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PREVALENCE AND DETERMINANTS OF HYPERTENSION AMONG BHUTANESE MONKS IN TASHI-CHOE-DZONG,

THIMPHU, BHUTAN

Mr. Namgay Tshering

A Thesis Submitted in Partial Fulfillment of the Requirements

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Thesis Title	PREVALENCE AND DETERMINANTS OF HYPERTENSION AMONG BHUTANESE MONKS IN TASHI-CHOE-DZONG, THIMPHU, BHUTAN
By	Mr. Namgay Tshering
Field of Study	Public Health
Thesis Advisor	Assistant Professor Ratana Somrongthong, Ph.D.

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นัมเกลย์ เซอริ่ง: ความชุกและปัจจัยเสี่ยงต่อโรคความดันโลหิตสูงในพระภิกษุ ประเทศภูฏาน ในทาชิ ชวย ซอง เทิมพู่ (PREVALENCE AND DETERMINANTS OF HYPERTENSION AMONG BHUTANESE MONKS IN TASHI-CHOE-DZONG, THIMPHU, BHUTAN) อาจารย์ที่ปรึกษาวิทยานิพนธ์หลัก: ผศ.ดร.รัตนา สำโรงทอง

ภาวะความดันโลหิตสูงถือว่าเป็นสาเหตุหนึ่งของการเจ็บป่วยและเสียชีวิตที่สำคัญในปัจจุบัน จากรายงานขององค์การอนามัยโลกปี 2547 พบว่ามีผู้เสียชีวิตจากจากภาวะความดันโลหิตสูงนี้ถึง 7.5 ล้านคนทั่วโลก ในประเทศภูฏานซึ่งจำนวนประชากรประมาณ 700,000 คน จากการรายงานของกระทรวงสาธารณสุขภูฏานปี 2553 พบว่ามีอัตราความชุกของการเกิดโรค 310 คน ต่อแสนประชากร

วัตถุประสงค์ของการการศึกษาครั้งนี้เพื่อทำการศึกษาความชุกของภาวะความดันโลหิตสูงและปัจจัยเสี่ยงที่มีผลต่อภาวะความดันโลหิตสูง โดยทำการศึกษาในกลุ่มพระภิกษุที่มีอายุ 20 ปีขึ้นไปจำนวน 138 รูป ณ วัดทาชิชวยส่อง ด้วยการวัดความดันโลหิตและค่าดัชนีมวลกายโดยทำการศึกษาแบบภาคตัดขวาง จากการวิเคราะห์ข้อมูลพบว่าความชุกของภาวะความดันโลหิตสูงเป็น 10.2 เปอร์เซ็นต์ และยังพบว่าอายุ ระยะเวลาที่บวช รายได้รายเดือน และดัชนีมวลกาย มีความสัมพันธ์กับการเกิดภาวะความดันโลหิตสูง (p-value at $\alpha < 0.05$)

จากการศึกษาพบว่ากลุ่มตัวอย่างส่วนใหญ่มีอายุอยู่ระหว่าง 20-30 ปี อัตราความชุกของภาวะความดันโลหิตสูงพบอยู่ในระดับต่ำ ระดับความรู้ของภาวะความดันโลหิตอยู่ในระดับต่ำ ดังนั้นการให้สุขศึกษาจึงเป็นสิ่งที่จำเป็นอย่างยิ่งที่ควรมีการส่งเสริม

สาขาวิชา: สาธารณสุขศาสตร์ ลายมือชื่อนิสิต .....

ปีการศึกษา: 2553 ลายมือชื่ออาจารย์ที่ปรึกษาวิทยานิพนธ์หลัก .....

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NAMGAY TSHERING: THE PREVALENCE AND DETERMINANTS OF HYPERTENSION AMONG BHUTANESE MONKS IN TASHI-CHOE-DZONG, THIMPHU, BHUTAN. ADVISOR : ASST. PROF. RATANA SOMRONGTHONG, Ph.D., 101 pp.

Hypertension or high blood pressure is one of the leading causes of mortality and morbidity in the World, as reported by the WHO in 2004 that 7.5 million deaths are solely attributable to the hypertension. Bhutan, a country of 0.7 million people, reported the current rate (prevalence) of hypertension at 310 per 10,000 population (AHB-2010).

As a step towards assessing the prevalence of hypertension and risk factors associated with hypertension, 138 monks at the Tashi-Choe-Dzong, age 20 years and above were recruited to participate in this study. The clinical parameters, i.e. blood pressure measurement and BMI measurement were undertaken on the surveyed monks on this cross sectional study. Analysis of the data revealed that the prevalence rate was 10.2%. Age, number of years of monkhood, monthly income and earlier history of hypertension were found significantly associated with the development of high blood pressure with p-value at $\alpha < 0.05$.

Since majority of the studied subjects are in the age group between 20-30 years, the observed prevalence rate was quite low. Moreover the knowledge level of the studied subjects was found very low with 44.9% possessing poor knowledge and 55.1% possessing just fair knowledge on Hypertension.

