this thesis is the result of my original work and that no part of it has been presented for another degree in this University or elsewhere:

Signature: ..... Date: 13th June, 2022

Declaration by supervisor

I hereby declare that the preparation and presentation of the thesis was supervised following the guidelines on supervision of thesis laid down by the University for Development Studies.

Michael Boah (PhD) Signature: ..... Date: 14th June, 2022
(Supervisor)

ABSTRACT

Hypertension is the foremost cause of mortality, affecting 1.28 billion adults aged 29-80 years globally. It affects 25% of men and 20% of women. Its burden is unreasonably felt in poor nations, where 67% of cases are found. The study aimed to determine the prevalence of hypertension and its risk factors among nursing and midwifery students of the Tamale campus of the University for Development Studies (UDS). A quantitative analytical cross-sectional study was conducted among 412 nursing and midwifery students of UDS. A questionnaire was used to collect information from respondents, including blood pressure (BP), height, weight, and other lifestyle and medical risk factors. Body Mass Index (BMI) was calculated from respondent's height and weight. The data were processed and analyzed using SPSS (version 24). A statistically significant P-value of 0.05 was chosen. The prevalence of hypertension, prehypertension, stage 1 hypertension, and stage 2 hypertension in the students was 39.8% (95% CI: 35.0% to 44.7%), 9.5% (95% CI: 2.8% to 16.2%), 16.3% (95% CI: 9.6% to 23.0%), and 23.5% (95% CI: 16.8% to 30.2%), respectively. The knowledge level of hypertension among the students was 73.5%. The risk of hypertension was increased among students aged 36-40 years (OR = 6.67, 95% CI: 2.49-17.890, $p < 0.001$), male students (Odds ratio = 1.66, 95% CI: 1.03-2.67, p =0.039), and overweight students (OR = 8.47, 95% CI: 1.05 to 68.29, p= 0.045). This analytical cross-sectional study shed light on the prevalence of hypertension among nursing and midwifery students at UDS on Tamale Campus. The prevalence of hypertension and obesity was found to be greater among students in this research. Students should also be sensitized on hypertension issues to enable them to detect traits of hypertension.

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DEDICATION

I dedicate this work to my wife, Gifty Obeng Antwi, daughter, Comfort Asante Rhema, my brother Paul Abrokwah, and all the students of School of Nursing and Midwifery, UDS.

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ABBREVIATION

ACC	American College of Cardiology/
AHA	American Hypertension Association hypertension
BMI	Body Mass Index
BP	Blood Pressure
CI	Confidence Interval
DBP	Diastolic Blood Pressure
GDHS	Ghana Demographic and Health Survey
HTN	Hypertension
IUA	International University of Africa
JNC7	Joint National Committee 7
KNUST	Kwame Nkrumah Universityof Science and Technology
MEPHASOUS	Mental and Physical Health Assessment of University Students
NCDs	Noncommunicable Diseases
OR	Odds Ratio
SBP	Systolic Blood Pressure
SPSS	Statistical Package for the Social Sciences
TCH	Tamale Central Hospital
TTH	Tamale Teaching Hospital
TWH	Tamale West Hospital
UAE	United Arab Emirates
UDS	University for Development Studies
UNIMAS	University of Malaysia, Sarawak
USA	United State of America
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Hypertension (HTN) is a disease that occurs as a consequence of the blood pressure in the arteries that transport blood from the heart to other regions of the human body that remains consistently elevated. Blood pressure is caused when blood is pushed by the heart, it presses on the walls of blood vessels. High blood pressure (BP) is a major clinical disorder that can harm a person's heart, brain, kidneys, and other organs (World Health Organization, 2021). Adults should have systolic blood pressure (SBP) of 120 mm Hg and diastolic blood pressure (DBP) of 80 mm Hg. Reduced systolic (105 mm Hg) and diastolic (60 mm Hg) blood pressure results in cardiovascular advantages. An SBP of 140 mm Hg or higher, and/or a DBP of 90 mm Hg or higher, are both recognized as HTN (World Health Organization, 2013).

HTN is the leading cause of death in the world, affecting 1.28 billion adults aged 29-80 years. It affects 25% of males and 20% of females. Its burden is largely felt in third-world nations, where 67% of cases are found (World Health Organization, 2021). The global population of people with high BP is growing. A report from research on 8.69 million people from 154 nations showed that the rate of systolic blood pressure of 110 to 115 increased from 73119 to 81373 per 100,000 people between 1990 and 2015 (Forouzanfar et al., 2017). Furthermore, systolic blood pressure of 140 or more per 100000 population increased from 17307 to 20526 people during the same period. They also reported that the annual deaths related to the number of people with a systolic blood pressure of 110 to 115 mm Hg grew from 135.6 to 145.2 for every 100,000, and a rise in deaths from 97.9 to 106.3 in 100,000 people was associated with SBP of 140 mm Hg or above.

In 2010, HTN was among the three most fundamental causes of global illness burden (Lim et al., 2012). HTN complications are responsible for 9.4 million fatalities per year, which is more than all infectious disease deaths put together. It is estimated to cause 45% of fatalities from cardiovascular disease and more than half of mortality from stroke (World Health Organization, 2013). HTN not only increases the risk of renal failure, early death, and morbidity , and heart disease and stroke. Increased blood pressure is responsible for more than 40% of deaths in diabetics. High BP is a worldwide social health concern (World Health Organization, 2021).

In a research to ascertain the global prevalence of HTN, which included data from 182 countries, it was indicated that, HTN prevalence ranged from 13.0% to 41.0% by Zeng et al. (2020). A pooled analysis of 1201 population-representative studies with 104 million participants were conducted to examine the worldwide patterns in the incidence, management, and control of HTN. The findings of these analyses showed that, despite stable global age-standardized prevalence, the number of people aged 30–79 years with HTN doubled from 1990 to 2019, from 331 million women and 317 million men in 1990 to 626 million women and 652 million men in 2019 (Zhou et al., 2021).

HTN rates were greater than 50% for men in nine countries and women in two countries in Central and Eastern Europe, Central Asia, Oceania, and Latin America (Zhou et al., 2021). In 2019, 59% of women and 49% men with HTN worldwide reported a previous diagnosis, and 47% of women and 38% of men were treated for HTN (Mansouri et al., 2020). The control rate for people with HTN in 2019 was 23% (20–27%) for women and 18% (16–21%) for males (Zhou et al., 2021). Furthermore, a 7.7% prevalence of HTN was reported at Bishop Stuart University in Mbarara, Uganda, by lecturers and support staff (Amanyire et al., 2019).

In Iran, a study showed that HTN was found to be prevalent in 17.3% of the population (18.9% males and 15.5% females) (Eghbali et al., 2018). The Houston campus of the University of Texas McGovern Medical School Pediatric and HTN Program assessed 22224, 10 to 17-year-old students in schools to determine the prevalence of hypertension. They indicated that the prevalence of raised BP (formerly called prehypertension) has grown from 14.8% to 16.3% in the Fourth Report in the new American Academy of Pediatrics guideline (Bell et al., 2019). In addition, on a large population of university students on dairy consumption in relation to HTN showed 6.9% prevalence of HTN (Mansouri et al., 2020).

Furthermore, AlWabel et al. (2018) indicated that preHTN was found to be prevalent in 29.2% of the medical student population at Quassim University. About 21.1% of medical students who were confirmed hypertensive had been identified and were taking an antihypertensive drug.

Nationally, Opoku et al. (2020) applied the New 2017 American College of Cardiology/American HTN Association HTN (ACC/AHA) and Joint National Committee 7 (JNC7) guidelines to assess the prevalence of HTN in Ghana. They revealed that 30.43% (n=3698) and 11.48% (n=1395) were hypertensive as per 2017 ACC/AHA and JNC7 respectively. In addition, Dosoo et al. (2019) carried out a neighborhood-based screening study to determine the prevalence of hypertension in Ghana's Middle Belt, it was indicated that, 28.1% (95% CI: 26.3%–29.8%) people were hypertensive. The pooled prevalence of HTN in Ghanaian society across 24 publications was 30.3% (95% CI 26.1–34.8%) (Atibila et al., 2021). Females had a prevalence of 30.1% (95% CI 25.6–36.0%) while males had a prevalence of 34.0% (95% CI 28.5–40.0%).

In 2018, evidence from the Sanuade et al. (2018) on the development, alertness, therapy, and control of high BP in the Ghanaian populace showed that high BP was found to be dominant in

13.0% of the population (12.1% of males and 13.4% females), 45.6% of partakers with high blood pressure were mindful of their illness, 40.5% were managing it, and 23.8% had their BP controlled.

In the Northern Region of Ghana, the prevalence of HTN in Tamale Metropolis was detected to be 46.0% (49.50% in males, 42.42% in females). Males and females alike had raised the occurrence of both systolic and diastolic HTN (Elijah et al., 2021). Moreover, findings from AlWabel et al. (2018) support the assumption that young individuals have high preHTN and HTN prevalence, with these vast majority of instances remaining undetected.

Concerning the risk factors of hypertension, the Global Burden Disease (2016) & Amanyire et al. (2019) pointed out that, low physical exercise, and raised body mass index (BMI), increase a person's risk of high systolic blood pressure. This was supported by Parekh & Prajapati (2021) who said HTN is caused by sedentary behavior, obesity, high salt intake, and tobacco use. In Ghana, the main risk factors of HTN have been indicated as age, gender, and urban dwelling; tobacco use, energy drinks, oral contraceptives, high BMI, prediabetes, hyperglycemia, and hypercholesterolemia (Opoku et al., 2020; Dosoo et al., 2019).

As they teach and raise awareness in communities, nurses and midwives act as mentors for the general public on health and healthy lifestyles (Kpormegbe, 2019). In addition to being subjected to numerous occupational risks at work, they are also known to operate under pressure and have strict schedules, and they frequently neglect their personal needs (Kpormegbe, 2019). These elements increase the risk of non-communicable diseases for nurses and midwives.

Since working longer hours at night tends to interfere with sleep, social life, and biological cycles, the hazards generally seem to rise (Gaudemaris et al., 2011). Workplace shift work has been linked

to metabolic syndrome, a collection of diseases that includes high BP, diabetes, obesity, and abnormal cholesterol levels (Opoku-Acheampong et al., 2017).

Consequently, it was against this context, that this research was conducted to investigate the prevalence of HTN and its influencing factors of it among nurses and midwifery students at UDS on the Tamale Campus.

1.2 Problem Statement

HTN is a complicated disease with varied aspects. It is regarded as the most prevalent infectious disease (World Health Organization, 2017). HTN in young adults mostly goes unaware. The frequency of HTN and its associated variables among nurses and midwifery students in Ghana has not been sufficiently studied.

It has been suggested that personal lifestyle choices play a role in the rising incidence of HTN. These include not exercising, drinking too much alcohol, smoking or using drugs, eating poorly, being obese, and experiencing psychological stress. These characteristics are now noticeable and prevalent among younger people (15–24 years old) (Alicke et al., 2017). While it is well-established in the majority of wealthy nations that youth and adolescent physical activity lowers the risk of obesity and hypertension in later life, the relationship is less evident in the majority of developing nations (World Health Organization, 2017). In Ghana, for example, female students performed worse than their male counterparts in terms of physical activity (39.9% vs. 36.0%, respectively; $p = 0.05$) (Ujunwa et al., 2013).

It is believed that between 1% and 2% of college students have hypertension, which is on the rise mostly as a result of the present young adult obesity epidemic (Falkner, 2012). One of the main challenges to effectively preventing and treating HTN is knowledge gaps (Jolles et al., 2012). Health literacy is knowledge that enables people to improve their overall health. Studies has

demonstrated a good correlation between the percentage of knowledge and those with controlled BP, even if this is not entirely dependent on an individual's competence or talents (Kilic et al., 2016; Poureslami et al., 2016).

According to reports, Ghana still has misunderstandings and information gaps about hypertension in its rural populations, which results in a lack of awareness and comprehension of potential hazards associated with the condition as well as the likely consequences of changing one's lifestyle. Knowledge of HTN has been found to be hampered by a number of factors, including official education, communication breakdowns, and inaccessibility to regular health education programs (Agyei-Baffour et al., 2018).

According to estimates, young adults of normal weight who have high blood pressure are frequently ignored (Anyaegbu & Dharnidharka, 2014). To properly monitor and develop health campaign initiatives about hypertension, a population that represents the nation's immediate workforce must have a thorough record of their level of understanding and the hazards associated with the condition.

According to a recent meta-analysis, depression affects about one-third of undergraduate nursing and midwifery students globally (Puthran et al., 2016). Unmanaged stress can lead to physical issues such as high blood pressure. According to research, nursing and midwifery students are more stressed than other professional college students. Students who live in hostels are also more prone to having high-stress levels (Karthikeson & Jagannathan, 2016).

According to previous research, students studying in medical areas are more likely to feel significant levels of academic stress (Punita et al., 2016). Academic pressure in students is linked to the development of a profession's knowledge foundation and the development of medical

abilities, both of which necessitate a substantial number of hours of theory and practice (Jacob & Einstein, 2016).

Due to curricular overload, the majority of nursing and midwifery students pursuing bachelor's degrees at University of Health and Allied Health Sciences reported moderate to severe stress (Yankey et al., 2017). Salifu (2021) also showed that Suicide ideation was linked to relationship issues, academic stress, harassment, drug abuse, and the prevalence of psychiatric disorders among undergraduates nursing students at UDS on Tamale campus. The covid-19 pandemic has forced schools to take on new teaching strategies and lecture schedules, which may have put some pressure on students. Likewise, results from Ghana's 2014 Physical activity Report Card showed that approximately one-third of Ghanaian youths participate in insufficient physical activity (Nyawornota et al., 2018). However, there has been no research done to establish the occurrence of HTN and its influencing factors among nursing and midwifery students at UDS Tamale campus.

A study that assessed university students' understanding of HTN lifestyle factors by Shaikh et al. (2011) uncovered that 75.5% indicated stress, 73.6% showed high cholesterol, 77.6% indicated obesity, and 71.85% indicated smoking. Furthermore, low physical exercise, high body mass index (BMI), sedentary behavior, excessive salt intake, tobacco use, poor stress management, inadequate consumption of fruit, and vegetables, harmful level of alcohol intake, age, energy drinks, coffee use, and oral contraceptives were indicated as risk factors (Global Burden of Disease, 2016; Amanyire et al., 2019; Parekh & Prajapati, 2021; Opoku et al., 2020; Dosoo et al., 2019; World Health Organization, 2013; & Shaikh et al., 2011; Amponsem-Boateng et al., 2021).

Thus, this study provides evidence regarding the frequency, awareness, and risk factors of HTN among undergraduate nursing and midwifery students in UDS who serve as the nation's direct labor force representatives.

1.3 Significance of the study

Considering the lecture schedules and lifestyles of undergraduate students at UDS, it is obvious that much effort is needed.

In Ghana, studies on HTN and its associated factors are common amongst university students are not adequate. Therefore, results from this research will offer relevant data to:

The result from the study will help the university management to provide the necessary guidance and counseling therapy for students. Again, the result of the study will enable the authorities of the university to develop effective lifestyle strategies that will be of help to the general public but particularly students, and staff. The findings of the study will serve as data for future research on the commonness of HTN and contributing factors among university students.

Moreover, the result from this study will serve as evidence for policy makers to formulate effective procedures to control, manage and prevent the condition. Support the planning, prevention, diagnosis, and management of HTN among students.

1.4 General research question

What was the prevalence of HTN and its risk factors among undergraduate nursing and midwifery students at UDS on Tamale campus.

1.4.2 Specific Questions

i. What was the prevalence of HTN among nursing and midwifery undergraduate students of UDS on Tamale campus?

ii. What was the knowledge level on HTN among undergraduate nursing and midwifery students of UDS on Tamale campus?

iii. What were the risk factors for HTN among undergraduate nursing and midwifery students of UDS on Tamale campus?

1.5 Objectives of the Study

1.5.1 General Objective

The main purpose of the study was to evaluate the prevalence of HTN and its risk factors among undergraduate nursing and midwifery students at UDS on Tamale campus.

1.5.2 Specific Objectives

i. To determine the prevalence of HTN among undergraduate nursing and midwifery students of UDS on Tamale campus.

ii. To evaluate the level of knowledge on HTN among undergraduate nursing and midwifery students of UDS on Tamale campus.

iii. To investigate the risk factors of HTN among undergraduate nursing and midwifery undergraduates of UDS on Tamale campus.

1.7 Conceptual Framework

The diagram below is the conceptual framework showing the risk factors on the development of HTN (Figure 1). The conceptual framework has one dependent variable which is hypertension. The independent variables include level of knowledge on hypertension, modifiable risk factors of hypertension, and non-modifiable risk factors of hypertension. The non-modifiable risk factors including a family history of hypertension, old age and co-existing diseases such as diabetes or kidney disease can influence a person's chances of developing hypertension.

Again, a person's knowledge level of HTN can influence his/her likelihood of developing hypertension. Good knowledge level of modifiable risk factors including unhealthy diets (excessive salt consumption, a diet high in saturated fat and trans fats, low intake of fruits and vegetables), physical inactivity, consumption of tobacco and alcohol, poor stress management, and being overweight or obese can help a person to change his/her lifestyle. However, poor knowledge

level on the modifiable risk factors can expose a person to lifestyles which can result in development of hypertension.

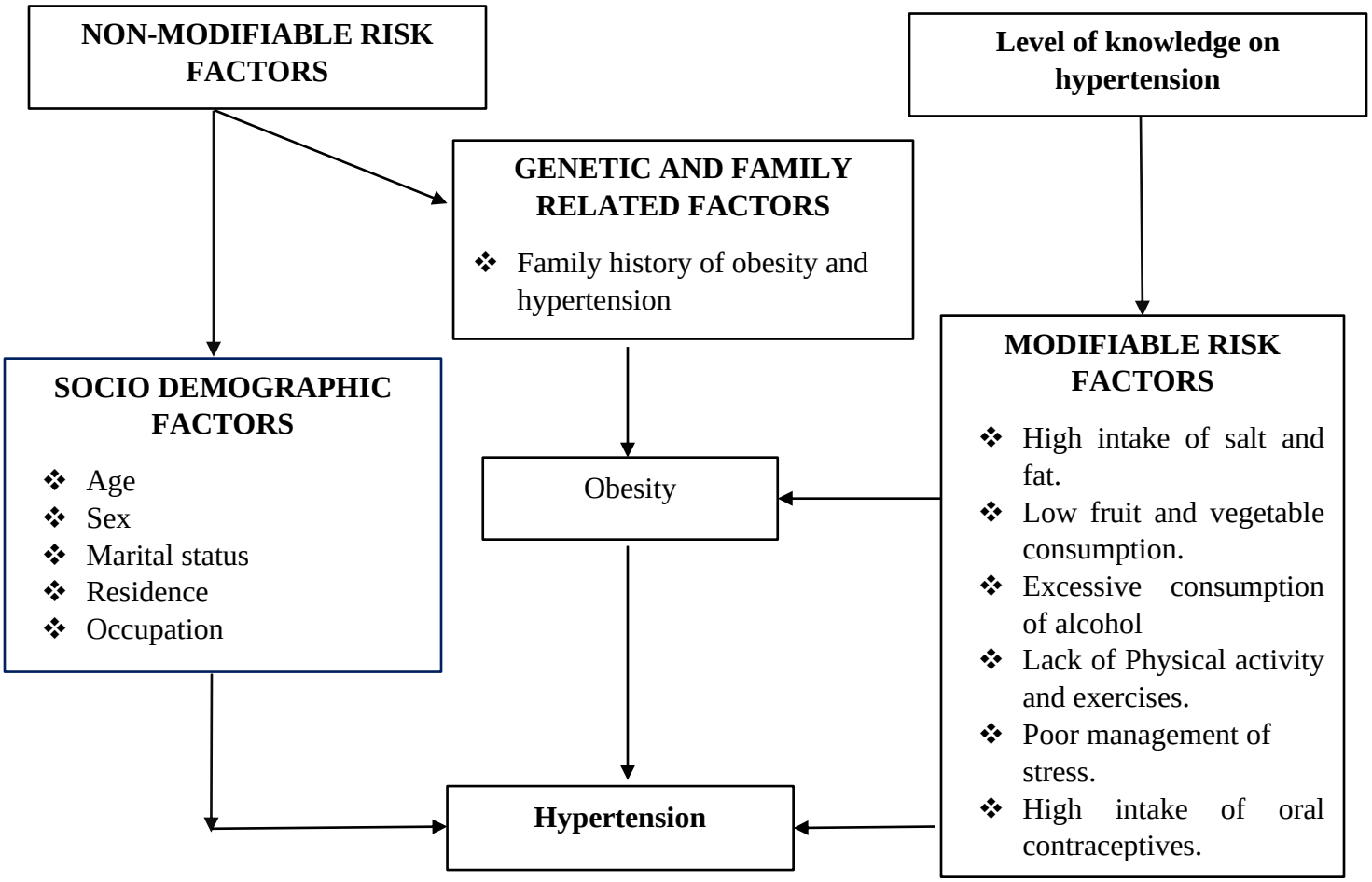

Figure 1: Conceptual framework on the risk factors of HTN (Adapted from Kpormegbe (2019).

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section encompasses a discussion of previous work on prevalence of HTN among undergraduate nursing and midwifery students. It gives a quick rundown of HTN and discusses its prevalence, knowledge, and risk factors among undergraduate nursing and midwifery students in different settings.

2.1 Theoretical framework of the study

To better understand the prevalence of HTN and its contributing factors among undergraduate nursing and midwifery students, the current study makes use of the Health Belief Model framework.

The Health Belief Model, by Rosenstock, (1974) uses four perception constructs—the likelihood of a health issue, its severity, the advantages of acting, and the obstacles to acting—to forecast health-related behaviors. These four constructs explain people's willingness to take action. Cue for action was later included to the model in addition to these four initial components since it felt vital to include another aspect that prompted action (Rosenstock, 1974).

Furthermore, the model recently included self-efficacy, which is the conviction that one can accomplish a task successfully (Rosenstock et al., 1988). This was done in order to better link the model with the interpersonal difficulties involved in altering unhealthy behaviors. According to the model, a person must believe that they are personally susceptible to a disease, that the disease will affect some aspects of their lives with at least a moderate degree of severity, that taking a

specific action would be advantageous by lessening the severity of the disease, and that the action would get past obstacles like cost, convenience, pain, or embarrassment (Becker, 1974).

Then, protective health behavior is triggered by cues to action. The cues may be external, such as the influence of the media, or internal, such as a person's physical conditions. Finally, the person should believe that he or she can successfully accomplish a task. Newell et al. (2009) investigated the impact of beliefs in preventing hypertension; their results indicated a substantial negative correlation between systolic or diastolic blood pressure and perceived severity. Risk scores were inversely correlated with self-efficacy. Adopting measures to lower the risk of hypertension was deemed beneficial by the majority of respondents, who also considered that their self-efficacy may aid in altering these habits. Rosenstock (1974) revealed that awareness of the illness or disease has a partial influence on self-efficacy, perceived susceptibility, and severity.

People who are appropriately informed about hypertension and its associated effects may be inspired to change their lifestyles by losing weight, cutting back on alcohol, exercising frequently, and eating more fruits and vegetables (Pierce et al., 2008; Xin et al., 2001). People who do not know much about hypertension are prone to think that they don't have a chance of developing hypertension or that it will affect them or others emotionally, socially, or medically (Whelton et al., 2002).

Less is known about the health belief model's relevance to undergraduate nursing and midwifery students, despite the fact that it has been demonstrated to assist and explain behavior linked to HTN in young adults. According to the model, in order to take the proper precautions, a person would have to think that they were personally at risk of contracting the illness. Beliefs have a crucial role in deciding how to manage and control health issues, and they are partially based on

knowledge about the condition. Knowledge and perceived vulnerability to illness are thought to be significant factors that influence people's behavior (Abood et al., 2003).

2.2 HTN

Hypertension, also known as high BP, is a major clinical issue that increases the risk of disorders of the heart, brain, kidneys, and other organs significantly (World Health Organization, 2021). It is the leading killer globally (World Health Organization, 2021). The diagnosis of HTN necessitates the measurement of blood pressure in a controlled environment under ideal conditions (Whelton & Carey, 2018). An automated electronic device or a sphygmomanometer with a cuff can be used to measure blood pressure, with the latter providing more consistent results and avoiding observer bias (World Health Organizatio, 2021). When measuring the blood pressure the client must rest for at least 5 minutes, two readings of elevated blood pressure on two different occasions are required to make a diagnosis (Whelton & Carey, 2018). The systolic (140 mmHg) and diastolic (90 mmHg) values show the levels of pressure in the vessels when the heart beats; the diastolic (diastolic = 90 mmHg) values describe the levels of pressure in the vessels when the heart beats (World Health Organization, 2021).

As there is usually no noticeable clinical manifestation, and most individuals are ignorant of the problem, HTN is said to be a "silent killer" (World Health Organization, 2021). Some of the signs that can develop include early hours migraines, runny nose, abnormal heart rhythms, eyesight problems, and ear-ringing (World Health Organization, 2021). High HTN causes fatigue, nausea, vomiting, forgetfulness, worry, difficulty breathing, and stiff muscles (World Health Organizatio, 2021).

HTN can be avoided by consuming less salt (less than 5 grams per day), consuming enough vegetables and fruit, being physically active, avoiding cigarettes, minimizing alcohol use, lowering saturated fat intake, and removing trans fats from the diet all recommended (World Health Organization, 2021). Reduced and regulated stress, regular blood pressure checks, treatment of high blood pressure, and management of other medical disorders are all strategies to handle HTN World Health Organization, 2021).

2.3 Prevalence of Hypertension

2.3.1 Global Trends of Hypertension

Despite stable global age-standardized prevalence, the number of individuals aged 30 to 79 with HTN doubled from 331 million women and 317 million men in 1990 to 626 million women and 652 million men in 2019, according to a pooled analysis of 104 million participants from 1201 population-representative studies (Zhou et al. 2021). In 2019, Canada and Peru had the lowest age-standardized prevalence of HTN for both men and women; Taiwan, South Korea, Japan, and a few Western European states, including Switzerland, Spain, and the UK, for women; and a number of low- and middle-income nations, including Eritrea, Bangladesh, Ethiopia, and Solomon Islands, for men. In Central and Eastern Europe, Central Asia, Oceania, and Latin America, the prevalence of HTN was higher than 50% for females in two countries and for males in nine countries.

In 2019, 47% of women and 38% of men with HTN received treatment, and 59% of women and 49% of men with HTN reported having had a prior diagnosis. In 2019, 18% of men and 23% of women with HTN had control rates. South Korea, Canada, and Iceland had the greatest treatment and control rates in 2019 (>70%; >50%), followed by the United States, Costa Rica, Germany, Portugal, and Taiwan. In Nepal, Indonesia, and several sub-Saharan African and Oceanian nations, treatment rates were fewer than 25% for women and less than 20% for men. For both men and

women in these nations, as well as for men in certain nations in North Africa, Central and South Asia, and Eastern Europe, control rates were less than 10%. Since 1990, treatment and control rates have increased in a number of countries, although Sub-Saharan Africa and Oceania have seen little change. Central Europe, high-income nations, and a few upper-middle- and recently high-income nations, such as Costa Rica, Taiwan, Kazakhstan, South Africa, Brazil, Chile, Turkey, and Iran, had the biggest improvements (Zhou et al., 2021).

2.3.2 Prevalence of HTN among Undergraduate nursing and midwifery Students

A study among nursing and midwifery students in Saudi Arabia's Eastern Providence revealed a rise in the occurrence of HTN by 61% (EL-Ashker et al., 2021). Another study revealed a 35.1% prevalence of HTN among nursing and midwifery students in Tunisia (Hajer et al., 2012). In Kuwait, it was revealed that 7% of university students were hypertensive (Al-Majed & Sadek, 2012). Moreover, preHTN was found to be common among undergraduate nursing and midwifery students aged 18–30 from seven Asian countries (Peltzer et al., 2017). According to the study, 19.0% of the total sample was prehypertensive, 6.7% was hypertensive and 74.2% was normotensives. Prevalence of preHTN among undergraduate nursing and midwifery students varied by country, varying from Indonesia (11.3%), Malaysia (11.5%), Laos, Myanmar, and Thailand (over 18%) (Peltzer et al., 2017). Undergraduate nursing and midwifery students in Jordan recorded a prevalence of BP of 35.2% (130/80 and 139/89 mmHg) and 13.5% high BP of more than 140/90 mmHg (Alhawari et al., 2018).

HTN is becoming more common in urban sub-Saharan Africa (SSA) according to recent evidence. However, there is a shortage of data on the occurrence of HTN in rural Africa. A meta-analysis and comprehensive review of the relationship between food shortage and significant controllable

risk factors for nutrition noncommunicable illnesses in SSA found HTN as the leading metabolic risk (Nkambule et al., 2021).

HTN was reported to be present in 7.7% of the population in a cross-sectional investigation of high blood pressure and related variables of 610 college nursing and midwifery students in Gondar, Ethiopia (Tadesse & Alemu, 2014). Males had a larger incidence of HTN than females. In a similar study among young adults residents of North Sudan, the prevalence and incidence of HTN were found to be 35.7% and 22.4%, respectively (Bushara et al., 2016). In the West Bank among Central University students, the prevalence of preHTN and HTN were recorded as 27.1% (38% males, 11.2% females) and 2.2% (3.3% males, 0.4% females), respectively (Tayem et al., 2012).

HTN and preHTN were found to be prevalent in 14.6% and 29.2%, respectively, of Medical Students at Qassim University (Alwabel et al., 2018). It was also discovered from the same study that 6.9% and 4.6% of the participants had isolated diastolic and systolic hypertension, respectively and systolic-diastolic HTN was seen in only 3.1% of the research participants. Their research indicated that there is a large occurrence of preHTN and high BP in university students, with the vast majority of occurrences being undetected. Another study conducted as a portion Mental and Physical Health Assessment of University Students (n=67,011) initiative found that 6.9% of students had HTN (Mansouri et al., 2020). According to a study done at the International University of Africa (IUA), nursing students had the highest prevalence of hypertension, with 100%, 92.3% in the medical laboratory students, 82.5% in dentistry students, 66% in medical students, and 61.8 % in pharmacy students (Hisam et al., 2018). A time-series investigation of variations in adiposity over four years as well as the relationship it has with HTN in sequential groups of young adult college students in metropolitan Cameroon revealed 6.3% prevalence of HTN (Choukem et al., 2017). Comparable research of students at the University of Malaysia,

Sarawak (UNIMAS) on HTN and its relationship with anthropometric indices revealed that the total occurrence of HTN was 8.2% (Cheah et al., 2018). Aryeetey (2011) pointed out that working in the medical field setting or as a health care provider does not reduce one's chances of having high blood pressure.

There are inadequate literature on the prevalence of HTN and preHTN in students in Ghanaian universities. A study conducted at KNUST revealed that 12(2.2%) of undergraduate students were hypertensive, whereas 26.1% of students had pre-HTN (Gyamfi et al., 2018).

2.4 Knowledge Level of Undergraduate nursing and midwifery Students on HTN

Outcomes from research conducted among SHS students in Ghana on HTN and associated risk factors revealed that 63% of participants had no knowledge of what HTN was, and 52.3% had no idea if a family member had it (Amponsem-Boateng et al., 2019). A survey of undergraduate nursing and midwifery students conducted in Jeddah, Saudi Arabia showed a significant gap in knowledge, attitude, and behavior about HTN risk factors (Baig et al., 2015). At Pakistan's Gomel University, 366 (72.4%) undergraduates nursing and midwifery had a sufficient understanding of hypertension, while 128 (27.6%) undergraduates had an insufficient understanding (Rashid et al., 2017). However, a comparable investigation in Pakistan discovered that, despite the low prevalence of HTN risk factors, undergraduate nursing and midwifery students have an insufficient understanding of the HTN -causing factors (Waseem et al., 2021).

According to another study, students' foundational understanding of the normal blood pressure range was found to be 30% (Nayak et al., 2016). Furthermore, HTN awareness among Gulf Medical University's fresh undergraduate health science learners in Ajman (United Arab Emirates) UAE found a high degree of understanding in all disciplines, with a few knowledge gaps of hypertension's explanation, as well as its manifestations, complications, and causing factors (Akter

et al., 2014). Nonetheless, a research paper by Hisam et al. (2018) showed that among university learners of IUA the level of knowledge on HTN was moderate(62.97%), with 77.8% knowing the normal blood pressure range and 67.3% knowing the definition of hypertension. In a similar study, undergraduate physiotherapy students had a moderate knowledge of HTN (Parekh & Prajapati, 2021). However, Turkish nursing students at the undergraduate level were knowledgeable about HTN and its risk factors (Badir et al., 2015).

The knowledge level of students regarding clinical manifestations of HTN was 21% among university students in Gandhinagar City, Gujarat (Nayak et al., 2016). The internet was the most popular source of information for students with 120 (74.5%) using it, 110 (68.3%) acquiring information from family members, 97 (60.2%) from health experts, 95 (59.0%) from books, 93 (57.8%) from television and radio, and 92 (57.1%) from relatives (Akter et al., 2014). The leading sources of HTN information for university students in Pakistan were academic learning 200(43.10%), magazines account for 100(21.55 %), brochures and photographs account for 12(2.58%), health care providers 59(12.27%), and online 93(20%) (Rashid et al., 2017).

The extent to which people are aware of both controllable and non-controllable risk factors among university students of IUA was poor (41.73% and 51.73%, respectively) (Hisam et al., 2018). Likewise, a total of 40% of university students had understanding of risk factors for HTN in Gandhinagar City, Gujarat (Nayak et al., 2016). According to a similar study, university students were unaware of HTN risk factors such as anxiety, excessive salt intake, sedentary lifestyle, and high BMI (Baig et al., 2015). However, smoking (84.1%), obesity (77.9%), and increase fatty food intake (74.6%) were all identified as hypertension-causing factors by the majority of the students (Baig et al., 2015). In another study, the majority of female students were aware that junk food, a

sedentary lifestyle, and high salt intake were all factors that contributed to HTN (Shravani et al., 2018).

Concerning the prevention of hypertension, Akter et al. (2014) found that 143 (88.8%) of students were aware that frequent physical movement reduces hypertension, 123 (76.4%) students were aware that a rise in weight must be managed, and 154 (95.7%) students were aware that frequent medical checkups can genuinely prevent hypertension. The level of knowledge of students on management of HTN showed that 142 (88.2%) students understood that hypertensive patients should not drink alcohol, 150 (93.2%) students understood that hypertensive patients need not smoke, 133 (82.6%) students knew that patients with HTN should follow a regular diet, and 149 (92.5%) students recognized that limiting salt intake improves HTN (Akter et al., 2014).

In terms of HTN treatment, it was revealed that 156 (96.9%) of students at Gulf Medical University in Ajman, UAE were aware that drugs for the treatment of high BP were available (Akter et al., 2014).

2.5 Risk Factors of HTN

Hypertension-causing factors are divided into controllable and non-controllable causing factors (World Health Organization, 2021). Controllable causing factors are the factors that can be successfully controlled with lifestyle interventions. Conversely, non-controllable causing factors are factors that are impossible to be changed (World Health Organization , 2021). HTN that happens to college students is mainly caused by an unhealthy lifestyle. The lifestyle includes fast food and high salt food consumption, stress, lack of sports exercise, obesity, smoking, coffee consumption, and alcohol consumption (Saufika et al., 2012).

2.5.1 Non-controllable Causing Factors

2.5.1.1 Age

Age is proven to be a non-controllable causing factor for many noncommunicable diseases (NCDs), including HTN (Forouzanfar, et al., 2017). As people get older, their chances of developing HTN increase (World Health Organization, 2013). Young grownups in China's Tujia-Nationality Settlement had varying levels of HTN depending on their age group, which increased exponentially as they grew older: 8.9% of those aged 20 to 24 years, and 10.2% of those aged 25 to 29 years, 12.3% of 30 tp 34 year old, 14% of 35 to 39 year old, and 22.2% of 40 to 44 year old (Liu et al., 2017). In North Sudan, age was identified as a significant causing factor for HTN (Bushara et al., 2016). In another study, those aged 30–39 years had a substantially greater danger of HTN than those aged 18–29 years (Khamis et al., 2020). In Rwanda, the occurrence of HTN was greater than twice as high in the elderly aged 55 to 64 years as it was in adults aged 44 and less (Nahimana et al., 2017).

Age was also associated with HTN in research done in Ghana, with the odds of HTN being much greater in the elderly 55-64 years compared to the other age groups (Opoku et al., 2020). Among Ghanaian Senior High School students, there was a positive connection between the prevalence of HTN and the age categories of 15 to 17 years, as well as 18 years and above, (Amponsem-Boateng et al., 2019).

2.5.1.2 Sex

While age is a non-modifiable causing factor for HTN in both males and females, sex is also a risk factor. A study conducted in Tanzania revealed that men had a higher prevalence than women (27.5% > 24.1%). In China, men recorded a greater prevalence of HTN (17.6%) than women (9.4%) (Liu et al., 2017). In Ethiopia, male students in a university setting had a higher rate of

HTN relative to female students(Tadesse & Alemu, 2014). The occurrence of HTN was also greater in males (16.4%) than in females (14.4%) in Rwanda (Nahimana et al., 2017).

Moreover, the commonness of HTN among a large population of learners showed an inverse association in men as well as women (Mansouri et al., 2020). In another research on young grownups in the United States, women were shown to be considerably less likely than men to have hypertension(12% vs. 27%) (Everett & Zajacova, 2015). Males had a greater prevalence of HTN (31.1%) than females (156%) among undergraduates at a Central University in the West Bank (Tayem et al., 2012).

In a study of university students in Ghana, it was discovered that a greater proportion of males were hypertensive when matched to female students (75.0% > 25.0%, p-value 0.006). Concerning pre-hypertension, a higher number of males (69.5% > 30%, p-value .006) were pre-hypertensive, whereas male students had a higher proportion of normality (56.3% vs. 43.7%, p=0.006) than female students (Gyamfi et al., 2018).

2.5.1.3 Family History

Biological history has been demonstrated to be a causal factor for developing hypertension. Family history of HTN was revealed by 31.8% of males and 44.4% of females among university students in Turkey (Güneş et al., 2019). In North Sudan, genetic history of HTN was discovered to be a causal factor. As a result, those with a positive family history of HTN had a 41.4% prevalence, compared to 30.9% for those who did not (p = 0.000) (Bushara et al., 2016). In Ghana, a look at population-based research on HTN showed family history as a risk factor (Addo et al., 2012). In KNUST, students with a biological history of HTN had a greater risk of developing pre-hypertension, but the link was not significant (p >.05) (Gyamfi et al., 2018). Among healthcare

workers in Korle Bu Teaching Hospital, a substantial link between HTN and a family history of HTN was discovered (Kpormegbe, 2019).

Nonetheless, research conducted at Qassim University showed that a biological history of HTN was not a causal factor for HTN among medical students (Alwabel et al., 2018). Likewise, in the West Bank among students at the Central University, there was no link found between the occurrence of HTN and family history of HTN (Tayem et al., 2012).

2.5.2 Modifiable Causing Factors of Hypertension

2.5.2.1 Unhealthy diets

Poor diets include increased salt eating, a high-fat diet that is heavy in saturated and trans fats, and a lack of fruits and vegetables. (World Health Organization, 2021). Diet is a major factor influencing the occurrence of chronic noncommunicable illnesses. Dietary patterns influence mental health and depression, as well as oxidant responses, response to stress, and cognitive function. Several university students consume to manage emotional and psychological problems (Bakhtiyari et al., 2011). The kind of meal eaten by undergraduate students is often influenced by a lack of time (Doostan, 2012). Undergraduate students are particularly vulnerable to tension and distress, and poor eating habits due to their unique conditions (Bakhtiyari et al., 2011) and, they are in greater danger of being overweight or obese as a result of their high fat and salt diet, as well as their lack of exercise (Abedi et al., 2011). A study carried out by Karimi et al. (2019), highlighted that with advancing age, people consume more fast food. Furthermore, there was a significant link between fast food intake and medical students, followed by midwifery students, who had the highest percentage of fast-food intake.

An unhealthy diet was known to be a cause factor associated with HTN among Turkey students in university settings (Güneş et al., 2019). Sugar-sweetened drinks, salt, and eating habits have all

been related to a rise in the risk of HTN in an Iranian national study (Akbarpour et al., 2019). Food with high fat and atrium becomes a favorite among college students. There are 22.0% of teenagers consumed food containing excessive salt 3 to 6 times a week (Dewi & Arista, 2012). A study found that 61.9% of respondents with excessive salt consumption were experiencing HTN (Kautsar et al., 2013).

A study conducted in Australia, New South Wales of over 5000 nurses and midwives, showed that when compared to senior nurses, younger nurses aged less than 34-year-olds were less inclined to eat the required quantity of fruits and vegetables and were more interested in eating fast meals and drinks fruit juices (Perry et al., 2018). Current findings of primarily young student nurses in Scotland with an average age of 24.5 years revealed that, when compared to the wider public, a lower number of learners followed the fruit and vegetable diet standards, and a lower number of students ate takeout meals (Evans et al., 2019).

For nursing and midwifery students who have never been exposed to a clinical setting and attending to patients, it is also likely that their wellbeing, eating habits, and way of life come second to their studies and clinical responsibilities. Due to the challenging nature of nursing and midwifery studies, as well as a lack of time and management skills, students are likely to prefer ready-to-eat, packaged fast foods and vending machine meals heavy in saturated fats, trans fats, salt, and sugar, which are usually accessible in healthcare settings (Winston et al., 2013). Furthermore, university students consume fewer dairy products than other groups because they are more prone to have poor eating habits (Mahon & Haas, 2013). Food prices, a busy daily schedule, and personal tastes may all have an impact on university students' dietary habits (Vilaro et al., 2018). Fast food, snacks, and sugar-sweetened beverages are more commonly consumed by university students than dairy, herbs, and fruits (Hilger et al., 2017; Betancourt-Nuñez et al., 2018).

Research on preHTN and psychosocial risk factors among Asian undergraduate students revealed that increased salt, sugar, soft drink, and fast food consumption were linked to preHTN (Peltzer et al., 2017). A cross-sectional survey among local communities inside the African continent which looked at the commonness of HTN and its related factors indicated that frequent intake of beef and fat was linked to a larger prevalence of hypertension, whereas consumption of fruits and vegetables on regular basis was linked to lower blood pressure measurements in a substantial way (de Ramirez et al., 2010). Notwithstanding, another study among Central University students in the West Bank reported no significant findings to link between usage of snacks and HTN (Tayem et al., 2012).

Research conducted in Tanzania about food consumption indicated higher odds of being hypertensive for students who ate unhealthy meals, however, individuals who ate cereal-based items had a lower risk, though it was not significant. Respondents who said they eat fruits did, however, have a significantly lower risk of developing HTN (Khamis et al., 2020).

2.5.2.2 Physical Inactivity

Among university students' lifestyles was a lack of physical (sports) exercise. Findings from a study showed that among 300 students who lacked physical exercise, 99 students (36.1%) experienced HTN (Ainun et al., 2012).