Field of Study : Public Health Student's Signature :

Academic Year : 2010 Advisor's Signature :

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LIST OF ABBREVIATIONS

WHO	World Health Organization
SEAR	South East Asian Region
PH	Pulmonary Hypertension
HT	Hypertension
BMI	Body Mass Index
PHC	Population and Housing Census
AHB	Annual Health Bulletin
NCD	Non-Communicable Disease
NBP	Normal Blood Pressure
HBP	High Blood Pressure
DASH	Dietary Approaches to stop Hypertension

CHAPTER I

1.1 General Background

Hypertension is rapidly becoming a major public health concern and burden globally. But however, it is often seen that hypertension and other non-communicable disease lack prevention, control and lack of management skills, especially in the developing and underdeveloped countries like sub-Saharan Africa and South East Asia. The 'Global and regional burden of disease and risk factors, 2001: systemic analysis of population health data' found that blood pressure was leading cause of death and morbidity globally (Lopez et al., 2001).

According to WHO report, hypertension is the leading global mortality responsible for 12.8% (7.5 million) of total deaths worldwide. South East Asian region is no exception to this fact that hypertension is increasingly the major threat to human life and major cause of disability (WHO Technical Report, Geneva., 2004). The standard fact for the underlining cause of hypertension is known to many people but the fact that who are most at risk and most susceptible groups are indeed difficult to rule out owing to the diverse nature of the country, their culture, topographical location, food habits and many more. But the basic fact is that hypertension is global concern and public health challenge.

The estimated total number of adults with hypertension in 2000 was 972 million (957-987 million); 333 million (329-336 million) in economically developed countries and 639 million (625-654 million) in economically developing countries. The number of adults with hypertension in 2025 is predicted to increase by about 60% to a total of 1.56 billion (1.54-1.58 billion) and this predicts also side-by-side increase in chronic disease burden which is closely linked with hypertension. And 51% of stroke (cerebro-vascular disease) and 45% of ischaemic heart disease deaths are attributable to high blood pressure (WHO Technical Report, Geneva., 2004).

According to the World Health Organization (WHO), the South East Asia Region (SEAR) consists of eleven countries with diverse population size, land area, sociopolitical environment, economy and health care systems. Each country has epidemiological and geographical factors that may contribute to risks for developing pulmonary hypertension (PH). Currently, there are no published estimates of the number of people suffering from PH in these countries. This article started as an attempt to capture a general overview of available, indexed publications on PH from the South East Asia region. Publications on PH from the SEAR originated almost entirely from India and Thailand. Further, virtually all of the Medline0 indexed research literature from the SEAR comes from these two countries (Menon., 2009).

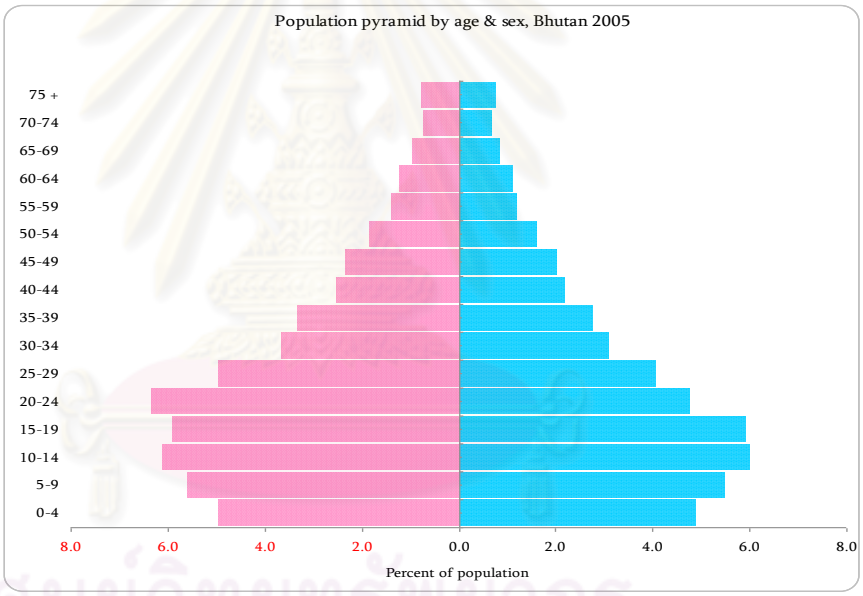

Figure. 1- Population Pyramid (NHPC-2005)

Bhutan with estimated total population of 683,407 (PHC, 2005) has witnessed the double burden of disease with the increased shift in the epidemiological trend with changing world and increased influence of modernization. Currently, Bhutan sees major public health burden due to non-communicable disease like injuries and trauma 971.3/10,000 population, hypertension with incidence rate of 310/10,000 population, Diabetes with incidence rate of 38/10,000 population, Alcohol liver disease incidence of 23/10,000 population and cancer incidence of 17/10,000 population (AHB, March

2010). Hence, from this data it is proven that the second largest NCD burden happens to be Hypertension, though no formal study on hypertension has been conducted.

Bhutan is small landlocked country with total area of 38,394 sq. Km. The almost 64% of the population falls within the age range of 15-64 year old and 65^{+} population of 32,615 only (Bhutan, profile, 2005).

1.1 Statement of the Problem

The prevalence data especially on non communicable diseases are very rare to find in South East Asian Region mainly because many countries in this region are currently going through the so called "nutrition transition". The nutrition transition is associated with a change in the structure of the diet, reduced physical activity and rapid increase in the prevalence of obesity. The Cross sectional study conducted in urban and rural setting of Kathmandu Valley, Nepal with total sample of 1633 randomly selected participants aged above 60 years and above has detected high prevalence of hypertension in the survey (32.5%) against diagnosed before the survey (22.4%). The study also observed that older age, no exercise, health perception, family history of hypertension and increased waist circumference have key influence on the increased risk of hypertension and diabetes (MK Chettri, 2008). Since Bhutan shares similar geographical location with Nepal and in lieu of certain similar cultural believes, this report can have certain positive signal to country like Bhutan to verify the fact and act to protect the health of general public.