Lower levels of work-related strenuous physical exercise were related to a higher occurrence of HTN and BP measurements among communities in sub-Saharan Africa (de Ramirez et al., 2010). In a similar report in Asian countries, behavior variables such as high physical inability were found to be related to preHTN among university students (Peltzer et al., 2017). Findings from a national survey in Iran showed that physical inactivity, regardless of age, was correlated to higher BP levels (Akbarpour et al., 2019). Comparable research conducted in Rwanda detected a higher prevalence of HTN among participants with high physical inactivity (Nahimana et al., 2017).

Furthermore, a cross-sectional investigation among pupils in senior secondary schools in Ghana showed a favorable connection between no physical activity and risk of HTN (Amponsem-Boateng et al., 2019). Health care workers revealed a significant relationship ($p<0.05$) between their levels of physical activity and the prevalence of HTN in Korle Bu Teaching Hospital (Kpormegbe, 2019).

2.5.2.3 Smoking or Consumption of Tobacco

Tobacco smoking is a significant causal factor for cardiovascular and respiratory disorders, over 20 types of cancer, and a variety of other serious well-being concerns since nicotine is extremely addicting (World Health Organization, 2021). Every year, over 8 million deaths are directly caused by tobacco. Over 7 million of this mortality are due to direct tobacco usage, while nonsmokers who inhale secondhand smoke responsible for 1.2 million deaths (World Health Organizations, 2021). More than 80% of the world's 1.3 billion tobacco users live in low- and middle-income countries (World Health Organization, 2021).

According to the results of a research project in Turkey, smoking was associated with HTN among university students (Güneş et al., 2019). In the West Bank, smoking had a substantial relationship with the commonness of preHTN and HTN among university learners (Amanyire et al., 2019b). In Rwanda respondents who were past smokers were more likely to be hypertensive (Nahimana et al., 2017). Besides, at University of Jordan, 111(22.0%) students were smokers, with a significant difference ($p = 0.025$) for raised SBP (mean difference = 4.2mmHg, CI: 3.2mmHg to 8.8mmHg), however comparing to nonsmokers there was no major variation for DBP ($p = 0.386$) (Alhawari et al., 2018).

In Turkey, Health Science students' and their parents' cigarette usage status was assessed, and the results showed that the life history of cigarettes consumption among the students was 20.6% and

16.1% were present smokers, 20.1 % of their moms and 41.7 % of their dads (Dergisi & Tepehan, 2018). In the Sunyani Municipality of Ghana, cigarette and shisha smoking were discovered to be substantially linked to HTN (Nyarko, 2018).

2.5.2.4 Alcohol Consumption

Alcohol abuse is one of the common cause factors for population health worldwide, and it has a direct impact on noncommunicable diseases like hypertension. Although the percentage of people consuming alcohol has declined in some regions of the world between 2000 and 2018, including Africa, the Americas, the Eastern Mediterranean, and Europe, an increase was observed in other places such as the Western Pacific Region from 2000 to 2018 as 51.5% to 53.8% respectively, and the Americas, Europe, and the Western Pacific are the only three World Health Organization regions currently account for more than half of the 2.3 billion alcohol consumers worldwide (Hammer et al., 2018). According to a study of undergraduate learners perusing nursing, the majority of learners did not think about the dangers of alcohol and cigarette usage since they considered it was typical and culturally suitable (Morales et al., 2011).

According to a survey of college students, 185 (37.1%) used drugs at least once in their lives. Between the ages of 13 and 21, people began to consume alcohol. The first substance shown is alcohol, followed by snuff, marijuana, benzodiazepines, and amphetamines in that sequence. When it came to drug users' self-perceptions of the impact of drugs on their academic performance, these students denied that drugs have any effect on their grades, showing that drug use is not seen as an issue if it only affects them, but as a problem if it impacts other studies (Ortega-Pérez et al., 2011).

Sadegh (2021) revealed that among Kerman University Medical Sciences, alcohol intake throughout a lifetime was 93(41.2%) with an average age of 23.13±2.11, of which 85(91.4%) and

36 (38.7%) had had a previous history of alcohol intake one year and one month respectively. For the rise every one year of age, the likelihood of consuming alcohol rises by 1.8 (p-value <0.001). Male students had a 2.9 times higher probability of using alcohol compared to female students (p-value = 0.001). It was 6.7 times higher among unmarried students than among married learners (p-value <0.001). It was 0.11 substantially greater among medical students than it was among midwives (p-value = 0.004), Students whose parents worked as freelancers had a four-fold increased probability of consuming alcohol (p-value = 0.002) than students with parents who have retired. Ainun et al. (2012) found in their study that university students had an unhealthy lifestyle, such as alcohol consumption. Eleven (68.8%) among 16 students who consumed two or more glasses per day of alcohol experienced hypertension.

Among six universities in Myanmar, alcohol drinking was found to be prevalent in 20.3 % of the population (males: 36.0%, females: 10.8%). The majority of the males (52.8%) and around a quarter of the females (24.8%) began drinking when they were ten years old. Parental alcohol usage was stated by more than one-third of both males and females (38.0% vs. 36.0%), whereas almost every male (88.1%) and a majority of females (60.4%) showed alcoholic beverages used by friends intake (Htet et al., 2020).

A study conducted among Faculty of Health Sciences Students in Turkey sought to examine students' and their parents' alcohol consumption status, and it was revealed that the lifetime history of alcohol consumption among the students was 11.2% and 21.1% of them continue to consume alcohol, with 4.5% of their moms and 21.9% of their dads doing so (Dergisi & Tepehan, 2018).

A population-based study conducted in Rwanda demonstrated that people who consumed alcohol had a 24% 24% increased risk of HTN in comparison to individuals who did not drink alcohol (Nahimana et al., 2017). Similarly, literature from Ghana found that excessive alcohol drinking

increased the risk of HTN among the wider public (Addo et al., 2012). It was also revealed from another study that alcohol consumption of at least 4 times a week was significantly associated with HTN (Aryeetey, 2011). Nonetheless, a study conducted among health care providers at Korle Bu Teaching Hospital showed no significant relationship ($p>0.05$) between intake of alcohol and HTN (Kpormegbe, 2019).

2.5.2.5 High Body Mass Index (Overweight or Obese)

Obesity and overweight are both explained as an abnormal or uncontrolled deposit of fat that is detrimental to someone's wellbeing. A BMI of 25 or above is taken as overweight, while 30kg/m^2 or greater of BMI is considered obese. In 2016, almost 1.9 billion people aged 18 and beyond were overweight, including 650 million those being obese. That same year, overweight or obese children and teenagers between the ages of 5 and 19 accounted for roughly 340 million. In 2020, it was reported that 39 million children under the age of five were overweight or obese (World Health Organization, 2021).

The results of a study done at the West Bank's Central University showed the occurrence of overweight and obesity were 25% of the population (31.1% males, 15.6% females) and 7.2% (9.4% males, 4% females) respectively. Males had a substantially greater prevalence of elevated BMI and blood pressure than females ($p<0.001$) (Tayem et al., 2012). In the same study, both preHTN and HTN were related to obesity ($r = 0.252$, $p = 0.001$). In Gondar, Ethiopia, the outcome of a cross-sectional study indicated that being overweight was recognized as a separate cause factor for HTN among university students (Tadesse & Alemu, 2014). Another study discovered a link between BMI and high blood pressure among Qassim University students (Alwabel et al., 2018).

Furthermore, an outcome of a time-series survey on university students in metropolitan Cameroon reported that the occurrence of obesity and overweight among males grew from 13.1% to 20.9%

(p-trend = 0.002) between 2009 and 2012, whereas the occurrence of stomach obesity among females increased from 6.5 % to 11.7% (p-trend = 0.027) (Choukem et al., 2017). The BMI and waist circumference were both found to be determinants of hypertension, with an elevation in BMI of 1 kg/m2 resulting in an 11% surge in the risk of HTN and each centimeter rise in waist circumference resulting in a 9% increase in the risk of HTN (Choukem et al., 2017).

Similar result was found among Ghanaian university students after taking gender and age into account, the waist-to-height ratio (WtHR) and BP status were revealed to be considered positively linked with BMI ($p<0.05$). Again, using logistic regression model, it was discovered that obesity indicated by WtHR ($p =.031$) and BMI ($p =0.0005$) were an important determinant of high blood pressure (Gyamfi et al., 2018).

2.5.2.6 Poor Stress Management or Depression

University students are a group of grownups who are susceptible to undergoing stress. For a large number of students, the transition from high school to college experience has the potential to have a big impact on their physical well-being and mental health. (Deliens et al., 2014). The need associated with making financial decisions and everyday life, making new friends and mental anguish can be exacerbated by social ties and severe academic workloads (Lee et al., 2016). This could lead to the acceptance of wild behavioral activity, such as alcohol misuse, overeating, substance use, and declination in physical activity (Vadeboncoeur et al., 2015). Like practicing nurses and midwives, nursing and midwifery students are engaged in-hospital training that includes work schedules, pressure, and emotional exhaustion, they may find it challenging to change their lifestyle patterns (Perry et al., 2018).

A reassessment of stress and coping strategies among nursing and midwifery students reported high academic loads and assignments as their primary sources of stress. In the same review, it was

reported that nursing and midwifery students are also under a lot of pressure when treating patients during clinical (Labrague et al., 2017). The complication of nursing and midwifery training enforces a strong level of stress among students, which may have a direct impact on food habits and enhance the danger of health problems, such as for overweight and obesity, and HTN (Yau & Potenza, 2013).

Stress was identified as a major causal factor for high BP (Mucci et al., 2016). It has been proposed that there exists a correlation between stressful events and high blood pressure. Modernization, societal changes, economical shifts, and work pressure are all contributing to increasing worry, unhappiness, and prolonged emotional stress among people (Liu et al., 2017). A study revealed that 7 (53.8%) among 13 respondents that were in the stressful condition experienced HTN (Ainun et al., 2012).

Research conducted by Opoku-Acheampong et al. (2017) among students at university of Ghana showed that when comparing male and female pupils, female students reported greater stress scores. Large amounts of information to study (88.2%), drafting a laboratory report (78.2%), persistent stress to keep better marks (66.4%), and a scarcity of spare time were the top stressors noted in the survey (46.4%). Even though the majority of students used good stress management tactics like proper use of time (68.2%), others resorted to comfort eating (9.1%) and hard liquor usage (1.8%). From their studies, perceived stress levels were found to be significantly inversely associated with social interactions, the health of the surroundings, physical fitness and psychological health ($r = -0.40$, $p \leq 0.001$), ($r = -0.37$, $p \leq 0.0001$), ($r = -0.49$, $p \leq 0.0001$), and ($r = -0.51$, $p \leq 0.0001$) respectively. Stress (71.8%) was shown to be significantly associated with gender and BMI among Turkish medical university students (Güneş et al., 2019).

A meta-analysis discovered that poor stress management was linked to a greater cause of HTN and people affected with HTN had a larger proportion of anxiety than normotensive patients. Chronic psychosocial stress was discovered to be a HTN significant predictor (Liu et al., 2017).

2.5.2.7 High Consumption of Oral Contraceptives

Existing research carried out in Nepal, Ghana, South Africa, and Nigeria indicated that the rate of oral contraceptive use among female students in university settings was 8.4% (Subedi, 2012), 40% (Amalba et al., 2014), 21.2% (Hoque & Ghuman, 2012), and 37.9% (Ezebialu & Eke, 2013), respectively. In Ghana's northern region, the usage of emergency contraceptives among nursing and midwifery students was reported a 49(25.65%) (Mohammed et al., 2019). According to another survey, the majority of 118 (59.3%) of university final year students had ever used emergency contraceptives before. Postinor-2 was used by the majority of the pupils (87.7%), and in the previous six months, 91 (45.7%) had not utilized emergency contraception while 64(32.2%) had used emergency contraceptives once in the past six months (Nachinab et al., 2021).

In several studies, oral contraceptive use has been linked to a greater chance of developing hypertension. Findings from a meta-analysis by Hui et al. (2017) revealed a positive correlation between the usage of oral contraceptives for a long period and the risk of hypertension, which included 24 articles with 270284 individuals. In their research, a direct association between the usage of oral contraceptives for a long time and the risk of HTN was discovered, and for every five years of oral contraception usage, the cause of HTN increased by 13%.

A similar study by Afshari et al. (2021) on Tabari cohort research, revealed that 42.2% of 35–70-year-old women (2520/5973) used oral contraceptives. HTN was found in 25% (1793/5979) of the participants. From their study oral contraceptive use was more likely to develop hypertension. The odds of developing HTN were found to be higher among women who use oral contraceptives for

61–120 months, and for more than 120 months. They concluded that oral contraceptives, particularly when used for a long time, can be associated with hypertension.

2.6 Summary

The review of previous literature determined that there is an occurrence of HTN and preHTN among university students in different settings. University students showed a significant gap in knowledge, attitude, and behavior about HTN cause factors.

The determinants of HTN can be either controllable or non-controllable determinants. Age, sex, and family history of HTN were all non-modifiable indicators of hypertension. High eating of salt, as well as a diet heavy in saturated and trans fats, and poor consumption of fruits and vegetables are all controllable cause factors, as are regular exercise, cigarette and alcohol abuse, and being overweight or obese.

Aside from the inconsistencies in the results, previous studies focused primarily on western countries, with limited evidence from African societies, particularly Ghana, where HTN is considered to be common (30.43% of Ghanaian adults) (Opoku et al., 2020). Even though nurses are required to provide knowledge, to assist decrease hypertension-associated deaths and diseases in Ghana, no research assessing nursing and midwifery students' understanding of HTN and related predictors has been reported. This knowledge gap makes it impossible to design a study with a priori hypothesis.

Regardless, there is a paucity of examination for preHTN and HTN in this age range, and clinicians are extra cautious to start antihypertensive drugs in hypertensive young adults than in grownup ones.

Understanding the risk factors that predispose to HTN is critical to changing lifestyle choices that promote optimal cardiovascular health. A crucial preventive educational method is to measure and effectively disseminate information about modifiable risk factors at a young age. Thus, strategies aimed at lowering blood pressure levels in young people, even if only slightly, are essential public health objectives.

In light of the aforementioned points was this investigation conducted to evaluate the prevalence of HTN and causes that are linked to it among nursing and midwifery learners at University for Development Studies on Tamale Campus.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter gives a more description of the study design, study setting, study group, inclusion and exclusion criteria, dependent and independent variables, sample size estimation, sample size techniques, data collection techniques and tools, data collection procedure, quality control, data analysis, and ethical consideration that governed the conduct of this research.

3.1 Study Setting

The research was carried out at UDS, Tamale campus, which can be found in the Tamale Metropolis (TM) of the Northern Province of Ghana. The region has 16 districts, one of which being the Tamale Metropolis. It is situated in the center of the region, towards the west and north, it surrounds the Sagnarigu District, Mion District to the east, East Gonja to the south, and Central Gonja to the south-west. UDS, Tamale campus is the central campus of the university (Ghana Statistical Service, 2021).

Tamale Campus consists of the following schools, Medicine, Allied Health Sciences, Nursing and Midwifery, Public Health, Pharmacy and Pharmaceutical Sciences, and Graduate School. The faculty of Education is also on this campus. These Schools and Faculty offer Diplomas, and Bachelor's degrees. All postgraduate programs are run at the Graduate School. The estimated population of students in UDS is twenty thousand and thirty-nine (20039) students. It is estimated that six thousand eight hundred and ninety (6890) students are on Tamale Campus with two thousand one hundred and fifty-nine (2159) in School of Nursing and Midwifery. The campus has a clinic and sports complex. Furthermore, Dungu community has a CHPS compound and a private hospital (Flagstaff Specialist). The students mostly seek healthcare from the University Health

Services and major hospitals in the Tamale Metropolis namely, the), Tamale Central Hospital (TCH), Tamale West Hospital (TWH), and Tamale Teaching Hospital (TTH).

3.2 Study Design

An analytical cross-sectional study design was used with quantitative approach. The usage of a cross-sectional survey helped the researcher to measure the effect (hypertension) and exposures (cause factors) in the subjects of the study at the same moment. It helped to compute the odds ratio (OR), which quantified the link between the exposure (s) and outcome.

3.3 Study Population

The participants in the research covered all undergraduate students from School of Nursing and Midwifery. All students available during the research and who consented to participate were considered in the investigation.

3.4 Inclusion and Exclusion Criteria

3.4.1 Inclusion Criteria

The research encompassed students who were able to satisfy the criteria below:

i. Identify as a student of the study area.

ii. Able to give informed consent.

iii. Students who were not pregnant or breastfeeding within the past six (6) months preceding the data collection.

iv. A regular student pursuing a nursing and midwifery programme.

3.4.2 Exclusion Criteria

i. Pregnant or breastfeeding students within the past six (6) months.

ii. UDS students outside Tamale Campus.

iii. UDS students who were not pursuing programme from School of Nursing and Midwifery.

iv. Graduate students were also excluded.

v. Students who had taken alcohol/caffeine in the past six (6) hours.

vi. Students who had smoked or taken tobacco products (cigarettes, cigars, smokeless tobacco) in the past six (6) hours.

vii. Students who did not sign the consent form.

3.5 Sample Size Estimation

The size of the sample for this investigation was estimated by applying the formula from Cochran with the following parameters: margin of error(d), confidence interval (CI) at 95%, and 50% estimated proportion of prevalence of hypertension. Using the Cochran's formula:

$n = \frac{Z^2 pq}{d^2}$, where:

n = sample size

z = confidence interval at 95% = 1.96

p = estimated proportion of prevalence of HTN = 50% = 0.5

q = 1 – p (i.e. q= 1 – 0.5 = 0.5)

d = error margin = 0.05

Putting the values into the equation;

$$= \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = \frac{3.8416(0.25)}{0.0025} = \frac{0.9604}{0.0025} = 384.16 \simeq 384$$

The total representative sample was 422 after accounting for a 10% nonresponse rate.

3.6 Sampling Techniques

The sample was assigned proportionally to each of the programmes in School of Nursing and Midwifery. A method of stratified sampling was employed to categorize the students in the research into four (4) components: BSc Midwifery, BSc. Nurse Practitioner, BSc. Nursing, and BSc Pediatric Nursing. Again, a stratified sampling method was utilized to find respondents from levels 200 to 400. The number of participants per class was derived by systematic sampling. Firstly, the class lists of all levels were collected for sampling. Afterward, the selected participants were invited to a common venue for data collection. This prevented potential participants who do not attend class frequently from being excluded. The table below contains the total number of students in each department and programme and the number of them that were sampled.

Table 1 Students population and the sample drawn from each

Department /programme	Population	Sample required
Nursing (n=1095)		
Top Up 400	70	14
Top Up 300	219	43
Mature 400	97	19
Matured 300	224	44
Generic 400	100	20
Generic 300	160	31
Generic 200	225	44
Midwifery (n=915)		
Top Up 400	206	40
Matured 400	57	11
Matured 300	67	13
Matured 200	84	17
Generic 400	156	31
Generic 300	213	42
Generic 200	132	26
Advance Nursing (n = 73)		
Practitioners 400	36	7
Practitioners 300	37	7
Pediatrics (n = 67)		
Pediatrics 400	67	13
Total	**2150**	**422**

3.7 Data Collection Techniques and Tools

A semi-structured self-administered questionnaire was employed to gather responses (see appendix I) that was designed by reviewing from previous studies (World Health Organization, 2005; Kpormegbe, 2019; Karmacharya, 2015). The questionnaire was structured as follows: Socio-demographic particulars of the students, and knowledge of controllable and non-controllable cause factors of HTN among respondents. Physical parameters including height and weight were used to estimate BMI, and an average of two blood pressure (BP) levels assessed at 10 minutes intervals were documented and used for estimation. Questionnaires were answered in the presence of the researcher. All the eligible students were provided with an in-depth explanation of the study objectives and were allowed to participate after they had given informed consent.

3.7.1 Assessing Students' Knowledge about Hypertension

A total of 44 questions were used to assess students' knowledge of HTN (see appendix I), which came up with a high internal consistency (Cronbach's alpha = 0.706). Each question had options such as "Yes", "No" and "Don't know" (Karmacharya, 2015). All questions were positively worded and each question attracted a score of 1 point, and 0 points were awarded if a student failed to choose the correct option. Scores for individual questions were summed to obtain a total score on knowledge. The cumulative knowledge score ranged from 0 – 44 points. The overall knowledge of students was categorized as high if a student scored a point ranging from 35 – 44, moderate if a student scored a point ranging from 23 – 34, and low if a student scored a pointless or equal to 22.

3.7.1.1 Knowledge level of respondents on risk factors of hypertension

The study used a total of 10 items to assess respondents' knowledge level about risk factors of hypertension. A respondent who got a question correct, received one (1) point. However, a respondent who got a question wrong, received zero (0) point. The knowledge level was categorized into two levels. The first level was 'Poor knowledge' thus if a respondent scored 60%

and blow (≤ 6 points). Nonetheless, the second level was 'Good Knowledge' thus if a respondent scored 61% and above (7 – 10 points).

3.7.1.2 Knowledge level of respondents on symptoms of hypertension

The maximum knowledge score was 12 points. A respondent who got a question correct, received one (1) point. However, a respondent who got a question wrong, received zero (0) point. The knowledge level was categorized into two levels. The first level was 'Poor knowledge' thus if a respondent scored 58% and blow (≤ 7 points). Nonetheless, the second level was 'Good Knowledge' thus if a respondent scored % and above (8 – 12 points).

3.7.1.3 Knowledge level of respondents on prevention of hypertension

The maximum knowledge score was 7 points. A respondent who got a question correct, received one (1) point. However, a respondent who got a question wrong, received zero (0) point. The knowledge level was categorized into two levels. The first level was 'Poor knowledge' thus if a respondent scored 57% and blow (≤ 4 points). Nonetheless, the second level was 'Good Knowledge' thus if a respondent scored 51% and above (5 – 7 points).

3.7.1.4 Knowledge level of respondents on management of hypertension

The maximum knowledge score was 4 points. A respondent who got a question correct, received one (1) point. However, a respondent who got a question wrong, received zero (0) point. The knowledge level was categorized into two levels. The first level was 'Poor knowledge' thus if a respondent scored 50% and blow (≤ 2 points). Nonetheless, the second level was 'Good Knowledge' thus if a respondent scored 51% and above (3 – 4 points).

3.8 Data Collection Procedure

Anthropometric data such as weight, height, and BP measurements were taken. Participants' weight was taken with a calibrated electronic Charter medical weight scale which measures in kilogram (kg). All participants were measured barefoot and in loose clothing and their pockets emptied. Before weighing each participant, the weighing scale was checked to make sure the reading was at zero (0) kg. Height was checked in centimeters (cm) by using a wall-mounted stadiometer. Each participant's height was transformed into meters (m). The BMI was estimated as the weight in kilograms (kg) divided by height in meters square (m^2) in one decimal place.

BP was determined in a comfortable seated posture with a well-calibrated electronic sphygmomanometer. BP has measured two times at least 10 minutes intervals, and the average value was taken. All participants were required to sit for 20 minutes, during which time they were asked to complete questionnaires. BP was checked twice in a relaxed sitting position with Omron M3 digital BP measurement machine with proper cuffs. The questionnaire was used to determine the individuals' lifestyles. The questionnaire revealed the participants' drinking, smoking, salty food, junk food, and oral contraception habits, as well as the number of times they participate in physical activity per week.

3.9 Variables

3.9.1 Dependent variable

HTN was the dependable variable in this research. The meaning of HTN was founded on the ranges of SBP and DBP. The systolic and diastolic blood pressures measured were used to determine the mean arterial pressure in each student, which was calculated as twice the diastolic blood pressure and added to the systolic blood pressure and then divided by three (3). Each student's blood pressure was estimated using a combination of SBP and DBP readings. Table 2 contains the ranges of BP levels.

Table 2 Blood pressure categories According American Heart Association (2020)

Blood Pressure Category	Systolic mmHg (Upper number)		Diastolic mmHg (Lower number)	24 Hour Mean Arterial Pressure Thresholds(mmHg)
Normal	Lower than 120	And	Lower than 80	Lower than 90
Elevated	120 – 129	And	Lower than 80	90 – 91
High Blood Pressure Stage 1 (Hypertension)	130 – 139	Or	80 – 89	92 – 95
High Blood Pressure Stage 2 (Hypertension)	140 or larger	Or	90 or larger	96 or larger
HTN crisis	Greater than 180	and/or	Greater than 120	

Source: https://www.heart.org/en/health-topics/high-blood-pressure/understanding-blood pressure readings. Accessed September 26, 2021.

3.9.2 Independent variables

Several factors were considered in the current study as potential factors that could influence the prevalence of HTN (Table 3). The inclusion of these factors in the study was guided by the existing literature (World Health Organization, 2005; Kpormegbe, 2019; Karmacharya, 2015).

A standard short-form physical activity questionnaire was used to measure physical activity (IPAQ Research Committee, 2005). This questionnaire contains questions that examine the status of physical activity and categorizes physical activity into three categories: poor, moderate, and intense. This questionnaire measures physical activity in the last 7 days and according to the final score, the intensity of the activity in the last 7 days is determined. Moreover, factors causing stress were identified using a 22-item questionnaire. The Dental Environmental Stress (DES) was adapted for the questionnaire (Cohen et al., 1983).

Table 3 The independent variables of the study

Independent variable	Type of variable
Socio demographic Characteristics	
Age	Continuous
Sex	Nominal: Male, female
Department of study	Nominal: Midwifery, Nursing, Advance nursing, and Pediatrics
Level of study	Ordinal: Level 200, Level 300, and Level 400
Nationality	Nominal: Ghanaian student, and international student
Marital status	Nominal: Single, married, dating, separated, divorced, and cohabitation.
Religion	Nominal: Christianity, Islamic, and Traditionalist
Residence	Nominal: Urban, and Rural
Ethnicity	Nominal: Akan, Frafra, Dagomba, Dagaati and others
Lifestyle Risk Factors	
Physical exercise level	Ordinal: Poor, moderate and intense.
Quantity of salt intake	Ordinal: less than 1 teaspoon, and 1 or more teaspoon
Alcohol consumption	Nominal: Drinkers, and non-drinkers
Smoking status	Nominal: Smokers, and non-smokers
Usage of oral contraceptive	Nominal: Consumers, and non-consumers
Psychosocial stress	Ordinal: Not stressful at all, somewhat stressful, quite stressful, and very stressful
Family and medical history of HTN	Nominal: History, and no history
Body mass index (BMI) of students	Ordinal: underweight ($<18.5 Kg/m^2$), healthy weight ($18.5\text{-}24.9 Kg/m^2$), overweight ($25\text{-}29.9 Kg/m^2$), obese ($30\text{-}34.9 Kg/m^2$), severely obese $35\text{-}39.9 Kg/m^2$, and morbidly obese ($\geq 40 Kg/m^2$)

3.10 Quality Control

The data was gathered in two stages: The first stage (Questionnaire completion). was done by participants themselves Standardized procedure was used for the data collection to ensure uniformity and high-quality data. The participants were encouraged to answer the questionnaires independently. Questionnaires were transformed into Google Forms with invited link: https://forms.gle/YQ1e1PNY5ZmovX3PA. All participants were invited to a common venue to obtain the data. Computers were set to help respondents to fill in the Google Forms with the help of a research assistant. Questionnaires were checked for completeness before they were submitted.

In the second part, anthropometric measures were taken by eight (8) trained nurses. To ensure accurate blood pressure measurement, the following points were ensured;

i. The accuracy of the devices (sphygmomanometer, and patient weighting scale) was checked.

The sphygmomanometer's accuracy was tested by replacing the batteries with new ones. A person whose blood pressure was known was measured to see if the sphygmomanometer could produce the same result.

The correctness of the patient weighing scale was examined by verifying that the scale is adjusted to zero before weighing a familiar object. An object whose weight was known was weighed and this was repeated to check on the consistency of the value produced. Two objects were weighed together if the total value obtained was the sum of the individual values. The scale was moved to a new location, and a familiar object was weighed to discover if it had changed weight.

ii. All participants' blood pressure was measured twice at 10 minutes intervals and the average was taken. This made it easier to get an accurate reading of the participants' blood pressure.

iii. The day before the study, all participants were asked to abstain from eating, coffee, cigarettes, and alcohol for six (6) hours before collecting their blood pressure reading.

iv. All participants were asked to sit quietly with their legs and ankles uncrossed and their backs supported against a chair in a relaxed position for at least 10 minutes before measurement. They were encouraged to remain quiet during measurement.

v. The participant's arm was ensured in a proper position. The same arm was used when taking the second measurement. The arm was lifted to the level of the participant's heart and rested on a table.

vi. The cuff was placed on the participant's exposed skin and not over their clothes. Pulling a sleeve up till it encircles the arm could result in erroneous measurement, so participants were encouraged to wear short sleeves or shirts that made it easy for them to slip their arm out of the sleeve.

3.11 Data Analysis

The data were downloaded from the Google Form into Microsoft Excel, cleaned, coded, imported, and analyzed by employing the computer software IBM Statistical Package for the Social Sciences (SPSS) version 24. Descriptive statistics were performed for continuous data, using the mean and standard deviation, and for categorical data, using percentage and frequency tables.

The data were analyzed through univariate analysis to investigate if the independent and dependent variables have a connection. Firstly, bivariate relationship using Pearson's chi-square test or Fisher's exact test for categorical variables, where applicable, was tested. The students' t-test was

used for continuous variables that followed a normal distribution and Kruskal Wallis test for continuous variables that were not normally distributed. Furthermore, the binary logistic model was used to test the association between the factors and the dependent variable. A p-value of 0.05 was taken as statistically significant and the prevalence of HTN was compared among the students.

3.12 Ethical consideration

Ethical considerations were considered in this research. Ethical approval was obtained from KNUST, Ethical Board for approval to conduct the research. Consent was obtained from School of Nursing and Midwifery, UDS and respondents by assuring them of confidentiality before administering the questionnaire. Thus, a written informed consent (see Appendix II) was submitted in two copies to all willing students before any questionnaire was administered.

The participant information leaflet provided information on the purpose of the research, potential risks and discomforts, potential benefits, costs/compensation, confidentiality, sharing of results, voluntariness, the option to drop out of the research, and contacts for additional data. The consent form also provided information on the statement of a person giving consent and the statement of the person obtaining informed consent.

Finally, anonymity and confidentiality were ensured by assigning codes to questionnaires, and information obtained was not used in any way against the participant except for the purpose stated.

CHAPTER FOUR

RESULTS

4.0 Introduction

This part outlines the results of the research. The results have been presented using both descriptive and inferential statistics. First, the distribution of the socio-demographic characteristics of students, the prevalence of HTN among students, and the knowledge level of students on hypertension. Second, the inferential analysis examined the causes that are linked to HTN among the students.

4.1 Socio-demographic Characteristics of the respondents

There were 422 students recruited for the study. However, 412 students completed the study, yielding a response rate of 97.6%. Two students failed to meet the inclusion requirements because they were pregnant and 8 students did not show up. The features of these 412 students are represented in Table 4.

The result showed that 207 (50.2%) of the students were from the Department of Nursing. The students were aged 18 and 44 years old. The average age of students was 29.01 years with a standard deviation of ($SD = \pm 5.48$). It was also revealed that 92 (22.3%) of the students were Dagomba. The majority of the students were females 317 (76.9%), reside in urban areas 214 (51.9%), live in off-campus hostels 385(93.4%), Christians 217 (52.7%), and single 260(63.1%).

All of the 412 (100.0%) students who took part in the study were Ghanaians. The result also showed that 99 (24.0%) were study Midwifery Generic. Less than half 176 (43.0%) of the students were in Level 300. There is more information available in Table 4.

Table 4 Socio-demographic Characteristics of the respondents (n=412)

Variable	Frequency	Percentage
Department		
Advance Nursing	14	3.4
Midwifery	178	43.2
Nursing	207	50.2
Pediatric Nursing	13	3.2
Sex		
Female	317	76.9
Male	95	23.1
Age group		
≤25	125	30.3
26-30	122	29.6
30-35	121	29.4
36-40	37	9.0
≥41	7	1.7
Ethnicity		
Akan	56	13.6
Bono	14	3.4
Dagaati	19	4.6
Dagomba	92	22.3
Ewe	30	7.3
Frafra	46	11.2
Gonja	25	6.1
Kassena	19	4.6
Kusaasi	9	2.2
Mamprusi	17	4.1
Mossi	22	5.3
Others*	63	15.3
Place of Residence		
Rural	198	48.1
Urban	214	51.9
Place of Residence on Campus		
Campus Hostel	27	6.6
Off-campus Hostel	385	93.4
Course of Study		
Midwifery Generic	99	24.0
Midwifery Matured	40	9.7
Midwifery Top Up	39	9.5
Nurse Practitioner	14	3.4
Nursing Generic	90	21.8
Nursing Matured	63	15.3
Nursing Top Up	54	13.1
Pediatric Nursing	13	3.2
Level of study		
200	82	20
300	176	43.0
400	154	37.0
Religion		
Christianity	217	52.7
Islamic	193	46.8
Traditionalist	1	0.2
None	1	0.2
Marital Status		
Married	122	29.6
Single	290	70.4

Source: field survey, 2022

*Others: Akyem, Bimoba, Birifo, Builsa, Busaga, Dagbon, Dagoa, Fante, Ga, Gurnisi, Hausa, Kakapo, Kasem, Komkomba, Krobo, Nabdam, Nafana, Sefwi, Sissala, Talensi and Yuroba.

4.1.1 Medical history of hypertension

The study assessed the history of HTN among students and their family members. The majority 193 (47.4%) of the students showed that they had family members with a history of hypertension. The majority 68 (35.2%) of the students indicated their fathers were hypertensive.

The students who knew of their BP measurement were 311 (76.4%). Out of these, 135 (43.4%) of them check their blood pressure once a year. More than half of them 144 (58.3%) were having normal BP levels. Those who were diagnosed by their doctor before the current study had the following readings; 140/96mmHg, and 165/100mmHg, but 1 (33.3%) could not recall their reading on a diagnosis.

Only 2 (66.7%) of the students who were diagnosed, were given prescribed drugs to lower their blood pressure. Lysinopril 10mg daily and Nifedipine 30mg daily were the prescribed drugs those two students who were diagnosed hypertensive were given. One of the students indicated that being hypertensive affects his studies. Table 5 provides more information on the history of HTN among students.

Table 5 Medical history of hypertension

Variable	Frequency (n)	Percentage (%)
Family history of hypertension		
Yes	193	47.4
No	157	38.6
Don't know	57	14.0
Total	407	100.0
Students' family members with a history of hypertension		
Aunty	3	1.6
Father	68	35.2
Grandparent	55	28.5
Mother	63	32.6
Mother and Father	1	0.5
Siblings	2	1.0
Uncle	1	0.5
Total	193	100.0
History of hypertension		
No	96	23.6
Yes	311	76.4
Total	407	100.0
The frequency at which students check their blood pressure measurement		
Every 3 – 4 months	74	23.8
Every 6 months	65	20.9
Monthly	37	11.9
Once a year	135	43.4
Total	311	100.0
Students' blood pressure levels when checked		
Normal	144	58.3
Prehypertension	31	12.6
HTN Stage 1	45	18.2
HTN State 2	27	10.9
Total	247	100.0
Students who had had a blood pressure reading of 140/90mmHg		
No	301	96.8
Yes	10	3.2
Total	311	100.0
Students diagnosed by a doctor to be hypertensive		
Yes	3	1.0
No	308	99.0
Total	311	100.0
Blood pressure reading on diagnosis		
140/96mmHg	1	33.3
165/100mmHg	1	33.3
Can't remember	1	33.3
Total	3	100.0
Number of students who had been prescribed medication to lower their blood pressure		
No	1	33.3
Yes	2	66.7
Total	3	100.0
List of medications Prescribed and their frequency of usage		
Lysinopril 10mg daily	1	50.0
Nifedipine 30mg daily	1	50.0
Total	2	100.0
Does being hypertensive affect your studies		
No	2	66.7
Yes	1	33.3
Total	3	100.0

Source: field survey, 2022

4.1.2 Prevalence of overweight and obesity among the students

The findings from the study showed that 19 (4.6%) of the students were underweight, with (BMI ≤18.4). The majority 267 (64.8%) of the students were having a healthy weight, (BMI = 18.5 – 24.9). The prevalence of overweight (BMI= 25.0 – 29.9) and obesity (BMI ≥30.0) among the students were 105 (25.5%) and 21 (5.1%) respectively.

4.2 Health and Lifestyle Related Factors among Respondents

4.2.1 The Quantity of Salt Students Take Daily

From the survey, the majority 304 (73.8%) of the students take 1 or more teaspoons of salt daily. Figure 2 provides more information on the quantity of salts students take daily. The result showed that the majority of the students 403 (97.8%), 336 (81.6%), 232 (78.4%), 316 (76.7%), and 396 (96.1%) do not eat diabetic diets, low carbohydrate/sugar diet, cholesterol diet, low salt diet, and no salt diet respectively. Students who do not follow weight reduction were 350 (85.0%). Again, there were 388 (94.2%) students that do not eat a vegetarian diet. More information is provided in Table 6.

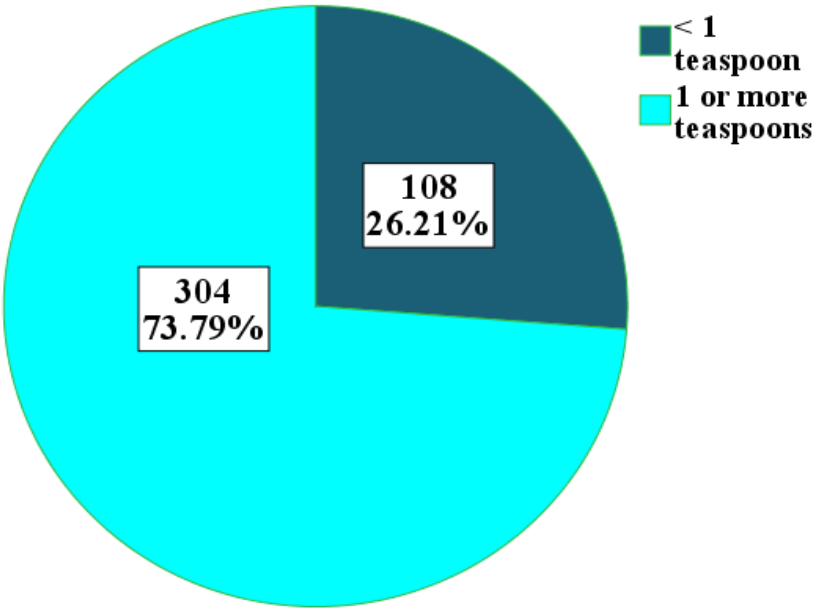

Figure 2 Quantity of salt students take daily

Source: field survey, 2022

Table 6 The Type of Diet Students are consuming (n = 412)

Variable	Frequency (n)	Percentage (%)
Diabetic		
No	403	97.8
Yes	9	2.2
Low Carbohydrate/Sugar		
No	336	81.6
Yes	76	18.4
Low Cholesterol		
No	323	78.4
Yes	89	21.6
Low Salt		
No	316	76.7
Yes	96	23.3
Weight Reduction		
No	350	85.0
Yes	62	15.0
Vegetarian		
No	388	94.2
Yes	24	5.8
No Salt		
No	396	96.1
Yes	16	3.9
No Special Diet		
No	351	85.2
Yes	61	14.8

Source: field survey, 2022

4.2.2 The Type of Physical Activity Students Engage In

According to the findings of the research, the vast majority 349 (84.7%) of the students were not engaged in an aerobic workout. The vast number of students 354 (85.9%) were not participating in bicycling. Students who did not engage in running/jogging were 296 (71.8%). The majority of the students 394 (95.6%) were not engaged in swimming. On the other hand, all the students 412 (100.0%) were engaged in walking.

From the result, it was revealed that, 49 (11.9%) of the students engaged in an aerobic workout. With students who engaged in bicycling, 41 (10.0%) do not regularly engaged in bicycling. For students who engaged in running/jogging, 71 (17.2%) do not regularly do so. For students who

engaged in swimming, 15 (3.6%) of the students do not regularly do so. All students 412 (100.0%) engaged in walking every day of the week. Table 7 provides more information on the frequency at which students engage in physical activities.

Table 7 Frequency of The Type of Physical Activity Students are Engaged

Variable	Frequency (n)	Percentage (%)
Aerobic Workout		
No	349	84.7
Yes	63	15.3
Frequency of aerobic work per week		
1 to 3 times	11	2.7
4 to 6 times	1	0.2
≥7 times	1	0.2
Inconsistently	49	11.9
0 times	350	85.0
Bicycling		
No	354	85.9
Yes	58	14.1
Frequency of bicycling per week		
1 to 3 times	11	2.7
4 to 6 times	1	0.2
≥7 times	3	0.7
Inconsistently	41	10.0
0 times	356	86.4
Running/Jogging		
No	296	71.8
Yes	116	28.2
Frequency of running/jogging per week		
1 to 3 times	33	8.0
4 to 6 times	11	2.7
≥7 times	0.2	0.5
Inconsistently	71	17.2
0 times	295	71.6
Swimming		
No	394	95.6
Yes	18	4.4
Frequency of swimming per week		
1 to 3 times	1	0.2
Inconsistently	15	3.6
0 times	396	96.1
Walking		
Yes	412	100.0
Frequency of walking per week		
1 to 3 times	22	5.3
4 to 6 times	40	9.7
≥7 times	297	72.1
Inconsistently	53	12.9

Source: field survey, 2022

2.5.2.8 The Duration of Physical Activity Students Engage In a week

The average duration of aerobic workouts students engage in a week is 3.44 minutes (SD = 10.15). The average duration of bicycling students engage in a week is 4.39 minutes (SD = 12.87). The average duration of running/jogging students engage in a week is 9.81 minutes (*SD* = 18.68). The average duration of swimming students engage in a week is 1.82 minutes (*SD* = 10.15). On the other hand, the average duration of walking students engage in a week was 82.84 minutes (*SD* = 110.748). Table 8 below contains the summary statistics of physical activity students engage in.

Table 8 The duration of physical activities students engaged in per week

Variable	Mean	Standard Deviation (*SD*)
Aerobic workout (minutes)	3.44	10.15
Bicycling (minutes)	4.39	12.87
Running/jogging (minutes)	9.81	18.68
Swimming (minutes)	1.82	10.15
Walking (minutes)	82.84	110.75

Source: field survey, 2021

4.2.3 Students who had smoked before

The result revealed that 400(97.1%) of the students had not smoked before. On the other hand, 12 (2.9%) of the students had smoked before. The average age of students who had smoked before was 19.33 years (*SD* = 2.77). None of the students smoked during the survey. The majority 273 (66.3%) of the students had no family members who smoke. On the other hand, 77 (18.7%) of the students had family members who smoke. However, 62 (15.0%) of the students indicated that they do not know if there was anybody in their family who smokes. Detailed information is represented in Figure 3 and Figure 4.