The recent hospital registration data shows that the prevalence of hypertension among Bhutanese is 310 per 10,000 populations. The 2007,Thimphu based survey on Risk Factors and prevalence of Non communicable Disease found that a vast majority of the population (91.1%) is exposed to at least one of the NCD risk factors, 56.5% exposed to 3-5 risk factors. Major risk includes tobacco consumption, alcohol intake, physical inactivity and improper diet. The survey also speculated that there is a huge potential of upsurge of NCDs in the country (Thimphu based 'STEP' Survey on NCD, 2007).

During the survey (STEP survey, 2007) it was found that out of the 1133 households sampled, vegetable oil was most widely used (96.8%) for meal preparation followed by ghee or butter (1.5%). The mean consumption of fat/oil in a month is 1.6 liters per adult per house hold. Over half the population consumed *ezay (Spicy chilli salad)* (56.7%) and suja (Salted butter tea) (55.5%) at least once a week. *Suja (Salted butter tea)* use may increase the consumption of butter and salt while *ezay(Spicy Chilli salad)* may be a good source of salt and other harmful preservatives. Over quarter (25.1%) eat dried meat at least once a week. The survey also found out that almost two third of the population (66.6%) are not eating enough fruits and vegetables(less than five combined servings per day). The consumptions of fruit are particularly low (1.2 serving a day) and not very frequent (3.7 days per week). The mean number of vegetable consumption is 3.2 servings per day, and the mean number of days in of vegetable consumption in a week is 6.4. The prevalence of alcohol consumption in Bhutan among male: female is 34.9% Vs. 25. 5%. There was also significant difference in drinking frequency with 7.9% of males drinking 5-6 days per week as compared to 3.2 % of females drinking 5-6 days per week (Thimphu based 'STEP' Survey on NCD, 2007).

In spite of the importance posed by this public-health challenge worldwide, high blood pressure is usually left uncontrolled or not managed both by medical staffs and individual cases and less attention is directed to the scientific findings that both dietary and lifestyle changes along with appropriate medicines can improve blood pressure control and decrease the risk of associated health complications.

1.2 Rationale

Mahayana Buddhism is the state religion of Bhutan, and Buddhists comprise two-thirds to three-quarters of its population. Although originating in Tibetan Buddhism, the Buddhism practiced in Bhutan differs significantly in its rituals, liturgy, and monastic organization (IRF Report., 2007). Until date, Bhutan has not conducted any health related research, survey or surveillance targeted at the increasing number of young monks in the country.

However, owing to maximum exposure to one or most often more than one risk factor, it is highly crucial to study the trend of NCD prevalence in the country. The country as of now has been more dependent on the health center records of the registered patients with reported cases like hypertension and diabetes type 2.

Buddhism, which was introduced in the seventh century, is the official religion of Bhutan. Bhutan is the only country in the world that has retained the Vajrayana form of Mahayana Buddhism as its national religion. There are more than seven thousand Buddhist monks and they are vitally involved in both the religious and social lives of the Buddhist population. Because of the religious significance of nearly every important event in the life of a Buddhist, the monks visit households and perform rites on such occasions as birth, marriage, sickness, and death (Keown, 1992).

Currently there are almost seven thousand registered monks all over the country with high concentration in the western region of the country. It was hypothesized that monks are highly vulnerable to life style related disease especially hypertension and type 2 diabetes owing to their unhealthy dietary habits, lack of physical, environment and lack of knowledge on HT.

Tashi-Cho-Dzong is house of central monastic body and it has more than 500 monks residing during the summer months and little more than 200 during the winter season (because the central monastic body migrates to Punakha, a tradition followed since 19th Century). Tashi_Choe-Dzong is house of religious leader (Spiritual leader) the 'Je Khenpo' the rank equivalent to the king of Bhutan. It also house golden throne room of His Majesty the King including some key sectoral offices. It is referred to as the central headquarter of the central monk body. Most of the senior monks with higher ranks are housed in Tashi_Choe-Dzong.

1.3 Objectives

The broad objectives of the proposed research are to;

- ✓ To assess the prevalence of hypertension among Bhutanese monks in Tashi-Cho-Dzong (above 20 years old)
- ✓ To assess the determinants (risk factors) of Hypertension
- ✓ To assess the level of knowledge on Hypertension

1.4 Research Questions

1. What is the prevalence and determinants of hypertension among the Bhutanese monks in Tashi-Choe-Dzong, Thimphu?
2. What are the risk factors of Hypertension among Bhutanese monks?
3. What is the level of Knowledge on the Hypertension among monks?