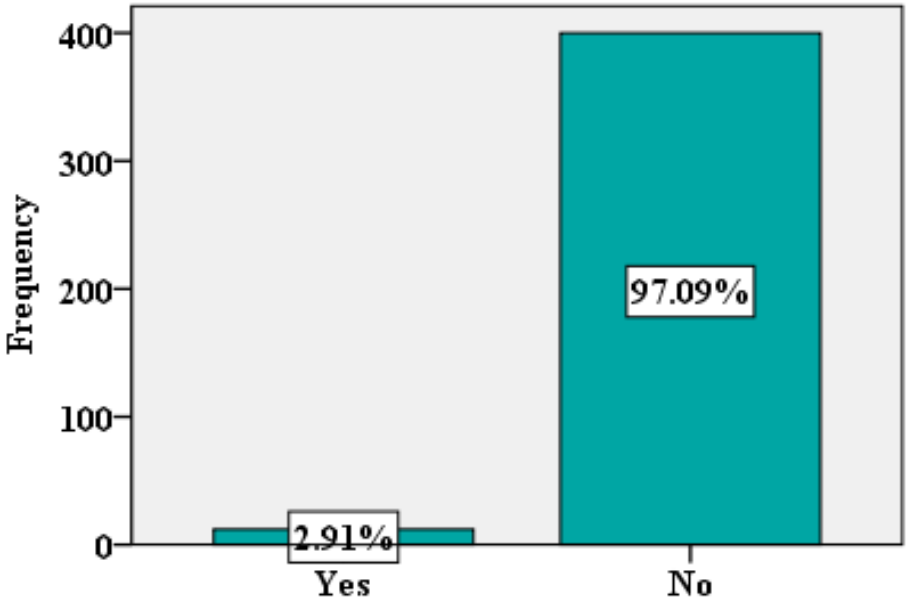

Figure 3 Students who had smoked before

Source: field survey, 2022

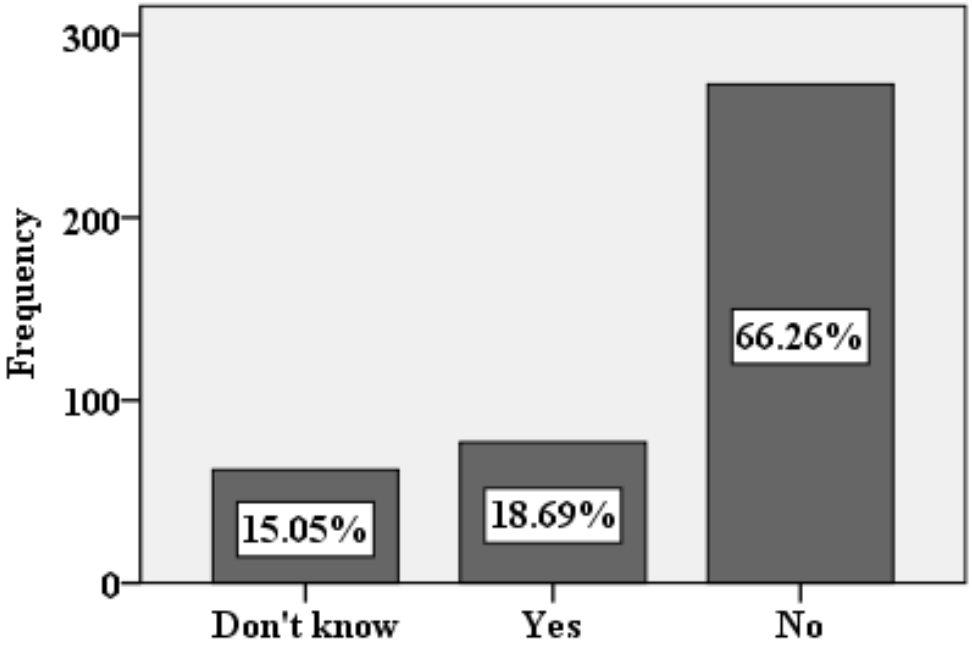

Figure 4 Students who had family members who smoke

Source: field survey, 2022

4.2.4 Students Who Had Taken Alcoholic Drink

The majority of students 325 (78.9%) have never consumed any alcoholic drink in their lifetime. However, 87 (21.1%) had taken alcoholic drinks such as beer, wine, spirits, akpeteshie, pito, palm wine, or bitters in their lifetime. The mean age of students who had drunk alcohol before was 20.07 years (*SD* = 4.81). During the survey, 57 (13.8%) stated that they were current consumers of alcohol. Figures 5 and 6 below provide more information on alcohol intake among students.

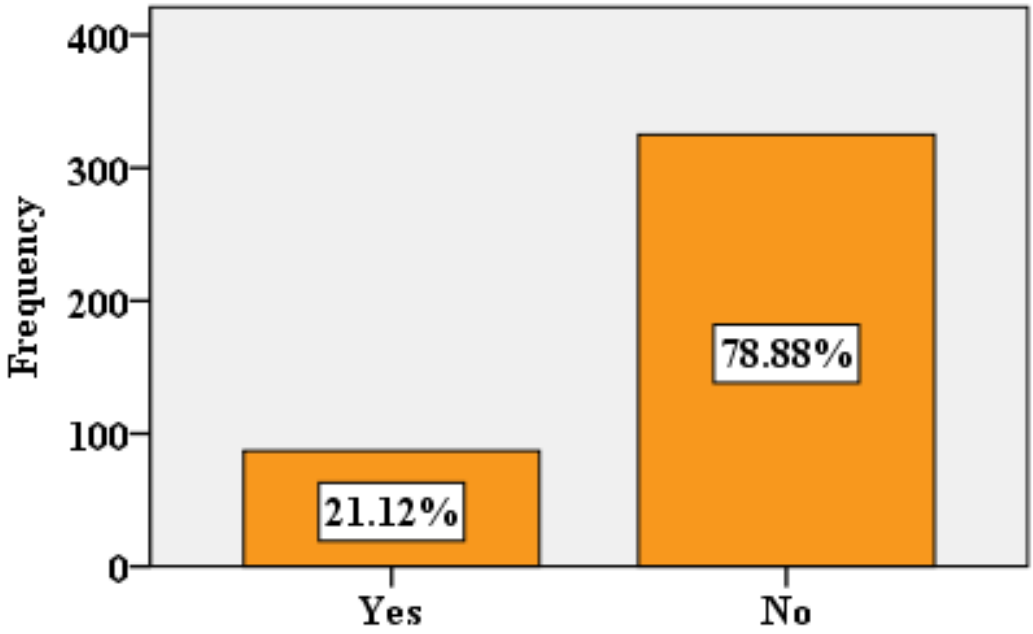

Figure 5 Students who have consumed alcoholic drinks in their lifetime.

Source: field survey, 2022

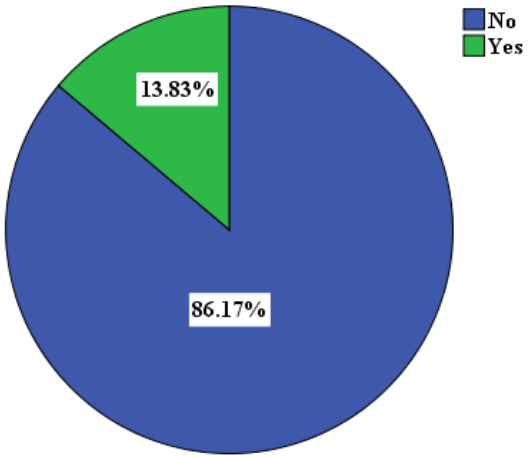

Figure 6 Number of students who currently consume alcohol

Source: field survey, 2022

4.2.5 Contraceptive Usage among Female Students

Results from the survey indicated that out of 317 (76.9%) female students, 107 (33.8%) of them had used oral contraceptives in their lifetime. Again, 90 (28.4%) female students currently consume oral contraceptives. The mean age of female students who had used oral contraceptives before was 22.83 years (*SD* = 3.78). Concerning the type of oral contraceptive female students used, 63 (70.0%) indicated emergency contraceptives. Table 9 below provides detailed information on the usage of oral contraceptives among female students at UDS.

Table 9 Contraceptive Usage among Female Students

Variable	Frequency (n)	Percentage (%)
Have you taken oral contraceptives before?		
Yes	107	33.8
No	210	66.2
Total	317	100.0
Do you currently take oral contraceptives?		
Yes	90	28.4
No	227	71.6
Total	317	100.0
Which type of oral contraceptive do you take?		
Emergency contraceptives	63	70.0
Pills	27	30.0
Total	90	100.0

Source: field survey, 2022

4.2.6 Stress assessment among students

The study categorized the causes of stress among UDS students into three categories; academic-related stress, psychosocial stress, and health-related stress. With academic-related stress, the majority 302 (73.3%) of the students stated high academic workload as very stressful. Dissatisfaction with face-to-face lectures was indicated as quite stressful by 129 (31.3%) of the students. Dissatisfaction with clinical was indicated to be somewhat stressful by 144 (35.0%) of the students. The high frequency of examinations was indicated to be very stressful by 263 (63.8%) of the students. Poor performance in examinations was stated to be very stressful by 213 (51.7%) of the students. Lack of learning materials was stated to be somewhat stressful by 178 (18.2%) of the students. Difficulty reading and understanding lecture notes/slides were stated to be somewhat stressful by 168 (40.8%) of the students.

Concerning psychosocial stressors, the inability to manage time was stated to be somewhat stressful by 137 (33.3%) of the students. Inability to concentrate during lectures was indicated to be quite stressful by 116 (28.2%) of the students. Anxiety about my performance in exams was indicated to be very stressful by 193 (46.8%) of the students. High parental expectations were indicated to be not stressful at all by 123 (29.8%) of the students. Worries about the future were indicated to be somewhat stressful by 119 (28.9%) of the students. Loneliness was stated to be not stressful at all by 138(33.5%) of the students. Financial problems were indicated to be very stressful by 296 (71.8) of the students. Family/marriage problems were also indicated to be not stressful at all by 127 (30.8%) of the students. Problems relating to members of the opposite sex were stated to be not stressful at all by 172(41.7%) of the students. Lack of time for relaxation was stated to be somewhat stressful by 124 (30.1%).

Concerning health-related stressors, lack of healthy diet/irregular eating habits was stated to be not stressful at all by 148 (35.9%) of the students. Sleep problems were stated to be somewhat stressful by 138 (33.5%) of the students. Illness/health problems were stated to be not stressful at all by 147 (35.7%) of the students. Problems with lectures online were stated to be very stressful by 173 (42.0%) of the students. Problems with lectures during face-to-face were stated to be very stressful by 177 (43.0%) of the students. Problems with accommodation were stated to be very stressful by 255 (61.9%) of the students. Problem with water was stated to be very stressful by 291 (70.6%) of the students. Problems with light were stated to be very stressful by 256 (62.1%) of the students. Problems with security were stated to be very stressful by 277 (67.2%) of the students. More information is provided in Table 10.

Table 10 Causes of stress among nursing and midwifery students

Stressor	Rating				
	Not stressful at all	Somewhat stressful	Quite stressful	Very stressful	Mean (Standard Deviation)
Academic-related					
High academic workload	7(1.7%)	37(9.0%)	66(16.0%)	302(73.3%)	3.61(0.722)
Dissatisfaction with online lectures	60(14.6%)	153(37.1%)	91(22.1%)	108(26.2%)	2.60(1.029)
Dissatisfaction with face-to-face lectures	77(18.7%)	97(23.5%)	129(31.3%)	109(26.5%)	2.66(1.064)
clinicals Dissatisfaction	82(19.9%)	144(35.0%)	68(16.5%)	118(28.6%)	2.54(1.106)
High frequency of examinations	32(7.8%)	38(9.2%)	79(19.2%)	263(63.8%)	3.39(0.944)
Poor performance in examinations	31(7.5%)	71(17.2%)	97(23.5%)	213(51.7%)	3.19(0.977)
Lack of learning materials	46(11.2%)	178(43.2%)	75(18.2%)	113(27.4%)	2.62(1.005)
Difficulty reading and understanding lecture notes/slides	58(14.1%)	168(40.8%)	82(19.9%)	104(25.2%)	2.56(1.017)
Psychosocial					
Inability to manage time	83(20.1%)	137(33.3%)	95(23.1%)	97(23.5%)	2.50(1.061)
Inability to concentrate during lectures	69(16.7%)	154(37.4%)	116(28.2%)	73(17.7%)	2.47(0.970)
Anxiety about my performance in exams	39(9.5%)	76(18.4%)	104(25.2%)	193(46.8%)	3.09(1.012)
High parental expectations	123(29.8%)	104(25.2%)	77(18.7%)	108(26.2%)	2.41(1.169)
Worries about future	82(19.9%)	119(28.9%)	107(26.0%)	104(25.2%)	2.57(1.073)
Loneliness	138(33.5%)	129(31.3%)	63(15.3%)	82(19.9%)	2.22(1.114)
Financial problems	17(4.1%)	32(7.8%)	67(16.3%)	296(71.8%)	3.56(0.807)
Family/marriage problems	127(30.8%)	103(25.0%)	73(17.7%)	109(26.5%)	2.40(1.178)
Difficulty relating to members of the opposite sex	172(41.7%)	128(31.1%)	54(13.1%)	58(14.1%)	2.00(1.056)
Lack of time for relaxation	107(26.0%)	124(30.1%)	83(20.1%)	98(23.8%)	2.42(1.114)
Health-related					
Lack of healthy diet/irregular eating habit	148(35.9%)	127(30.8%)	75(18.2%)	62(15.0%)	2.12(1.063)
Sleep problems	125(30.3%)	138(33.5%)	78(18.9%)	71(17.2%)	2.23(1.064)
Illness/health problems	147(35.7%)	123(29.9%)	60(14.6%)	82(19.9%)	2.19(1.125)
Problems with lectures during online	40(9.7%)	99(24.0%)	100(24.3%)	173(42.0%)	2.99(1.025)
Problems with lectures during face-to-face	54(13.1%)	55(13.3%)	126(30.6%)	177(43.0%)	3.03(1.043)
Problems with accommodation	40(9.7%)	39(9.5%)	78(18.9%)	255(61.9%)	3.33(0.998)
Problems with water	21(5.1%)	27(6.6%)	73(17.7%)	291(70.6%)	3.54(0.829)
Problems with light	28(6.8%)	38(9.2%)	90(21.8%)	256(62.1%)	3.39(0.913)
Problems with security	26(6.3%)	42(10.2%)	67(16.3%)	277(67.2%)	3.44(0.192)

Source: field survey, 2022

4.3 The overall prevalence of HTN among the respondents

According to the result (Figure 7), the total prevalence of HTN among the students was 39.8% (95% CI: 35.0% to 44.7%)..

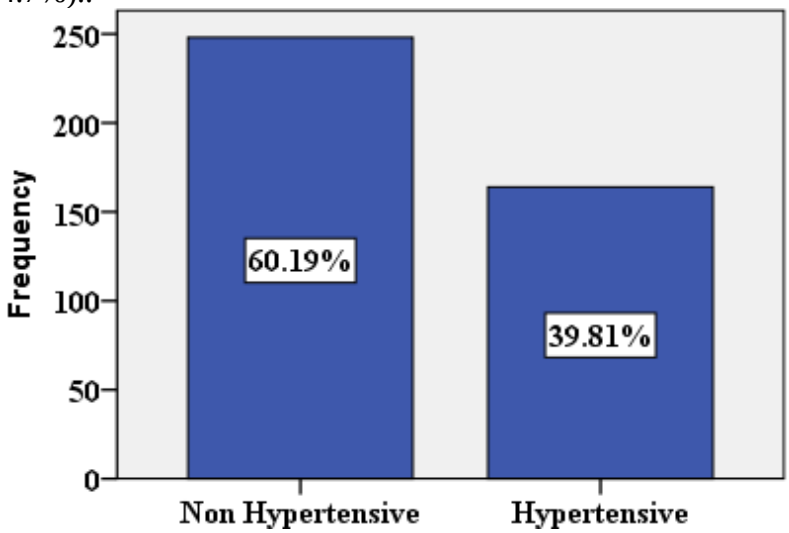

Figure 7 The prevalence of HTN among the students

Source: field survey, 2022

4.3.1 The Prevalence of HTN Among Nursing and Midwifery Students

The prevalence of prehypertension, stage 1 hypertension, and stage 2 HTN in the students was 9.5% (95% CI: 2.8% to 16.2%), 16.3% (95% CI: 9.6% to 23.0%), and 23.5% (95% CI: 16.8% to 30.2%), respectively. Table 11 contains more information.

Table 11: Prevalence of HTN among the students.

24-Hour Mean Arterial Pressure Categories	24-Hour Mean Arterial Pressure Thresholds, mmHg	Frequency (n)	Percentage (%)
Normal	Less 90	209	50.7
Prehypertension	90 to 91	39	9.5
Stage-1 Hypertension	92 to 95	67	16.3
Stage-2 Hypertension	≥ 96	97	23.5

Source: field survey, 2022

4.3.2 Prevalence of systolic blood pressure among the students

The majority 49.0% (95% CI: 44.2% to 53. %) of the students were with the normal range of systolic blood pressure. Results from the study showed that 33.0% (95% CI: 28.2% to 37.8%),

14.1% (95% CI: 9.3% to 18.9%), and 3.9% (95% CI: -0.9% to 8.7%) of the students presented with prehypertension, prevalence of stage 1 SBP, and stage 2 DBP, respectively. Table 12 presents more information.

Table 12: Prevalence of systolic blood pressure among the students

Blood Pressure Category	Systolic mmHg (Upper number)	Frequency (n)	Percentage (%)
Normal	Less than 120	202	49.0
PreHTN	120 – 129	136	33.0
High Blood Pressure (Stage 1 Hypertension)	130 – 139	58	14.1
High Blood Pressure (Stage 2 Hypertension)	140 or higher	16	3.9

Source: field survey, 2022

4.3.3 Prevalence of diastolic blood pressure among the students

The prevalence of normal diastolic blood pressure among the students was 68.9% (95% CI: 64.2% to 73.6%). It was also revealed that, 24.8% (95% CI: 20.1% to 29.5%), 6.1% (95% CI: 1.4% to 10.9%) and 0.2% (95% CI: -4.5% to 4.9%) presented with prehypertension, stage-1, and stage-2 prevalence of diastolic blood pressure, respectively. Table 13 contains more information.

Table 13: Prevalence of diastolic blood pressure among the students

Blood Pressure Category	Diastolic mmHg (Lower number)	Frequency (n)	Percentage (%)
Normal	Less than 80	284	68.9
PreHTN	80 – 89	102	24.8
High Blood Pressure (HTN Stage 1)	90 – 99	25	6.1
High Blood Pressure (HTN Stage 2)	100 or higher	1	0.2

Source: field survey, 2022

4.3.4 Distribution of the prevalence of HTN by students' background characteristics

It was indicated that more male students (50.5%) are hypertensive than female students (36.6%). The results showed a statistically significant association between sex and HTN (X^2 = 5.922, p = 0.015).

It was shown that students aged 36 – 40 years (72.2%) have a higher proportion of HTN than different age groups. The result displayed a statistically significant correlation between age and HTN (X^2 = 36.767, p < 0.001).

Students who stay in rural areas (47.5%) have a higher proportion of HTN than those students who stay in urban areas (32.7%). There was a statistically significant correlation between the place of residence and HTN (X^2 =.9.357, p = 0.002).

Students who live in off-campus hostels (41.8%) have a higher proportion of HTN than students who live in campus hostels (11.1%). Students' place of residence on campus showed a significant relationship with the prevalence of HTN (X^2 =.9.929, p = 0.002).

Students in Level 300 (46.7%) have a higher proportion of HTN than the rest of the levels. The level of students showed a statistically significant association with HTN (X^2 =.12.355, p = 0.002).

Students who had separated (100.0%) have a higher proportion of HTN than the rest of the marital status. The marital status of students displaced a statistically significant association with HTN (X^2 =.16.167, p = 0.003).

It was again revealed that both overweight students (42.9%) and obese students (42.9%) have a higher proportion of HTN than the rest of the BMI categories. The result showed a statistically significant association between BMI and HTN (X^2 =.10.067, p = 0.018).

Students who take 1 or more teaspoons of salt daily (43.1%) have a higher proportion of HTN than those who take less than 1 teaspoon daily (30.6%). The number of salt students takes daily showed a statistically significant association with HTN (X^2 =.5.227, p = 0.002).

However, students with good knowledge level on HTN (39.9%) reported a higher proportion of HTN than those with poor knowledge. More information is provided in Table 14.

Table 14: Distribution of HTN by the background characteristics of students

Variable	Prevalence of hypertension		
	Not Hypertensive n (%)	Hypertensive n (%)	Chi-square Test (P-value)
Sex			
Male	47(49.5)	48(50.5)	5.922
Female	201(63.4)	116(36.6)	**(0.015)**
Age (years)			
≤ 25	95(75.4)	31(24.6)	36.767
26 – 30	80(66.1)	41(33.9)	**(< 0.001)**
31 – 35	60(49.2)	62(50.8)	
36 – 40	10(27.8)	26(72.2)	
≥ 41	3(42.9)	4(57.1)	
Place of Residence			
Urban	144(67.3)	70(32.7)	9.357
Rural	104(52.5)	94(47.5)	**(0.002)**
Place of Residence on Campus			
Campus hostel	24(88.9)	3(11.1)	9.929
Off-campus hostel	224(58.2)	161(41.8)	**(0.002)**
Level			
200	72(75.0)	24(25.0)	12.355
300	90(53.3)	79(46.7)	**(0.002)**
400	86(58.5)	61(41.5)	
Religion			
Christianity	135(62.2)	82(37.8)	2.919
Islamic	122(58.0)	81(42.0)	(0.404)
Traditionalist	0(0.0)	1(100.0)	
None	1(100.0)	0(0.0)	
Marital status			
Single	170(65.4)	90(34.6)	16.167
Married	57(46.7)	65(53.3)	**(0.003)**
Separated	0(0.0)	1(100.0)	
Dating	19(70.4)	8(29.6)	
Cohabitating	2(100.0)	0(0.0)	
BMI Categories (Kg/m^2)			
Underweight	18(94.7)	1(5.3)	10.067
Healthy weight	158(59.2)	109(40.8)	**(0.018)**
Overweight	60(57.1)	45(42.9)	
Obese	12(57.1)	9(42.9)	
Family history of hypertension			
Yes	112(58.0)	81(42.0)	0.966
No	96(61.1)	61(38.9)	(0.617)
Don't know	37(64.9)	20(35.1)	
Quantity of salt students take daily			
< 1 teaspoon	75(69.4)	33(30.6)	5.227
1 or more teaspoons	173(56.9)	131(43.1)	**(0.022)**
Smoke consumption			
Yes	7(58.3)	5(41.7)	0.018
No	241(60.3)	159(39.8)	(0.894)
Alcohol intake			
Yes	50(57.5)	37(42.5)	0.341
No	198(60.9)	127(39.1)	(0.559)
Contraceptive Usage mong Female Students			
Yes	66(61.7)	41(38.3)	0.134
No	182(59.7)	123(40.3)	(0.715)
Knowledge level			
Poor	5(62.5)	3(37.5)	0.018
Good	243(60.1)	161(39.9)	(0.893)

Source: field survey, 2022

4.3.5 Distribution of normal, prehypertension, stage-1, and stage-2 HTN according to respondents' characteristics.

The result of the study revealed that the prevalence of stage-2 HTN was more in male students (27.4%) than in female students (22.4%). The result of the investigation indicated a statistically significant relationship between sex and HTN (X^2 =.10.378, p = 0.016).

The result indicated that the prevalence of preHTN was greater among participants aged 41 years and older (14.3%). Again, more students aged 41 years and above reported a greater prevalence of both stage 1 HTN and stage 2 HTN (28.6%). The result detected a statistically significant relationship between age and HTN (X^2 =.49.287, p < 0.001).

Furthermore, the prevalence of preHTN was higher among urban dwellers (12.1%) than rural dwellers (6.6%). The result also indicated that stage-1 and stage-2 HTN were more prevalent among rural residents (17.2%) and (30.3%), respectively. The result revealed a statistically significant connection between the place of residence and HTN (X^2 =.12.688, p = 0.005).

The prevalence of preHTN was higher among students who stay in campus hostels (14.8%). It was also revealed that both stage-1 and stage-2 HTN were higher among students who stay in off-campus hostels (17.1%) and (24.7%), respectively. The findings of the research showed a statistically significant correlation between the place of residence on campus and HTN (X^2 =9.975, p = 0.019). Table 15 provides more information.

Table 15: Prevalence of preHTN and HTN Stage 1 and Stage 2 by students' characteristics

	Categories of HTN among students				
	Normal = 209	**PreHTN = 39**	**Stage-1 HTN = 67**	**Stage-2 HTN = 97**	**Pearson X^2** ***(P – value)***
Variable	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Sex					
Male	35(36.8)	12(12.6)	22(23.2)	26(27.4)	10.378
Female	174(54.9)	27(8.5)	45(14.2)	71(22.4)	**(0.016)**
Age (years)					
≤ 25	80(63.5)	15(11.9)	13(10.3)	18(14.3)	49.287
26 – 30	68(56.2)	12(9.9)	24(19.8)	17(14.0)	**(< 0.001)**
31 – 35	50(41.0)	10(8.2)	22(18.0)	40(32.8)	
36 – 40	9(25.0)	1(2.8)	6(16.7)	20(55.6)	
≥ 41	2(28.6)	1(14.3)	2(28.6)	2(28.6)	
Place of residence					
Urban	118(55.1)	26(12.1)	33(15.4)	37(17.3)	12.688
Rural	91(46.0)	13(6.6)	34(17.2)	60(30.3)	**(0.005)**
Place of residence on campus					
Campus hostel	20(74.1)	4(14.8)	1(3.7)	2(7.4)	9.975
Off-campus hostel	189(49.1)	35(9.1)	66(17.1)	95(24.7)	**(0.019)**
Marital Status					
Single	142(54.6)	28(10.8)	38(14.6)	52(20.0)	20.659
Married	47(38.5)	10(8.2)	26(21.3)	39(32.0)	(0.056)
Separated	0(0.0)	0(0.0)	0(0.0)	1(100.0)	
Dating	18(66.7)	1(3.7)	3(11.1)	5(18.5)	
Cohabitating	2(100.0)	0(0.0)	0(0.0)	0(0.0)	
Religion					
Christianity	114(52.5)	21(9.7)	38(17.5)	44(20.3)	15.457
Islamic	95(49.2)	17(8.8)	29(15.0)	52(26.9)	(0.079)
Traditionalist	0(0.0)	0(0.0)	0(0.0)	1(100.0)	
No	0(0.0)	1(100.)	0(0.0)	0(0.0)	
BMI Categories (Kg/m^2)					

≤ 18.4	15(78.9)	3(15.8)	0(0.0)	1()5.3	15.233
18.5 – 24.9	136(50.9)	22(8.2)	43(16.1)	66(24.7)	(0.082)
25.0 – 29.9	47(44.8)	13(12.4)	22(21.0)	23(21.9)	
≥ 30	11(52.4)	1(4.8)	2(9.5)	7(33.3)	
Quantity of salt intake					
< 1 teaspoon	63(58.3)	12(11.1)	18(16.7)	15(13.9)	7.897
≥ 1 teaspoon	146(48.0)	27(8.9)	49(16.1)	82(27.0)	**(0.048)**
Alcohol intake					
Yes	41(47.1)	9(10.3)	15(17.2)	22(25.3)	0.579
No	168(51.7)	30(9.2)	52(16.0)	75(23.1)	(0.901)
Smoking status of students					
Yes	6(50.0))	1(8.3)	2(16.7)	3(25.0)	0.030
No	203(50.0)	38(9.5)	65(16.3)	94(23.5)	(0.999)
Contraceptive Usage among Female Students					
Yes	56(52.3)	10(9.3)	10(9.3)	31(29.0)	6.137
No	153(50.2)	29(9.5)	57(18.7)	66(21.6)	(0.105)
History of hypertension					
Yes	1(10.0)	1(10.0)	4(40.0)	4(40.0)	8.039
No	206(51.9)	37(9.3)	63(15.9)	91(22.9)	**(0.045)**
Family history of hypertension					
Yes	94(45.4)	18(47.4)	33(49.3)	48(50.5)	4.861
No	83(40.1)	13(34.2)	22(32.8)	39(41.1)	(0.562)
Don't know	30(14.5)	7(18.4)	12(17.9)	8(8.4)	

Source: researcher's computations, 2022

4.3.6 Causes of stress among respondents by categories of hypertension

The result of the study showed that dissatisfaction with clinicals (M = 2.66, SD = 1.080) put more stress on students with no HTN as compared to students with HTN (M = 2.36, SD = 1.124). The result showed a statistically significant association between dissatisfaction with clinicals and development of HTN (p = 0.007). It was revealed that lack of learning materials put more stress on students with no HTN (M = 2.79, SD = 1.012) as compared to students with HTN (M = 2.40, SD = 0.957). The result showed a statistically significant association between lack of learning materials and HTN among the students (p < 0.001).

Moreover, financial problems (M = 3.66, SD = 0.713) put more stress on students with HTN as compared to students with no HTN (M = 3.49, SD = 0.858). The result showed a statistically significant association between financial problems and development of HTN among the students (p = 0.040). The result also showed that high parental expectations put more stress on students with no HTN (M = 2.56, SD = 1.152) as compared to students with HTN (M = 2.15, SD = 1.147). There was a statistically significant association between high parental expectations and development of HTN (p < 0.001). It was revealed that family/marriage problems put more stress on students with no HTN (M = 2.51, SD = 1.1221) as compared to students with HTN (M = 2.23, SD = 1.094). The result showed a statistically significant association between family/marriage problems with HTN (p = 0.020). The result showed that lack of time for relaxation put more stress on students with no HTN (M = 2.58, SD = 1.135) as compared to students with HTN (M = 2.17, SD = 1.037). The result showed a statistically significant association between lack of time for relaxation and development of HTN (< 0.001).

Furthermore, among the health-related stressors, illness/health problems put more stress on students with no HTN (M = 2.34, SD = 1.166) as compared with students with HTN (M = 1.95,

SD = 1.020). The result found a statistically significant association between illness/health problems and development o HTN (p = 0.001). The result found that problems with accommodation put more stress on students with HTN (M = 3.51, SD = 0.883) as compared to students without HTN (M = 3.21, SD = 1.052). The result showed a statistically significant association between problems with accommodation and development of HTN (p = 0.002). More information is provided in Table 16.

Table 16: Causes of stress among respondents by categories of hypertension.

Category	Overall Prevalence of Hypertension				
	Non-hypertensive	Hypertensive	Total scores	At 95 CI of Total Scores	P-value
	Mean (SD)	Mean (SD)	Mean (SD)		
Academic-related stress					
High academic workload	3.56(0.740)	3.68(0.690)	3.61(0.722)	(3.54 – 3.68)	0.092
Dissatisfaction with online lectures	2.67(0.996)	2.49(1.071)	2.60(1.029)	(2.50 – 2.70)	0.090
Dissatisfaction with face-to-face lectures	2.73(1.029)	2.55(1.109)	2.66(1.064)	(2.55 – 2.76)	0.098
Dissatisfaction with clinicals	2.66(1.080)	2.36(1.124)	2.54(1.106)	(2.43 – 2.65)	**0.007**
High frequency of examinations	3.35(0.940)	3.46(0.649)	3.39(0.944)	(3.30 – 3.48)	0.245
Poor performance in examinations	3.14(0.976)	3.28(0.975)	3.19(0.977)	(3.10 – 3.29)	0.145
Lack of learning materials	2.79(1.012)	2.40(0.957)	2.62(1.005)	(2.52 – 2.72)	< **0.001**
Difficulty reading and understanding lecture notes/slides	2.6(1.039)	2.37(0.953)	2.56(1.017)	(2.46 – 2.66)	**0.001**
Psychosocial					
Inability to manage time	2.57(1.074)	2.39(1.036)	2.50(1.061)	(2.40 – 2.60)	0.088
Inability to concentrate during lectures	2.57(0.950)	2.32(0.983)	2.47(0.970)	(2.37 – 2.56)	**0.010**
Anxiety about my performance in exams	3.09(0.990)	3.10(1.049)	3.09(1.012)	(3.00 – 3.19)	0.884
High parental expectations	2.56(1.152)	2.15(1.147)	2.41(1.169)	2.30 – 2.53	< **0.001**
Worries about future	2.73(1.048)	2.32(1.068)	2.57(1.073)	2.46 – 2.67	< **0.001**
Loneliness	2.38(1.139)	1.97(1.030)	2.22(1.114)	(2.11 – 2.32)	< **0.001**
Financial problems	3.49(0.858)	3.66(0.713)	3.56(0.807)	(3.48 – 3.64)	**0.040**
Family/marriage problems	2.51(1.221)	2.23(1.094)	2.40(1.178)	2.28 – 2.51	**0.020**
Difficulty relating to members of the opposite sex	2.10(1.116)	1.84(0.940)	2.00(1.056)	1.89 – 2.10	**0.016**
Lack of time for relaxation	2.58(1.135)	2.17(1.037)	2.42(1.114)	2.31 – 2.53	< **0.001**
Health-related					
Lack of healthy diet/irregular eating habit	2.20(1.086)	2.01(1.021)	2.12(1.063)	2.02 – 2.23	0.083
Sleep problems	2.36(1.059)	2.04(1.044)	2.23(1.064)	2.13 – 2.33	**0.003**
Illness/health problems	2.34(1.166)	1.95(1.020)	2.19(1.125)	2.08 – 2.30	**0.001**
Problems with lectures during online	2.97(1.002)	3.01(1.062)	2.99(1.025)	2.89 – 3.08	0.667
Problems with lectures during face-to-face	2.96(1.050)	3.15(1.025)	3.03(1.043)	2.93 – 3.14	0.061
Problems with accommodation	3.21(1.052)	3.51(0.883)	3.33(0.998)	3.23 – 3.43	**0.002**

Problems with water	3.50(0.849)	3.60(0.797)	3.54(0.829)	3.46 – 3.62	0.243
Problems with light	3.35(0.936)	3.46(0.875)	3.39(0.913)	3.30 – 3.48	0.205
Problems with security	3.42(0.914)	3.48(0.910)	3.44(0.912)	3.36 – 3.53	0.570

4.4 Knowledge about HTN among Students

4.4.1 Heard about HTN

The findings of the investigation displaced that the majority (98.8%) of the students had heard of hypertension. All the respondents who reported having heard about HTN indicated that HTN is high BP. The result showed that the majority of the students (97.8%) indicated that HTN is extremely dangerous to a person's health. The majority of the students (92.4%) stated that lowering high BP would rise a person's health. Again, it was indicated by the majority of the students (92.6%) and (92.1%) that the topic number and the bottom number reported for blood pressure measurement are systolic and diastolic respectively. The normal BP level for the top number and bottom number was stated to be 120 and 80 by (72.2%) and (74.2%) of the students respectively.

In addition, the result revealed that the majority of the students (61.9%) and (60.4%) stated that the level of an individual's blood pressure is high for the top number and bottom numbers were ≥ 140 and ≥ 90, respectively. The top number and bottom number were both stated to be important in blood pressure measurement by (71.3%) of the students. It was also indicated by (96.1%) of the students that there are ways/strategies/activities that people can use to lower their BP. Table 17 provides more information.

Table 17 Knowledge about the measurement of blood pressure

Variable	Frequency (n)	Percentage (%)
Meaning of hypertension		
High blood pressure	407	100.0
How dangerous is HTN to a person's health?		
Extremely	398	97.8
Somewhat	7	1.7
Not at all	2	0.5
Would lowering high blood pressure improve a person's health?		
Yes	376	92.4
No	27	6.6
Don't know	4	1.0
Meaning of topic number reported for blood pressure measurement		
Systolic	377	92.6
Diastolic	13	3.2
Don't know	17	4.2
Meaning of bottom number reported for blood pressure measurement		
Systolic	14	3.4
Diastolic	375	92.1
Don't know	18	4.4
The normal blood pressure level for the top number		
120	294	72.2
< 120	85	20.9
> 120	27	6.6
Don't know	1	0.2
The normal blood pressure level for the bottom number		
80	302	74.2
< 80	73	17.9
> 80	31	7.6
Don't know	1	0.2
The level of an individual's blood pressure is high for the top number		
< 140	21	5.2
≥ 140	252	61.9
> 140	131	32.2
Don't know	3	0.7
The levels of an individual's blood pressure are high for the bottom number		
< 90	21	5.2
≥ 90	246	60.4
> 90	136	33.4
Don't know	4	1.0
The number (s) which is or are more important in blood pressure measurement		
Top	45	11.1
Bottom	68	16.7
Both	290	71.3
Don't know	4	1.0
Are there ways/strategies/activities that people can use to lower their blood pressure?		
Yes	391	96.1

No	12	2.9
Don't know	4	1.0

Source: field survey, 2022

4.4.2 Knowledge of students on the risk factors of HTN

The majority of the students 405 (99.5%) identified consumption of tobacco and alcohol as a causal factor for hypertension. Being overweight or obese and co-existing sicknesses (diabetes or kidney disease) was stated to be a risk factor by 400 (98.3%) and 391 (96.1%) of the students respectively. Table 18 provides more information.

Table 18 Knowledge about the risk factors of HTN

Statement	Yes	No	Don't know
Consumption of tobacco and alcohol	405(99.5%)	2(0.5%)	0(0.0%)
Unhealthy diets (high intake of salt, fat, low intake of fruits and vegetables)	398(97.8%)	6(1.5%)	3(0.7%)
High intake of oral contraceptives	277(68.1%)	66(16.2%)	64(15.7%)
Being overweight or obese	400(98.3%)	6(1.5%)	1(0.2%)
Co-existing diseases (diabetes or kidney disease)	391(96.1%)	11(2.7%)	5(1.2%)
Family history of hypertension	391(96.1%)	12(2.9%)	4(1.0%)
Physical inactivity	372(91.4%)	27(6.6%)	8(2.0%)
Age of a person	379(93.1%)	20(4.9%)	8(2.0%)
Gender of a person	281(69.0%)	86(21.1%)	40(9.8%)
Poor management of stress	368(90.4%)	28(6.9%)	11(2.7%)

Source: field survey, 2022

4.4.2.1 Knowledge level of respondents on risk factors of hypertension

According to the findings, the knowledge level of students on risk factors of HTN was 384 (93.2%) (Figure 8).

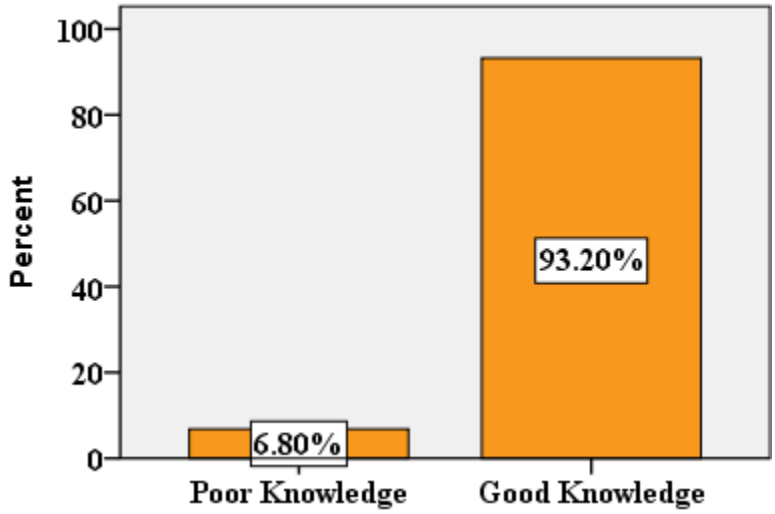

Figure 8: Knowledge level of respondents on risk factors of hypertension

Source: Field Survey, 2022

4.4.3 Knowledge about the symptoms of hypertension

The result reveled that the majority of the students stated early morning headaches 372 (91.4%), irregular heart rhythms357 (87.7%), and fatigue 369 (90.7%) as symptoms of hypertension. It was also revealed by the majority of the students that confusion 319 (78.9%), anxiety 369 (90.7%), and chest pain 354 (87.0%) as symptoms of HTN respectively. Table 19 provides more information.

Table 19 Knowledge about the symptoms of hypertension

Statement	Yes	No	Don't know
Early morning headaches	372(91.4%)	21(5.2%)	14(3.4%)
Nosebleeds	230(56.5%)	139(34.2%)	38(9.3%)
Irregular heart rhythms	357(87.7%)	35(8.6%)	15(3.7%)
Vision changes	351(86.2%)	38(9.3%)	18(4.4%)
Buzzing in the ears	252(61.9%)	100(24.6%)	55(13.5%)
Fatigue	369(90.7%)	35(86%)	3(0.7%)
Nausea	121(29.7%)	236(58.0%)	50(12.1%)
Vomiting	105(25.8%)	249(61.2%)	53(13.0%)
Confusion	319(78.4%)	67(16.3%)	21(5.2%)
Anxiety	369(90.7%)	29(7.1%)	9(2.2%)
Chest pain	354(87.0%)	39(9.6%)	14(3.4%)
Muscle tremors	303(74.4%)	61(15.0%)	43(10.6%)

Source: field survey, 2022

4.4.3.1 Knowledge level of respondents on symptoms of hypertension

The result revealed that the knowledge level of students on symptoms of HTN was 288 (69.9%) (Figure 9).

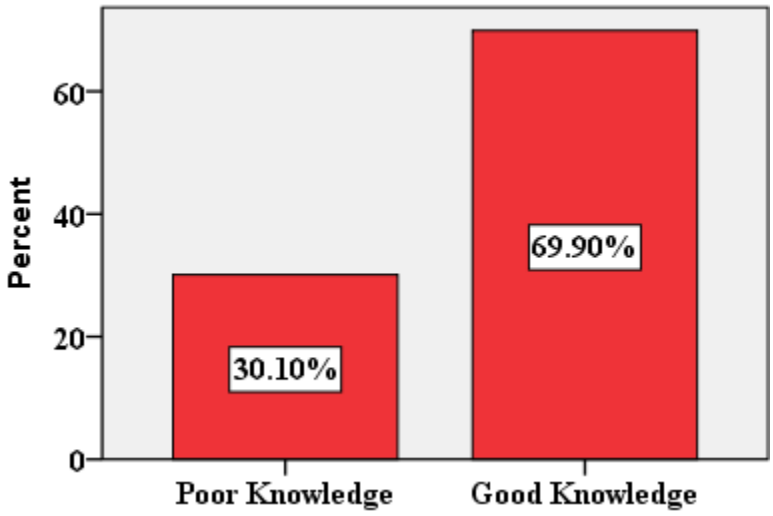

Figure 9 Knowledge level of students on symptoms of hypertension.

Source: Field survey, 2022

4.4.4 Knowledge of students about the prevention of hypertension

The majority of the students 401 (98.5%), 399 (98.0%), 401 (98.5%), and 396 (97.3 %) identified decreasing salt intake (to lower than 1 teaspoon a day), being physically strong regularly, stopping the use of tobacco, and reducing alcohol consumption as a preventive measure of hypertension. Detailed information is provided in Table 20.

Table 20 Knowledge about the prevention of hypertension

Statement	Yes	No	Don't know
Reducing salt intake (to less than 1 teaspoon daily)	401(98.5%)	5(1.2%)	1(0.2%)
Eating more fruit and vegetables	398(97.8%)	7(1.7%)	2(0.5%)
Being physically active on a regular basis	399(98.0%)	7(1.7%)	1(0.2%)
Avoiding the use of tobacco	401(98.5%)	5(1.2%)	1(0.2%)
Reducing alcohol consumption	396(97.3%)	11(2.7%)	0(0.0%)
Limiting the intake of foods high in saturated fats	304(74.7%)	69(17.0%)	34(8.4%)
Eliminating/reducing trans fats in diet	291(71.5%)	79(19.4%)	37(9.1%)

Source: field survey, 2022

4.4.4.1 Knowledge level of respondents on prevention of hypertension

According to the result, the knowledge level on the prevention of HTN among the students was 393 (95.4%) (Figure 10).