1.5 Operational Definition

Operational definition in any research proposal paper is important because they establishes the rules and procedures the research investigator will use to measure the key variable of study and they also provide unambiguous meaning tot terms that otherwise might be interpreted in different ways:

Hypertension: High blood pressure, defined as a repeatedly elevated blood pressure exceeding 140 over 90 mmHg -- a systolic pressure above 140 with a diastolic pressure above 90. (*WHO and ISH)*

BMI: is referred to as WHO recommended BMI (Weight to Height) cut-offs for Asian people. ie; The current WHO BMI cut-off points of <16 kg/m^2 (severe underweight), 16·0–16·9 kg/m^2 (moderate underweight), 17·0–18·49 kg/m^2 (mild underweight), 18·5–24·9 kg/m^2 (normal range), ≥25 (overweight), 25–29·9 kg/m^2 (pre-obese), ≥30 kg/m^2 (obesity). 30–39·9 kg/m^2 (obese class I), 35–39·9 kg/m^2

(obese class II), ≥40 kg/m^2 (obese class III) should be retained as international classification.

Knowledge: In my study knowledge is referred to as the level of individual knowledge on hypertension, whether good, poor or fair.

Practice: Referred to as change in dietary habits, regular exercise and controlling BP.

Education: is referred to as highest education level of the study population.

Physical Activity: Physical activity is referred to as any form of exercise (moderate or vigorous) that involves bodily movement.

Determinants: is referred to as underlining risk factors, such as unhealthy diets, lack of physical activity, alcohol consumption.

Dietary Habits: is referred to as high intake of sodium, saturated fats, for ex. *Suja* (Butter tea containing 1200 mg. of sodium and 42 gm of fat in 1 ltr. of water). Intake of fruits and vegetables.

Alcohol: this is referred to as consumption of any beverages that contains certain percentage of alcohol like beer, wine and local brewed 'Ara'.

Age: is referred to as adults and elderly people who are more susceptible to hypertension development. (Preferably above age of >=45 years).

Quality of Life: Quality of Life is referred to as the domain of life directly affected by the change in health.

Stress: referred to as amount of mental pressure that makes someone feel depressed.

Winter months: Months starting from November to February of every year

Summer months: Months starting from March to October of every year

1.6 Conceptual Framework;

In this proposed study, the objectives were to understand the prevalence of Hypertension (HT) among the monks residing the Tashi-Choe-Dzong, Thimphu and also to assess the possible risk factors for the cause of HT if any. In view of the limited study time and considering the time and budgetary constraints, the study has been confined to few selected independent variables, categorized as; i) Demographic factors (Age, Income & Education level), ii) Health Behavior (Dietary Habits, Exercise and alcohol consumption) iii) Knowledge on Hypertension.

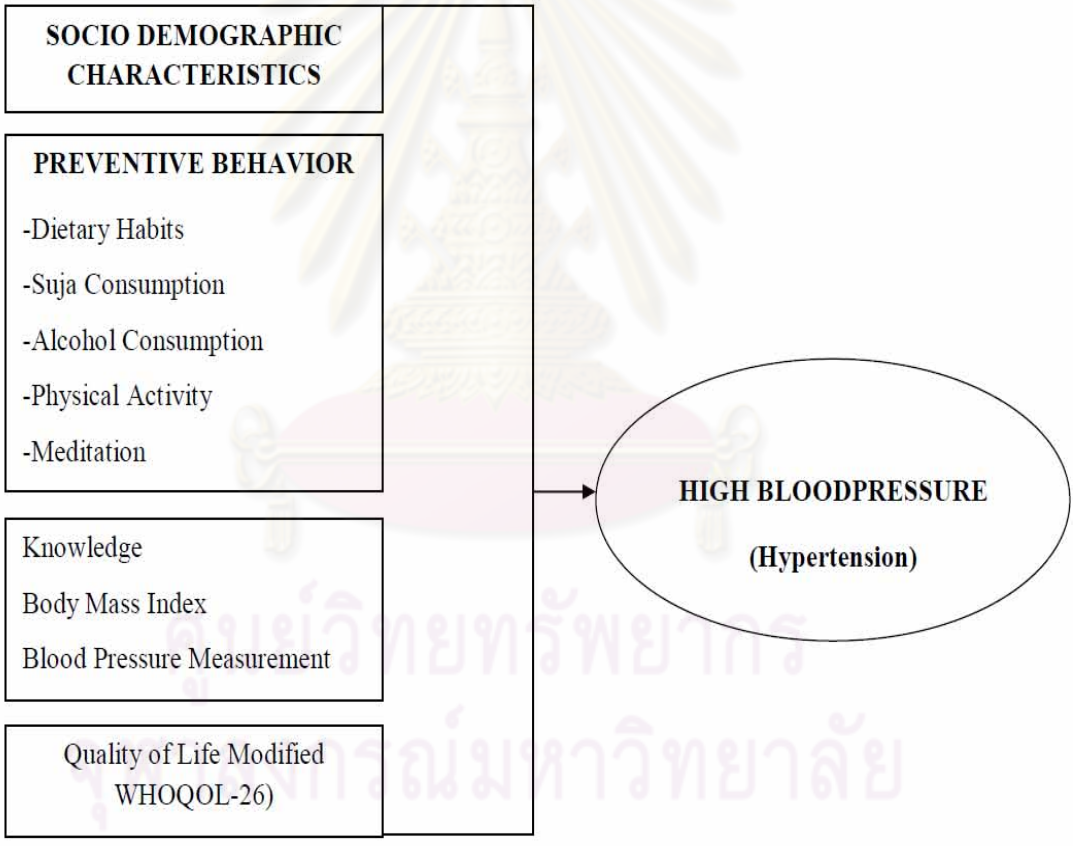

Figure 2: Conceptual Framework

CHAPTER II

LITERATURE REVIEW

Introduction:

A literature review is an account of what has been published on a topic by accredited scholars, scientists and researchers. Literature review basically helps the researchers and scholars to broaden their individual ideas on the related topics that one intends to carry out further researches. The literature review for this portion of topic is on the associations and causal relationship of the high blood pressure leading to hypertension through assessment of the evidence based findings in researches conducted in similar field by the researchers and renowned scientists around the globe.