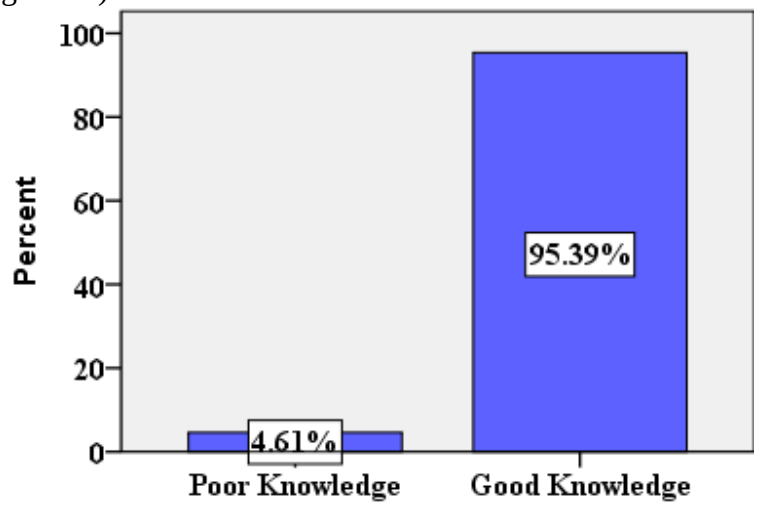

Figure 10: Knowledge level of students on prevention of hypertension.

Source: Field survey, 2022

4.4.5 Knowledge about the management of HTN

The majority of the students 388 (95.3%), and 403 (99.0%) stated stress reduction and management, and regularly checking BP as ways of HTN management respectively. Table 21 provides more information

Table 21 Knowledge about the management of HTN

Statement	Yes	No	Don't know
Reducing and managing stress	388(95.3%)	7(1.7%)	12(2.9%)
Regularly checking blood pressure	403(99.0%)	4(1.0%)	0(0.0%)
Treating high blood pressure	403(99.0%)	4(1.0%)	0(0.0%)
Managing other medical conditions	403(99.0%)	4(1.0%)	0(0.0%)

Source: field survey, 2022

4.4.5.1 Knowledge level of respondents on management of hypertension

The result revealed that the knowledge level of the students on the management of HTN was 404 (98.1%) (Figure 11).

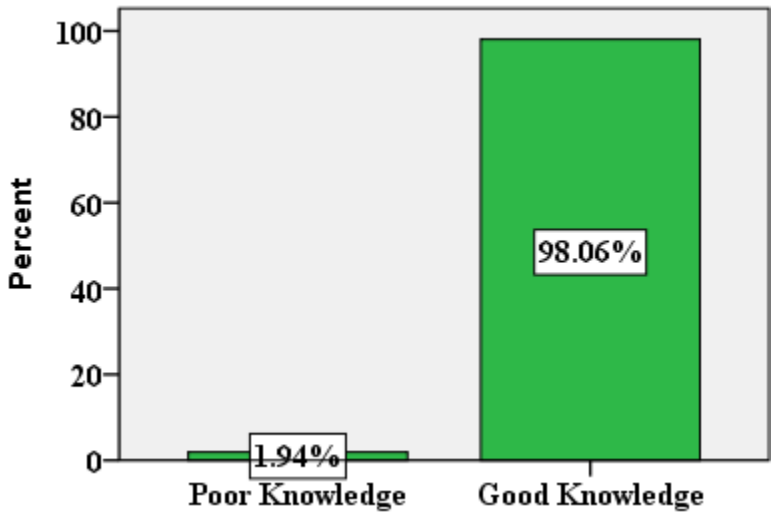

Figure 11: Knowledge level of students on the management of hypertension

Source: Field survey, 2022

4.5 Knowledge level of students about hypertension

From the survey, the average knowledge score was 36.6 (*SD* = 6.3) with a range of 0 to 44 points. According to the criteria used to evaluate the level of knowledge, the majority 299 (73.5%) of the students had a high knowledge level about hypertension. These were students who scored between 35 and 44 points. The number of students who had moderate knowledge of HTN was 106 (26.0%). These were students who scored between 23 and 34 points. Lastly, 2(0.5%) of the students had poor knowledge about hypertension. These are students who scored between 0 and 22 points. Table 22 contains more information.

Table 22: Level of Knowledge about HTN among students (n = 407)

Knowledge Scores	Rating	Frequency (n)	Percentage (%)
0 – 22	Low	2	0.5
23 – 34	Moderate	106	26.0
35 – 44	High	299	73.5

Source: field survey, 2022

4.5.1 Level of knowledge about HTN by students' characteristics

The findings showed that students aged 25 years and below (1.6%) reported higher proportion of both low levels of knowledge on HTN respectively. The majority of the students aged 31 – 35 years (87.7%) had the highest proportion of the high level of knowledge on hypertension. Age had a statistically significant relationship with the knowledge of hypertension.

Furthermore, Level 200 students (2.2%) had the highest percentage of students with both low levels of knowledge respectively. The result displaced that the majority of students in Level 400 (84.2%) had the highest proportion of a high level of knowledge. The result detected a statistically significant association between the level of students and knowledge of hypertension.

The result indicated a higher percentage of Pediatric students (84.6%) with a higher level of knowledge on hypertension. There was no statistically significant relationship between the course and level of knowledge. Detailed information is provided in Table 23.

Table 23 Level of knowledge about HTN by students' characteristics

Variable	Level of knowledge among students			Fisher's Test (P – Value)
	Low	Moderate	High	
	n (%)	n (%)	n (%)	
Sex				
Male	1(1.1)	21(22.3)	72(76.6)	1.622
Female	1(0.3)	85(27.2)	227(72.5)	(0.444)
Department				
Advance Nursing	0(0.0)	1(7.1)	13(92.9)	7.405 (0.285)
Midwifery	0(0.0)	42(24.0)	133(76.0)	
Nursing	2(1.0)	61(29.8)	142(69.3)	
Pediatric Nursing	0(0.0)	2(15.4)	11(84.6)	
Age				
≤ 25	2(1.6)	52(42.3)	69(56.1)	35.202
26 – 30	0(0.0)	30(25.2)	89(74.8)	**(< 0.001)**
31 – 35	0(0.0)	15(12.3)	107(87.7)	
36 – 40	0(0.0)	8(22.2)	28(77.8)	
≥ 41	0(0.0)	1(14.3)	6(85.7)	
Place of residence				
Urban	2(0.9)	56(26.5)	153(72.5)	1.953
Rural	0(0.0)	50(25.5)	146(74.5)	(0.377)
Place of residence on Campus				
Campus hostel	0(0.0)	10(38.5)	16(61.5)	2.319
Off-campus hostel	2(0.5)	96(25.2)	283(74.3)	(0.314)
Marital status				
Single	2(0.8)	74(28.9)	180(70.3)	7.767
Married	0(0.0)	(23(18.9))	99(81.1)	(0.457)
Separated	0(0.0)	0(0.0)	1(100.0)	
Dating	0(0.0)	9(34.6)	17(65.4)	
Cohabitating	0(0.0)	0(0.0)	2(100.0)	
Religion				
Christianity	0(0.0)	56(26.0)	159(74.0)	3.027
Islamic	2(1.1)	50(26.3)	138(72.6)	(0.805)
Traditionalist	0(0.0)	0(0.0)	1(100.0)	
None	0(0.0)	0(0.0)	1(100.0)	
Level				
200	2(2.2)	44(47.8)	46(50.0)	39.596
300	0(0.0)	39(23.1)	130(76.9)	**(< 0.001)**
400	0(0.0)	23(15.8)	123(84.2)	

Source: field survey, 2022

4.6 A binary logistic regression analysis of factors associated with hypertension

A binary logistics regression analysis (one model per outcome) was computed to estimate the odds ratio. Compared to students aged ≤ 25 years, the odds of acquiring HTN were found to be larger in students aged 31 to 35 years (OR = 2.51, 95%CI: 1.322 to 4.777, p = 0.005) and 36 to 40 years (OR = 6.67, 95% CI: 2.486 to 17890, p < 0.001). Compared to female students, the odds of acquiring HTN were seen to be higher in male students (OR = 1.66, 95% CI: 1.026 to 2.674, p =0.039).

Moreover, compared to Level 200 students, the odds of acquiring HPT were seen to be higher in Level 300 students (OR = 1.99, 95%CI: 1.079 to 3.651, p = 0.028). Compared to underweight, the odds of suffering from HTN were found to be higher in healthy weight (OR = 9.77, 95%CI: 1.243 to 76.874, p = 0.030) and overweight (OR = 8.47, 95%CI: 1.050 to 68.285, p 0.045). Compared to intake of less than 1 teaspoon daily, the odds of suffering from HTN were seen to be higher in students who take 1 or more teaspoons of salt daily (OR = 1.72, 95%CI: 1.078 to 2.748, p = 0.023)

Furthermore, compared to urban dwellers, the odds of suffering from HTN were seen to be higher in rural dwellers (OR = 1.86, 95%CI: 1.247 to 2.772, p = 0.002). Compared to campus hostels, the odds of acquiring HTN were seen to be larger in students who live in an off-campus hostel (OR = 5.45, 95%CI: 1.619 to 18.680, p = 0.006). Other factors and the prevalence of HTN in this sample did not show any statistically significant associations. More information can be found in Table 24.

Table 24: Binary logistic regression analysis of factors associated with hypertension

Characteristics	OR	95% CI	P-Value
Age groups in year			
≤ 25	Reference	Reference	Reference
26 – 30	1.35	0.746 – 2.457	0.319
31 – 35	2.51	1.322 – 4.777	**0.005**
36 – 40	6.67	2.486 – 17.890	**< 0.001**
≥ 41	3.73	0.602 – 23.066	0.157
Sex			
Female	Reference	Reference	Reference
Male	1.66	1.026 – 2.674	**0.039**
Level			
200	Reference	Reference	Reference
300	1.99	1.079 – 3.651	**0.028**
400	1.23	0.647 – 2.353	0.524
BMI Categories			
Underweight	Reference	Reference	Reference
Healthy weight	9.77	1.243 – 76.874	**0.030**
Overweight	8.47	1.050 – 68.285	**0.045**
Obese	7.59	0.77 8 – 74.026	0.081
Quantity of salt students take daily			
< 1 teaspoon	Reference	Reference	Reference
1 or more teaspoons	1.72	1.078 – 2.748	**0.023**
Place of residence			
Urban	Reference	Reference	Reference
Rural	1.86	1.247 – 2.772	**0.002**
Place of residence on campus			
Campus hostel	Reference	Reference	Reference
Off-campus hostel	5.45	1.619 – 18.680	**0.006**
Knowledge level			
Poor	Reference	Reference	Reference
Good	0.746	0.471 – 1.183	0.214

Source: field survey, 2022

CHAPTER FIVE

DISCUSSION

5.0 Introduction

This part shows the discussion of the major results of this research. The main purpose of this research was to determine the prevalence of HTN and its risk factors among nursing and midwifery students of UDS on Tamale campus. The discussion is presented based on the following objectives; the prevalence of hypertension, the knowledge level on hypertension, and the association between HTN among nursing and midwifery students of UDS on Tamale campus.

5.1 Prevalence of HTN Among Nursing and Midwifery Students

Among the 412 students who participated in this research, the overall prevalence of HTN was 39.8% (95% CI: 35.0% to 44.7%). This result supports a study published in Saudi Arabia's Eastern Providence which revealed a rise in the prevalence of HTN by 61% (EL-Ashker et al., 2021), and 35.1% in Tunisia (Hajer et al., 2012). In this investigation, the prevalence of HTN was shown to be larger than that reported in Kuwait with 7.0% among university students (Al-Majed & Sadek, 2012). It is inconsistent with findings that showed 7.7% of HTN among 610 university students in Gondar Ethiopia (Tadesse & Alemu, 2014). The variations may be due to changes in data collection methods, population age groups researched, and time. For example, in Kuwait the population age group were young people aged 25 years and below (Al-Majed & Sadek, 2012). Again, the study conducted at Saudi Arabia's Eastern Providence used convenient sampling to recruit participants.

In this research, it was also discovered that (9.5%) of the students were prehypertensive. This result also agrees with a study that stated that the prevalence of preHTN among undergraduate students

varied by country, differing from Indonesia (11.3%) and Malaysia (11.5%) to more than 18% in Laos, Myanmar, and Thailand (Peltzer et al., 2017). However, it does not agree with a study that showed a high 27.1% prevalence of preHTN in undergraduate learners in the West Bank (Tayem et al., 2012). This also disagrees with a study that revealed 26.2% of preHTN among university students of KNUST (Gyamfi et al., 2018). A person's lifestyle has been connected to the development of pre-HTN and hypertension. As a result, discrepancies in prevalence were most likely due to differences in setting. Compared to students from KNUST, the majority of the students in the current study live in off-campus hostels.

Moreover, changes in sample procedures could have increased sampling bias and reduced statistical power, resulting in these discrepancies. The previous studies used sample random sampling and they included other students from different programmes. However, the current study used systematic sampling and included only undergraduate nursing and midwifery students. Contextual factors and lifestyle differences among study participants could explain variances in HTN prevalence.

Overall, the value of the prevalence of HTN found among the study sample identify HTN as a significant health problem among undergraduate nursing and midwifery students aged 18 years and above at UDS.

5.2 Knowledge Level of Students on Hypertension

The findings of this research proved that nearly all the students surveyed had heard of hypertension. This aggress with a study conducted at Pakistan’s Gomel University, which reported 72.4% students had a good understanding of hypertension, while 27.6% students had insufficient knowledge (Rashid et al., 2017). On the contrary, it disagrees with an investigation among

university students in Jeddah, Saudi Arabia which showed a significant knowledge gap, and attitude about HTN risk factors (Baig et al., 2015).

The result of the current study revealed a high level of awareness of HTN among the students. This disagrees with a study which stated that HTN awareness among first-year university health science learners from Gulf Medical University in Ajman (United Arab Emirates) UAE found a high degree of awareness in all domains, with some understanding gap of definition, symptoms, complications, and risk factors of HTN (Akter et al., 2014).

In this research, the normal BP level for systolic and diastolic was correctly stated by the majority of the students. This contradicts research by Nayak et al. (2016) who indicated that students' fundamental knowledge of the normal range of BP was found to be poor. Nonetheless, it agrees with a study by Hisam et al. (2018) who stated that 77.8% of university students of IUA knew the normal blood pressure range.

The result indicated that the students have adequate knowledge levels on the clinical manifestation of HTN among the students. This contradicts the findings of a study that showed that the knowledge level of university students in Gandhinagar City, Gujarat regarding signs and symptoms of HTN was 21% (Nayak et al., 2016).

The knowledge level of students on risk factors of HTN was adequate. This contradicts research carried out in Pakistan which found that university students have an insufficient understanding of the risk factors of HTN (Waseem et al., 2021). The majority of the students stated unhealthy diets (excessive use of salt, fat, and inadequate use of fruits and vegetables as a risk factor. In a similar study, majority of students were aware that junk food, a sedentary lifestyle, and high salt intake were all factors that contributed to HTN (Shravani et al., 2018). However, it contradicts a

study that reported that university students were unaware of HTN cause factors such as alcohol drinking and smoking, stress, increased salt use, sedentary behavior, and high BMI (Baig et al., 2015). Being overweight or obese was indicated as risk factors by the students. This agrees with a study that stated that smoking and obesity were all identified as causal factors for HTN by the majority of the students (Baig et al., 2015).

The students reported adequate knowledge on prevention of hypertension. Reducing salt intake (to less than 1 teaspoon daily) and, being physically active regularly was stated to be a preventive measure. A comparable study conducted by Akter et al. (2014) showed that the students pointed out that regular physical movement reduces hypertension, Again, the students were aware that gaining weight must be managed, and frequent medical checkups can genuinely prevent hypertension.

The result showed that the students had good knowledge on the management of hypertension. They were able to indicated that stress reduction and management, and regularly checking BP as ways of HTN management. This is comparable to a HTN study that detected the knowledge level of university learners on the prevention of HTN to be adequate (Akter et al., 2014).

The overall knowledge level of the students on HTN was good. This agrees with a study conducted at Pakistan's Gomel University, which indicated that the students had good knowledge about HTN (Radwan et al., 2019). In a similar study by Badir et al. (2015) Turkish nursing students at the undergraduate level were knowledgeable about HTN and its risk factors.

Only a few of the students reported moderate knowledge level on hypertension. In a comparable study, similar result was found among undergraduate physiotherapy students (Parekh & Prajapati, 2021). However, it contradicts a study by Hisam et al. (2018) which indicated that among

university students of IUA the level of understanding of HTN was moderate. On the other hand, 2(0.5%) of the students had poor knowledge of hypertension. The high knowledge level among nursing students, according to the study, may be attributable to their first-year course, which covers several elements of hypertension.

5.3 Controllable and Non-controllable Risk factors among students

5.3.1 Non-controllable Risk Factors

The development of HPT is strongly connected to age and sex. According to this study, it was shown that students aged 36 – 40 years (72.2%) have a greater proportion of HTN than the rest of the age groups. Previous research has also showed that age was a proven non-controllable risk factor for many noncommunicable diseases (NCDs), including HTN (Forouzanfar, et al., 2017). As people get older, their chances of developing HTN increase. Moreover, the study reported that compared to students aged ≤ 25 years, the chance of developing HTN was seen to be greater in students aged 31 to 35 years (OR = 2.51, 95%CI: 1.322 to 4.777, p = 0.005) and 36 to 40 years (OR = 6.67, 95% CI: 2.486 to 17890, p < 0.001). In a similar study students aged 30–39 years had a substantially greater danger of HTN (AOR = 2.1, 95% CI, 1.02–4.36) than those aged 18–29 years (Khamis et al., 2020).

The findings of this survey presented that the proportion of males (50.5%) that were hypertensive was significantly greater than females (36.6%), a finding that has been supported by several studies. A study conducted in Tanzania revealed that males had a greater prevalence than females (27.5% > 24.1%). In a comparable study, males had a greater prevalence of HTN (31.1%) than females (156%) among students at a West Bank Central University (Tayem et al., 2012). In Ethiopia, male students in a university setting had a higher rate of HTN relative to female students (Tadesse & Alemu, 2014). This study found that compared to female students, the chances of

developing HTN were found to be greater in male students (OR = 1.66, 95%CI: 1.026 to 2.674, p = 0.039). This is comparable to an investigation of university students in Ghana, which discovered that a higher percentage of males were hypertensive as compared to female students (75.0% > 25.0%, p-value 0.006) (Gyamfi et al., 2018).

There are both biological and behavioral reasons for the observed sex differences in HTN. The biological factors that protect women from hypertension include chromosome differences, sex hormones, and other biological sex differences (Sandberg & Ji, 2012). Adolescence is when these biological elements first appear, and they continue into adulthood until women approach menopause, when gender variations in HTN diminish or disappear.

High body mass index (BMI) and, to a lesser extent, smoking and inactivity are behavioral risk factors for hypertension (National Center for Health Statistics, 2012). There are some complex differences between men and women in these important behavioral risk variables (Ogden et al., 2012). However, the distribution of BMI differs by gender, with women more likely than men to be obese, particularly higher-grade obese. However, compared to women, men are more likely to be overweight (Flegal et al., 2012). Although the gender gap has decreased over the past few decades, women are less likely than males to smoke (Agaku et al., 2013). Conversely, men tend to be more physically active than women (National Center for Health Statistics, 2012). When combined, these behavioral variations imply that some behavioral factors, like smoking, may widen the gender gap in hypertension, while other behavioral factors, like obesity and physical activity, may differentially reduce it.

5.3.2 Controllable Risk Factor of Hypertension.

The occurrence of high BMI (overweight and obesity), as well as other controllable behavioral factors such as the quantity of salt use, place of residence, alcohol drinking, and smoking, are

thought to play a role in the development of hypertension. The current study showed a significant association between HTN development and high BMI. The results of this investigation revealed that both overweight students and obese students have a higher proportion of HTN than the rest of the BMI categories. Compared to underweight, the chances of developing HTN were found to be greater in healthy weight (OR = 9.77, 95%CI: 1.243 to 76.874, p = 0.030) and overweight (OR = 8.47, 95%CI: 1.050 to 68.285, p = 0.045). This agrees with a study that discovered that obesity indicated by BMI [OR = 6.89(0.71 – 66.48), p = 0.0005] was a significant cause of high BP (Gyamfi et al., 2018). A previous study discovered a relationship between BMI and high BP among Qassim University students (Alwabel et al., 2018).

The result from this study indicated a significant relationship between the quantity of salt intake and the development of hypertension. This study showed that compared to intake of less than 1 teaspoon daily, the chances of developing HTN were found to be greater in students who take 1 or more teaspoons of salt daily (OR = 1.72, 95%CI: 1.078 to 2.748, p = 0.023). This agrees with a study that found that 61.9% of respondents with excessive salt consumption were experiencing HTN (Kautsar et al., 2013). Güneş et al., (2019) found that, excessive salt consumption was known to be a risk factor associated with HTN among Turkey students in university settings. Contrary to earlier research, this study revealed no link between smoking and alcohol intake and the prevalence of hypertension. This could be because these factors are unusual in the area studied.

5.4 The Research Limitation

This research used a cross-sectional design; therefore, causation was not established. As a result, the conclusions drawn in the study are limited to associations and not causal effects. Another drawback is that some study variables were based on respondents' self-reports, which were susceptible to recall bias. In addition, the study did not include First-year students (Level 100

students) as they had not reported during the survey. Finally, the study was limited to nursing and midwifery students of University for Development Studies, which makes the finding not applicable to other categories of nursing and midwifery students in different university settings.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This section provides a brief description of key findings, conclusions, and recommendations. The main purpose of this study was to determine the prevalence of HTN and its risk factors among nursing and midwifery students of University for Development Studies (UDS) on Tamale campus

6.1 Summary of Findings

According to the findings, the total prevalence of HTN among the students was 39.8%. It was indicated that more male students (50.5%) are hypertensive than female students (36.6%).