In this review, the information is sought in four key areas; ie, the Hypertension, Determinants of high blood pressure, Socio Demographic Factors and Prevention, Control and Management of Hypertension.

2.1 Hypertension

Hypertension or **high blood pressure** is a condition in which the blood pressure in the arteries is chronically elevated. With every heart beat, the heart pumps blood through the arteries to the rest of the body. Blood pressure is the force of blood that is pushing up against the walls of the blood vessels. If the pressure is too high, the heart has to work harder to pump, and this could lead to organ damage and several illnesses such as heart attack, stroke, heart failure, aneurysm, or renal failure.

Hypertension is defined as systolic blood pressure of 140 mmHg or greater and or diastolic pressure 90 mmHg or greater. There are two types of hypertension: one is essential hypertension or primary hypertension: the term essential hypertension is usually referred to high blood pressure without any evident cause. Most of the hypertensive patients, up to 90-95%, are found to have this type of hypertension. Another one is secondary hypertension: the hypertension caused by the result of disease(s). Usually the

secondary Hypertension is caused by the renal disease, disorders of endocrine gland and other diseases (WHO, 1999).

The World Health Report 2002 identified hypertension, or high blood pressure, as the third ranked factor for disability-adjusted life years. Hypertension is one of the primary risk factors for heart disease and stroke, the leading causes of death worldwide. Recent analyses have shown that as of the year 2000, there were 972 million people living with hypertension worldwide, and it is estimated that this number will escalate to more than 1.56 billion by the year 2025. Nearly two-thirds of hypertensive live in low- and middle-income countries, resulting in a huge economic burden (Chockalingam et al, 2006).

Classification of the blood pressure is often confusing with many standards being set by numerous organizations and sectors to best suit their situations for further public health interventions. However, the World Health Organisation (WHO) and the International Society of Hypertension (ISH) have developed the below blood pressure chart/classification to give us a guide to what is high blood pressure and what is normal blood pressure (BP chart,WHO).

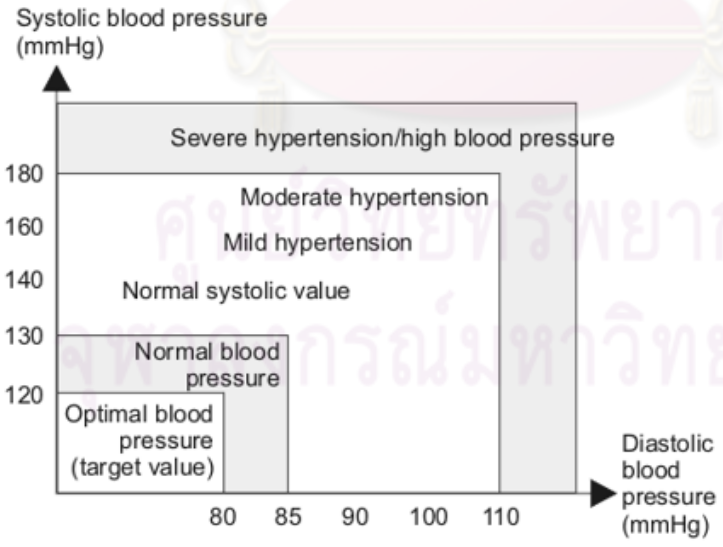

Figure 3: Blood Pressure Classification

2.2 Determinants of High Blood Pressure

There are numerous determinants of high blood pressure if not controlled will lead to secondary hypertension and many future complications. The key determinants as discussed in some scholarly articles are described as follows;

2.2.1 High BMI

Asians comprise the largest single ethnic group in the world and the fastest growing minority ethnic group within the United States. The prevalence of hypertension in most Asian groups is similar to that of non-Asians. The associations with hypertension are similar to those seen in Western populations. Body mass index is a surprisingly strong predictor of blood pressure, even in very lean Asian populations. Studies in Asian groups suggest that the prevalence of target organ disease as related to hypertension are dependent on other cardiovascular disease risk factors. Stroke is more common than heart disease in Asia. Hypertension treatment data in East Asia is sparse, and treatment methods vary widely. Hypertension control among the world's largest ethnic group remains a challenge (Jones, 2002).

A low physical fitness level and high BMI were independently associated with a high BP and risk of having hypertension in both girls and boys. Interaction was found between BMI and fitness (Nielsen et al., 2003).

It was also found that the study on ‘Difference in body mass index and waist: hip ratios in North Indian rural and urban populations’ revealed that overweight is widely prevalent in the adult urban Delhi population. Among urban men, 35.1% of those surveyed had a BMI of ≥25, this result indicates that overweight and obesity are a major public health problem in urban Delhi Population. The BMI distribution in rural Haryana reveals an interesting pattern with a low prevalence of overweight and obesity but a higher prevalence of underweight (BMI <18.5). Therefore, in the Indian Population the overweight coexists with under nutrition depending on the residence (Reddy et al., 2002).