Moreover, the overall knowledge level of the students was 73.5%. There was a significant link between the age and sex of students and the development of hypertension. The odds of students aged 36 to 40 years developing HTN were 6.67 times more likely than students aged ≤ 25 years. The odds of male students developing HTN were 1.66 times more likely than female students.

Furthermore, place of residence, high BMI (overweight), and quantity of salt consumption had a significant relationship with the development of hypertension. The chances of rural dwellers developing HTN were 1.86 times more likely than urban dwellers. The odds of overweight students developing HPT were 8.47 times more likely than those underweight. The odds of students who take 1 or more teaspoon salt daily developing HTN were 1.72 times more likely than those who take less than 1 teaspoon daily.

6.2 Conclusion

This analytical cross-sectional study shed light on the prevalence of HTN among nursing and midwifery students at UDS on Tamale Campus. The prevalence of HTN and obesity was found to

be greater among students in this research. Different cause factors, encompassing socio-demographic factors (older age, and sex: male), high BMI (overweight and obese), unhealthy diet (excessive salt intake), and place of residence have been stated to improve the prevalence of HTN among the students. This can aid in the development of intervention initiatives. To promote HTN awareness, prevention, and control, there should be education, screening, counseling and management strategies put in place for the students.

6.3 Recommendation

- There is therefore the need to sensitize the student body of UDS on HTN issues to enable them to detect traits of HTN and the ideal recommendations for assistance.
- I recommend that the university should intervene early and respond effectively by conducting frequent screening programs to monitor the BP and BMI of students. High-risk students should be contacted and counseled on a lifestyle change.
- Interventional programs for students should be implemented at an early age, with the government instilling instruction on HTN prevalence and risk factors in educational curricula.
- Effective prevention and management programs should be formulated for learners, to increase their knowledge and lifestyle habits early on in life.
- Parents, mass media, schools, and health officials, must do more to promote awareness of HTN in youths.
- Physical activity and understanding of good and bad eating habits among students need to improve. It is suggested that gender-specific initiatives be developed to promote healthy lifestyle habits among students.

- Further research should be conducted to cover other schools, areas, and different parts of the country in terms of the prevalence of HTN and associated factors among undergraduates.

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APPENDIX I: QUESTIONNAIRE FOR UNDERGRADUATE STUDENTS

PREVALENCE OF HYPERTENSION AND ITS ASSOCIATED FACTORS AMONG

UNDERGRADUATE STUDENTS OF UNIVERSITY FOR DEVELOPMENT STUDIES ON

TAMALE CAMPUS

Date of Interview: ___/___/2021 (DD/MM/YYYY) Questionnaire ID: ……

Name of Department: ……

Instruction: Please CIRCLE or TICK the appropriate response.

SECTION 1: DEMOGRAPHIC CHARACTERISTICS

1. Gender: 0. Male 1. Female

2. Age (complete in years): …….

3. Ethnicity: ……

4. What is your place of residence? 0. Urban 1. Rural

5. What is your place of residence on campus? 0. Campus hostel 1. Off-campus hostel

6. Are you an international student or a Ghanaian student? 0. Ghanaian 1. International

7. What course are you studying? ……

8. Which level are you now? 0. 100 1. 200 2. 300 3. 400

9. What is your religion? 0. Christianity 1. Islamic
2. Traditionalist 3. None 4. Other (specify): ……

10. How is your marital status?
0. Single 1. Married 2. Widowed 3. Separated
4. Dating 5. Co-habiting

SECTION 2: KNOWLEDGE OF HYPERTENSION

11. Have you ever heard of hypertension? 0. Yes 1. No **(if no skip to Question 35)**

12. What does the term hypertension mean?

0. High blood pressure 1. High-level stress or tension 2. Nervous condition
3. High blood sugar 4. Overactivity 5. Don't know

13. How dangerous is hypertension to a person's health?

0. Extremely 1. Somewhat 2. Not at all 3. Don't know

14. Would lowering high blood pressure improve a person's health?

0. Yes 1. No 2. Don't know

15. What do the two numbers reported for blood pressure measurement mean?

0. Top number: …… 1. Bottom number: …… 2. Don't know

16. What should the normal blood pressure levels be?

i.	Top number	0. 120	1. < 120	2. > 120	3. Don't know
ii.	Bottom number	0. 80	1. < 80	2. > 80	3. Don't know

17. At what levels would you say an individual's blood pressure is high?

i.	Top number:	0. < 140	1. ≥ 140	2. > 140	3. Don't know
ii.	Bottom number:	0. < 90	1. ≥ 90	2. > 90	3. Don't know

18. In blood pressure measurement, which number (s) **is or are** more important?

0. Top 1. Bottom 2. Both 3. Don't know

19. Are there ways/strategies/activities that people can use to lower their blood pressure?

0. Yes 1. No 2. Don't know

20. Which of the following do you think may increase an individual's risk of hypertension? Circle **Yes**, **No or Don't know** in the table below.

S/No.	Risk Factor of Hypertension	Circle Yes, No, or Don't know
a.	Consumption of tobacco and alcohol	0. Yes 1. No 2. Don't know
b.	Unhealthy diets (high intake of salt, fat, low intake of fruits and vegetables)	0. Yes 1. No 2. Don't know
c.	High intake of oral contraceptives	0. Yes 1. No 2. Don't know
d.	Being overweight or obese	0. Yes 1. No 2. Don't know
e.	Co-existing diseases (diabetes or kidney disease)	0. Yes 1. No 2. Don't know
f.	Family history of hypertension	0. Yes 1. No 2. Don't know
g.	Physical inactivity	0. Yes 1. No 2. Don't know
h.	Age of a person	0. Yes 1. No 2. Don't know
i.	Gender of a person	0. Yes 1. No 2. Don't know
j.	Poor management of stress	0. Yes 1. No 2. Don't know

21. Which of the following are common symptoms of hypertension? Circle **Yes, No or Don't know** in the table below.

S/No.	Symptoms of Hypertension	Circle Yes, No, or Don't know
a.	Early morning headaches	0. Yes 1. No 2. Don't know
b.	Nosebleeds	0. Yes 1. No 2. Don't know
c.	Irregular heart rhythms	0. Yes 1. No 2. Don't know
d.	Vision changes	0. Yes 1. No 2. Don't know
e.	Buzzing in the ears	0. Yes 1. No 2. Don't know
f.	Fatigue	0. Yes 1. No 2. Don't know
g.	Nausea	0. Yes 1. No 2. Don't know
h.	Vomiting	0. Yes 1. No 2. Don't know

i.	Confusion	0. Yes	1. No	2. Don't know
j.	Anxiety	0. Yes	1. No	2. Don't know
k.	Chest pain	0. Yes	1. No	2. Don't know
l.	Muscle tremors	0. Yes	1. No	2. Don't know

22. Which of the following will help to prevent or reduce hypertension? Circle **Yes**, **No or Don't know** in the table below.

S/No.	**Prevention of Hypertension**	**Circle Yes, No, or Don't know**		
a.	Reducing salt intake (to less than 1 teaspoon daily)	0. Yes	1. No	2. Don't know
b.	Eating more fruit and vegetables	0. Yes	1. No	2. Don't know
c.	Being physically active on a regular basis	0. Yes	1. No	2. Don't know
d.	Avoiding the use of tobacco	0. Yes	1. No	2. Don't know
e.	Reducing alcohol consumption	0. Yes	1. No	2. Don't know
f.	Limiting the intake of foods high in saturated fats	0. Yes	1. No	2. Don't know
g.	Eliminating/reducing trans fats in diet	0. Yes	1. No	2. Don't know

23. Which of the following will help to manage hypertension? Circle **Yes**, **No or Don't know** in the table below.

S/No.	**Management of Hypertension**	**Circle Yes, No, or Don't know**		
a.	Reducing and managing stress	0. Yes	1. No	2. Don't know
b.	Regularly checking blood pressure	0. Yes	1. No	2. Don't know
c.	Treating high blood pressure	0. Yes	1. No	2. Don't know
d.	Managing other medication conditions	0. Yes	1. No	2. Don't know

SECTION 3: HISTORY OF HYPERTENSION

24. Do you have blood relatives with history of hypertension?

0. Yes 1.No (**if no go to question 26**) 2. Don't know

25. If yes, who is the person?

0. Father 1. Mother 2. Siblings 3. Child

4. Grandparent 5. Other (Specify) ……

26. Before your blood pressure measurement, were you aware of your hypertension status?

0. Yes 1. No

27. How often do you see your doctor for blood pressure checkups?

0. Monthly 1. Every 3 – 4 months 2. Every 6 months 3. Once a year E. Nil

28. What was your last blood pressure? ……mmHg 1. Can't remember

29. Have you had a blood pressure reading of 140/90mmHg in the past 12 months?

0. Yes 1. No 2. Did not check BP in the past 12 months

30. Has your doctor diagnosed you as being hypertensive? 0. Yes 1. No (**if no go to question 35**)

31. If yes, what was your blood pressure reading on diagnosis? ……

32. Have you been prescribed any medication to lower your blood pressure?

0. Yes 1. No (if no go to question 35)

33. If yes, list medication and dosage: ……

34. If yes, does being hypertensive affect your studies? 0. Yes 1. No

SECTION 4: LIFESTYLE FACTORS

35. What quantify of salt do you take daily? 0. < 1 teaspoon 1. 1 or more teaspoons

36. Select the type of diet you are following by Circling **Yes** or **No** in the table below.

S/No.	Type of Diet	Circle Yes or No
a.	Diabetic	0. Yes 1. No
b.	Low carbohydrate/sugar	0. Yes 1. No
c.	Low cholesterol	0. Yes 1. No
d.	Low salt	0. Yes 1. No
e.	Weight reduction	0. Yes 1. No
f.	Vegetarian	0. Yes 1. No
g.	No salt	0. Yes 1. No
h.	No special diet	0. Yes 1. No

37. What type of physical activity do you do currently? Circle **Yes** or **No** in the table below.

S/No.	Type of Physical Activity	Circle Yes or No
a.	Aerobic workout	0. Yes 1. No
b.	Bicycling	0. Yes 1. No
c.	Running/jogging	0. Yes 1. No
d.	Swimming	0. Yes 1. No
e.	Walking	0. Yes 1. No

38. What is the frequency per week of the physical activity you engage in?

Frequency/week	**Zero**	**Inconsistently**	**1 – 3 times**	**4 – 6 times**	**≥ 7 times**
Physical Activity					
Aerobic workout					
Bicycling					
Running/jogging					
Swimming					
Walking					

39. What is the duration of the physical activity you engage in? Write the number of minutes you spend on each physical activity.

Physical Activity	Duration/Week (in minutes)
Aerobic workout	
Bicycling	
Running/jogging	
Swimming	
Walking	

40. Have you ever smoked before? 0. Yes 1. No **(if no, skip to question 42)**

41. If yes, how old were you when you started smoking? …….. years.

42. Do you currently smoke? 0. Yes 0. No **(if no, skip to question 44)**

43. If yes, how many times do you smoke currently in a day on average?
0. 1 – 5 times 1. 6 – 10 times 2. > 10 times

44. Does anyone in your home smoke currently? 0. Yes 1. No 2. Don't know

45. Have you ever consumed an alcoholic drink such as beer, wine, spirits, akpeteshie, pito, palm wine, or bitters? 0. Yes 1. No (**if no skip to question 49**)

46. How old were you when started drinking alcohol? ……. years.

47. Do you currently drink alcohol? 0. Yes 1. No

48. If yes, please specify the type of alcohol and the frequency at which you drink it (them). **Tick (√)** where applicable.

Frequency (per bottle or can)	Never	1 per month	1 per week	2 – 4 times per week	> 5 times per week
Type of alcoholic Beverage					
Akpeteshie					
Beer					
Stout					
Red/White wine					
Liquor (vodka, gin,)					
Pito					
Other (specify)					

Note: Question 49 to 55 are for Female Students only.

49. Have you ever taken oral contraceptives before? 0. Yes 1. No (**if no, skip to Question 55**)

50. If yes, how old were you when you started using oral contraceptives? …….. years.

51. Do you currently take oral contraceptives? 0. Yes 1. No

52. Which type of oral contraceptive do you take?

0. Emergency contraceptives 1. Pills (**if pills skip to Question 54**)

53. How many times do you take emergency contraceptives currently in a week on average?

0. 1 – 5 times 1. 6 – 10 times 2. > 10 times

54. What is the type of emergency contraceptives you use and their frequency per week?

Frequency per week	1 per week	Twice per week	3 times per week	> 3 times per week
Type of emergency contraceptive				
Postinor-2				
Lydia Post Pill				

NorLevo				
Pregnon				
Other (specify):				

55. What is the type of pills you use and their frequency per year?

i. Name of pills …… ii. Frequency per year ……

SECTION 5: STRESS ASSESSMENT

56. Causes of Stress among students

Below are some statements about causes of stress. Please circle the box that best describes your experience of each.

Category	Stressor	Rating			
		Not stressful at all (1)	**Somewhat stressful (2)**	**Quite stressful (3)**	**Very stressful (4)**
Academic-related	High academic workload	1	2	3	4
	Dissatisfaction with online lectures.	1	2	3	4
	Dissatisfaction with face-to-face lectures	1	2	3	4
	Dissatisfaction with clinicals	1	2	3	4
	High frequency of examinations	1	2	3	4
	Poor performance in examinations	1	2	3	4
	Lack of learning materials	1	2	3	4
	Difficulty reading and understanding lecture notes/slides	1	2	3	4
Psychosocial	Inability to manage time	1	2	3	4
	Inability to concentrate during lectures	1	2	3	4
	Anxiety about my performance in exams	1	2	3	4
	High parental expectations	1	2	3	4
	Worries about future	1	2	3	4
	Loneliness	1	2	3	4
	Financial problems	1	2	3	4
	Family/marriage problems	1	2	3	4

	Difficulty relating to members of the opposite sex	1	2	3	4
	Lack of time for relaxation	1	2	3	4
Health-related	Lack of healthy diet/irregular eating habit	1	2	3	4
	Sleep problems	1	2	3	4
	Illness/health problems	1	2	3	4
	Problems with lectures during online	1	2	3	4
	Problems with lectures during face-to-face	1	2	3	4
	Problems with accommodation	1	2	3	4
	Problems with water	1	2	3	4
	Problems with light	1	2	3	4
	Problems with security	1	2	3	4

57. Stress Coping Strategies

Coping strategy	**Details**	**Circle Yes or No**	
		0. Yes	**1. No**
Active coping	Doing something about the situation, taking action to negate stressor	0. Yes	1. No
Positive reframing	Seeing something good in what is happening, learning from experience	0. Yes	1. No
Alcohol/tobacco/substance abuse	Using tobacco/alcohol/drugs to feel better	0. Yes	1. No
Humor	Making fun of the situation	0. Yes	1. No
Given up coping	Giving up the attempt to do anything about the situation	0. Yes	1. No
Emotional support	Getting emotional support/advice from friends and family	0. Yes	1. No
Instrumental support	Getting help and advice from lectures	0. Yes	1. No
Self-distraction	Doing something to take my mind off the situation such as watching TV, movies, shopping, listening to music	0. Yes	1. No
Religion	Praying/meditating	0. Yes	1. No
Venting	Expressing negative feelings: showing anger at things/people	0. Yes	1. No

Acceptance	Learning to live with the situation, accepting it	0. Yes	1. No
Denial	Refusing to believe it happened, not accepting the situation	0. Yes	1. No

Circle **Yes** or **No** in the table below to indicate the type of coping strategies you adopt to manage stress?

SECTION 6: PHYSICAL MEASUREMENT

Blood pressure measurement

58. First blood pressure reading: Systolic (mmHg) _____ Diastolic (mmHg) _____

59. Second blood pressure reading: Systolic (mmHg) _____ Diastolic (mmHg) _____

Body Mass Index

60. Height (cm) _____

61. Weight (kg) _____

APPENDIX II

UNIVERSITY FOR DEVELOPMENT STUDIES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF SOCIAL AND BEHAVIOURAL CHANGE

CONSENT FORM FOR RESPONDENTS

Title of Research: Prevalence of hypertension and its associated factors among undergraduate students of University for Development Studies on Tamale Campus

Name and affiliation of researcher

Emmanuel Asante, University for Development Studies, Tamale

Research supervisor: Dr. Michael Boah, Department of Epidemiology, Biostatistics, and Disease Control, University for Development Studies, Tamale

PART 1: INFORMATION SHEET

Introduction

I am Emmanuel Asante an MPhil student of the University for Development Studies (UDS), Tamale. I am conducting a study on the prevalence of hypertension and its associated factors among undergraduate students of University for Development Studies, Tamale Campus. I am going to provide you with information about the study and invite you to take part in this study. This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask. Before you decide, you can talk to anyone you feel comfortable with about the study.

Purpose of research

The main purpose of this study is to determine the prevalence of hypertension and its risk factors among nursing and midwifery students of University for Development Studies (UDS) on Tamale Campus.

Procedure of the research

The study will require you to complete a questionnaire that will ask you some questions about hypertension. It will take you about 20 mins to complete the questionnaire. Your weight and blood pressure will be also measured. You are invited because your experience as an undergraduate student contributes to my understanding and knowledge of hypertension among undergraduate students of UDS.

Potential risks and discomforts

By participating in this study, you may be sharing with me some information that you may consider very personal and confidential and you may feel uncomfortable talking about some of the topics. You may decline to answer any question or take part in the research if you don't wish to do so. You are not mandated to give me any reason for not responding to any question, or for refusing to take part in the study. In addition, in the performance of some procedures like weight, height, and blood pressure measurements, you may experience some discomforts. Feel free to let me know if you experience any discomforts during the study.

Potential benefits

You will not derive direct benefits from participating in this study. However, your participation will help me to know the prevalence and the factors which increase the risk of hypertension among undergraduate students of UDS. By this study, epidemiological data which can support planning, prevention, diagnosis, and management of hypertension among undergraduate students may be provided.

Costs/Compensation

Your participation in this study is free and you will not be compensated for participating. I will only ask you to spare some of your time to answer the questions I will ask

Confidentiality

If you participate in the study, other students who see us together may ask you questions about the study but I will not share information about you with anyone outside who is not part of the study team. The information that I will collect from this study will be used only for academic purposes. A code number instead of your name will be used for any information about you. Only I will know what your number is and I will not share that information or give it to anyone.

Sharing of results

I will not share anything that you tell with anybody outside the study team and nothing will be attributed to your name. I will make recommendations from the knowledge that I will acquire from this study so that the school's authorities may see what to do to minimize the risk of hypertension among students of UDS. In the future, I may publish the results so that other interested people may learn from the study.

Voluntariness and right to withdraw from the study

Participation is voluntary and you do not have to participate if you do not wish to do so. You can withdraw from the study at any time without penalty. You do not have to give me any reason(s) for withdrawing or refusing to participate. You also have the option of having your raw data returned to you or being destroyed at any time.

Contacts for additional information

If you have any questions concerning this study, please do not hesitate to contact the researcher, Emmanuel Asante on 024 874 2601 (email: emmanuelas2025@uds.edu.gh) or the research supervisor Dr. Michael Boah on 0244876056 (email: mboah@uds.edu.gh).

Further, if you have any concern about the conduct of this study, your welfare, or your rights as a research participant, you may contact:

The Office of the Head of Department

Department of Social and Behavioural Change

School of Public Health

University for Development Studies

Tamale

Email: sbcdepartment@uds.edu.gh

PART 2: CERTIFICATE OF CONSENT

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this study have been explained to the above individual to the best of my ability. I confirm that the participant was allowed to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the consent has been given freely and voluntarily.

Statement of person giving consent:

I have been invited to participate in a study about hypertension among undergraduate students of UDS, Tamale campus. I have read the information on this study. I know enough about the purpose, methods, risks, and benefits of the research study to decide that I want to take part in it. I understand that my participation is voluntary and I understand that I can withdraw from being part of this study at any time without having to explain myself. I have also talked it over with the interviewer and my questions have been answered to my satisfaction. I **agree voluntarily to participate in this study**.

NAME: _____

DATE: _____ SIGNATURE/THUMB PRINT: _____

Statement of person obtaining informed consent:

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this study have been explained to the above individual to the best of my ability. I confirm that the participant was allowed to ask questions about the study, and all the questions

asked by the participant have been answered correctly and to the best of my ability. I confirm that the consent has been given freely and voluntarily

DATE: _____ NAME: _____

APPENDIX III: ETHICAL APPROVAL

Kwame Nkrumah
University of Science
and Technology, Kumasi

College of Health Sciences
SCHOOL OF MEDICINE AND DENTISTRY

COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Our Ref: CHRPE/AP/019/22

20th January, 2022.

Mr. Emmanuel Asante
University for Development Studies
Department of Social and Behavioural Change
Tamale

Dear Sir,

LETTER OF APPROVAL

Protocol Title: ***"Prevalence of Hypertension and its Associated Factors among Undergraduate Students of the University for Development Studies Tamale Campus."***

Proposed Site: ***School of Nursing and Midwifery, University for Development Studies, Tamale.***

Sponsor: ***Principal Investigator.***

Your submission to the Committee on Human Research, Publications and Ethics on the above-named protocol refers.

The Committee reviewed the following documents:

- A notification letter of 30th November, 2021 from the School of Nursing and Midwifery, UDS (study site) indicating approval for the conduct of the study at the School.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning **20th January, 2022** to **19th January, 2023** renewable thereafter. The Committee may however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Thank you for your application.

Yours faithfully,

Rev. Prof. John Appiah-Poku
Honorary Secretary
FOR: CHAIRMAN