In the recent years the BMI has become the medical standard used to measure overweight and obesity, this is a measure of how a person’s weight is for his/her height (NIH Publication No. 98–4083, September 1998).

$$BMI\ (kg\ /\ m^2) = \frac{Weight}{Height^{\ 2}}$$

A desirable BMI according to the WHO recommended cut-offs for Asian is considered to be between 18.5 and 22.9 Kg/m2. A BMI of 23-24.9 Kg/m2 is defined as 'Overweight' and ≥25 Kg/m2 as 'Obese' (Low S et al., 2009; 38:66-74)

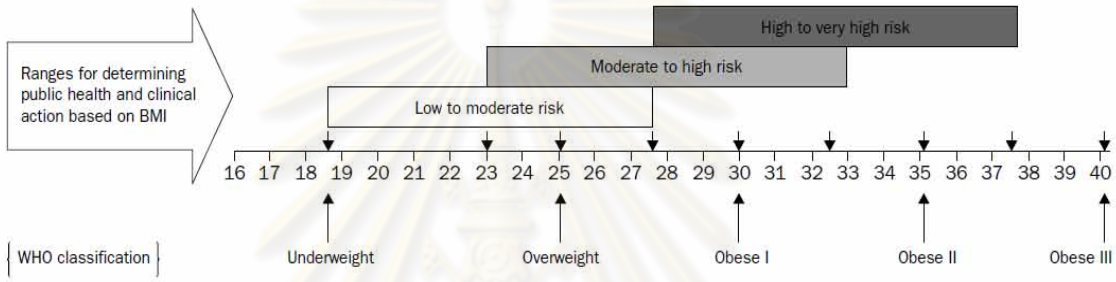

Figure 2: **Body-mass index (BMI) cut-off points for public health action**

Figure 4: BMI Scale

2.2.2 Smoking

Tobacco use is the most common cause of avoidable cardiovascular mortality worldwide. There are now 1.3 billion cigarette smokers, 82 percent in developing countries, and if current practices continue, there will be an estimated one billion tobacco-related deaths during the 21st century. The immediate noxious effects of smoking are related to sympathetic nervous over activity, which increases myocardial oxygen consumption through a rise in blood pressure, heart rate, and myocardial contractility (Norman M Kaplan, Clinical Professor of Internal Medicine University of Texas Southwestern Medical Center).

With each cigarette, the blood pressure rises transiently and the presser effect may be missed if the blood pressure is measured 30 minutes after the last smoke. The transient rise in blood pressure may be most prominent with the first cigarette of the day even in habitual smokers. In one study of normotensive smokers, there was an average elevation in systolic pressure of 20 mmHg after the first cigarette. Furthermore, ambulatory blood pressure monitoring suggests an interactive effect

between smoking and coffee drinking in patients with mild essential hypertension, resulting in a mean elevation in daytime systolic pressure of approximately 6.0 mmHg (Groppelli et al., 1992 and Narkeiwicz et al., 1995).

Smoking in Bhutan is culturally unacceptable especially for the religious group of people, hence the recent Tobacco Ban policy in Bhutan imposes penalty of 'Misdemeanor' for the people engaged in using and selling tobacco products. However, it is hard to find the evidence of tobacco use among the monks as it is badly associated with numerous Bhutanese Buddhist values.

2.2.3 Alcohol

In one prospective cohort study sample of 28,848 women from the women's health study and 13,455 men from the physicians, the health study free of baseline hypertension, cardiovascular diseases and cancer. The researcher found that a J-shaped association between alcohol intake and hypertension in women and in men, alcohol intake was positively and significantly associated with the risk of hypertension and persisted after multivariate adjustment. Models stratified by baseline systolic blood pressure (<120 versus ≥120 mm Hg) or diastolic blood pressure (<75 versus ≥ 75 mm Hg) did not alter the relative risks in women and men. In conclusion, light-to-moderate alcohol consumption decreased hypertension risk in women and increased risk in men. The threshold above which alcohol became deleterious for hypertension risk emerged at ≥4 drinks per day in women versus a moderate level of ≥1 drink per day in men (Howard et al., 2008).

Around 4% of the global disease burden is also thought to be alcohol related, which is comparable with that attributed to the effects of tobacco (4.1%) and high blood pressure (4.4%) (Ezzati *et al*., 2002; WHO, 2002).

The relationship between alcohol and cardiovascular disease, especially hypertension and coronary heart disease, is not as clear-cut. In France, the prevalence of coronary artery disease is lower—although their diets and their dietary fat content remain the similar—compared with many other Western countries. This was attributed to their tradition of wine drinking and these observations led to the so-called French paradox (Renaud and de Lorgeril, 1992).

Alcohol in Bhutan is highly embedded with the culture, and even religious offering includes alcohol menu. The studies have shown that 58% of the Bhutanese drinks alcohol (MoH, 2001).

The studies have shown link between alcohol and blood pressure, the evidence to date suggests that ethanol, rather than some other constituent of alcoholic beverages or an associated behavior, raises blood pressure. The available evidence suggests that alcohol induced hypertension will indeed lead to the usual hypertensive sequalae (Criqui. H., 1987).

Unit of alcohol

Following measures were regarded as one unit of Alcohol for different types of alcoholic beverage each containing 10 grams of absolute alcohol. Beer-285 ml, other spirits-30 ml, Wine-120 ml, Ara-120 ml, Bangchang- 285ml, Singchang-120ml (STEP Survey; Thimphu, 2007)

2.2.4 Physical Exercise

Epidemiologic studies suggest that the relationship between sedentary behavior and hypertension is so strong that the National Heart Foundation, the World Health Organisation and International Society of Hypertension, the United States Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure, and the American College of Sports Medicine (ACSM) have all recommended increased physical activity as a first line intervention for preventing and treating patients with pre-hypertension (systolic BP 120–139 mmHg and/or diastolic BP 80–89 mmHg). The guidelines also recommend exercise as a treatment strategy for patients with grade 1 (140–159/80–90 mmHg), or grade 2 (160–179/100–109 mmHg) (Baster et al,)

The U.S. Surgeon General, (1) along with the Centers for Disease Control and Prevention and the American College of Sports Medicine, recommend getting a minimum of 30 minutes of moderate-intensity physical activity on most days of the week. You can do all 30 minutes at once or break it up into 10- or 15-minute periods.

Moderate intensity exercise or physical activity is activity that causes a slight but noticeable increase in breathing and heart rate. One way to gauge moderate activity is with the "talk test" - exercising hard enough to break a sweat but not so hard you can't comfortably carry on a conversation.

Brisk walking is an ideal moderate-intensity activity. For the average person, brisk walks mean walking 3-4 miles an hour, or about as fast as you'd walk if you were late for a ball-game or PTA meeting.

It is incumbent that experts develop innovative worksite physical activity and wellness programs. A pedometer-monitored walking program is one way that a worksite health initiative can improve the health and wellness of its employees and simultaneously reduce health-care costs (Liz et al,. 2007)

Engaging students in moderate to vigorous physical activity (MVPA) in P.E. prepares them to lead physically active lives and can improve health and academic outcomes.2 Physical activity does not have to compete with educational goals; in fact, it can help students learn content by enhancing concentration skills and on-task behavior. (Active Living Research., 2009).

According to the project in California in the US on LEAN (Leaders Encouraging Activity and Nutrition), *Moderate physical activity* refers to activities equivalent in intensity to brisk walking or bicycling. *Vigorous physical activity* produces large increases in breathing or heart rate, such as jogging, aerobic dance or bicycling uphill.

2.2.5 Preventive Behaviors (Dietary Habits)

Hypertension cannot be cured but can be controlled through life style modifications and prescriptive medications if at all necessary. People trying to control hypertension often are advised to follow certain diet regime, such as decrease sodium intake, increase potassium, watch calories and maintain a reasonable weight.

A landmark study called DASH (Dietary Approaches to Stop Hypertension) looked at the effects of an overall eating plan in adults with normal to high blood pressure. Researchers found that in just eight weeks, people following the DASH diet saw their blood pressure decrease. A subsequent study called DASH 2 looked at the effect of

following the DASH diet and restricting salt intake to 1500 mg per day. Under the DASH 2 diet, people with Stage 1 hypertension had their blood pressure decrease as much or more than any anti-hypertensive medication had been able to lower it (Anderson et al., 2008).

The study on 'The relationship between selected factors and food consumption among monks in the northern region of Thailand' found that the monks ate rice, meat and vegetable according to nutrition flag 51.1%, 36.8% and 59.9% respectively, but 62.7% ate a small amount of fruits, about 60.5% ate uncooked meat and 48.8% drank tonic drinks. About 80% washed hands before eating. By using weight for height to evaluate the nutritional status, it was found that 62.9% of the sample has normal nutritional status, 12.3% was under nutrition and 25% was showing over nutritional status (Prasitnarapun, 2004).

Excess dietary salt is a well established cause of high blood pressure and vascular disease. National and international bodies recommend a significant reduction in population salt intakes on the basis of strong evidence for health gains that population salt reduction strategies could achieve. The Australian Division of World Action on Salt and Health (AWASH) coordinates the Drop the Salt! Campaign in Australia. This aims to reduce the average amount of salt consumed by Australians to six grams per day over five years through three main implementation strategies targeting the food industry, the media and government. This strategy has the potential to achieve a rapid and significant reduction in dietary salt consumption in Australia. With industry and government engagement, this promises to be a highly effective, low cost option for preventing chronic disease, (Dunford, et al,. 2009).

A low fat diet (19%) may not provide sufficient calories, essential fatty acids, and some micronutrients (especially vitamin E and zinc) for healthy untrained individuals, and it also lowered ApoA1 and HDL-C. Increasing fat intake to 50% of calories improved nutritional status, and did not negatively affect certain cardiovascular risk factors (Meksawan et al., 2004).

The most staple diet in Bhutan for every citizens at every level is mainly the rice, rice is grown in Bhutan (Red Rice) and is also imported from the neighboring Indian cities

of West Bengal and Assam. Almost 90% of the portion of every meal is rice and rest are the variety of dishes that one desires and can afford to have. The 2007 STEP survey in Bhutan revealed that almost every one are associated with atleast 1-2 risk factors of non-communicable disease, hence this can be associated with individual dietary habit other than smoking, drinking alcohol and chewing betel nuts. Rice is the predominant staple food for 17 countries in Asia and the Pacific, nine countries in North and South America and eight countries in Africa. Rice provides 20 percent of the world's dietary energy supply, while wheat supplies 19 percent and maize 5 percent (FAO., 2004).

TABLE 1. Nutrient contents of rice varieties

Type of rice	Protein *(g/100g)*	Iron *(mg/100g)*	Zinc *(mg/100g)*	Fibre *(g/100g)*
White – polished[a]	6.8	1.2	0.5	0.6
Brown[a]	7.9	2.2	0.5	2.8
Red[b]	7.0	5.5	3.3	2.0
Purple[b]	8.3	3.9	2.2	1.4
Black[a]	8.5	3.5	-	4.9

Sources: [a] = Association of Southeast Asian Nations (ASEAN) food composition table; [b] = Chinese food composition table.

Figure 5 4: Nutrient content of Rice

In Bhutan the meal serving is referred to as 250-400 Grams of cooked red rice with Raw, green leafy vegetable; 1 cup of 240 ml; cooked vegetable of ½ cup (120 ml).

The quantity of the fruit serving per day was Medium sized Apple, Banana or Orange – 1 piece; Chooped, cooked or canned fruit – ½ cup (120 ml) and Fruit Juice – ½ Cup (120 ml). The WHO recommends intake of at least 5 servings of fruits and vegetables everyday (STEP Survey, Thimphu. 2007).

Over half the population consumed suja (Salted Butter Tea) at least once a week, which might be the good source of fat and sodium. Over quarter (25.1%) eat dried beef (meat) at least once a week (STEP Survey, Thimphu. 2007). Looking at this trend, it is presumably predicted that Bhutanese population in general have unhealthy dietary habits. Suja (Salted butter tea) commonly known as Tibetan butter tea is one

of the unique recipe served in Bhutan on all the special occasions and are usually served within family at least 1-2 times a week. The recipe for the preparation of suja includes; Water+Plaing Black Tea + Raw Butter (2 table spoons=28 grams)+Salt (1/2 teaspoon salt=1000 mg of sodium) + ½ teaspoon mild power (optional). The WHO daily recommended intake of fat and sodium is 65 grams and 2400 mg for adults.

*Figure 6 : Preparing **'Suja'** –Salted Butter Tea*

2.2.6 Socio Economic Status (Income Level):

In a cohort study of young adults on 'socioeconomic trajectories and incident hypertension', the impact of initial socioeconomic status and change in socioeconomic status was assessed across 10 years; on the development of essential hypertension among black and white young men and women. The studies have found out that the decline in income from year 5 to 10 tended to be associated with hypertension with p-value of 0.07 / significant (Matthews et al., 2002).

Several modifiable socioeconomic determinants, such as education and occupation, are associated with hypertension. Additional socioeconomic status markers such as urban or rural dwelling and individual, local or national economic conditions are also associated with hypertension, although these associations are complicated and at times somewhat contradictory. Possible explanations for this impact include awareness of hypertension prevention and control and better accessibility and adherence to medical treatment among higher socioeconomic status groups, as well as

low birth weight and higher job strain among lower socioeconomic status groups (Grotto et al., 2008). Low socioeconomic status is associated with higher blood pressure. There is a need to develop and test culturally appropriate interventions to reduce the prevalence of hypertension among these populations to minimize the resultant cardiovascular morbidity and mortality.

2.2.7 Quality of Life (QOL & Stress)

Quality of life (QOL) has become a topic of growing interest in medical and psychiatric practice (Katching and Krautgartner, 2002). Recent studies show that psychiatric outpatients experience a poorer QOL compared with members of the general population (Masthoff, Trompenaars, Van Heck and De Vries, 2006). However, the presence of specific psychiatric disorders (e.g. effective disorders, anxiety disorders, Schizophrenia) and personality disorders are negatively related to QOL (Bobes and Gonzalez, 1997; Schneier, 1997; Simon, 2003; Masthoff et al., 2006). In addition to the above-mentioned factors, a potential determinant of QOL is experienced stress. Hence this finding clearly reveals the close association of quality of life with the stress. This study by *Masthoff et al. 2006* revealed that the presence of psychopathology is merely a risk factor for winding up in stressful situations, whereas the factor stress itself directly affects Quality of Life (QOL). In this study the stress was assessed using perceived stress questionnaire.

Stress can cause hypertension through repeated blood pressure elevations as well as by stimulation of the nervous system to produce large amounts of vasoconstriction hormones that increase blood pressure. Factors affecting blood pressure through stress include white coat hypertension, job strain, race, social environment, and emotional distress. Furthermore, when one risk factor is coupled with other stress producing factors, the effect on blood pressure is multiplied. Overall, studies show that stress does not directly cause hypertension, but can have an effect on its development. A variety of non-pharmacologic treatments to manage stress have been found effective in reducing blood pressure and development of hypertension, examples of which are meditation, acupressure, biofeedback and music therapy. Recent results from the National Health and Nutrition Examination Survey indicate that 50 million American adults have hypertension (defined to be a systolic blood pressure of greater than 139

mm Hg or a diastolic blood pressure of greater than 89 mm Hg). In 95% of these cases, the cause of hypertension is unknown and they are categorized as "essential" hypertension. Although a single cause may not be identified, the general consensus is that various factors contribute to blood pressure elevation in essential hypertension. In these days of 70 hour work weeks, pagers, fax machines, and endless committee meetings, stress has become a prevalent part of people's lives; therefore the effect of stress on blood pressure is of increasing relevance and importance. Although stress may not directly cause hypertension, it can lead to repeated blood pressure elevations, which eventually may lead to hypertension (Kulkarni et al., 1998).

2.2.8 Family History of Hypertension

The study to assess ‘knowledge, beliefs, and behaviors about hypertension control among middle aged Korean Americans with hypertension’, had found that the vast majority (n=445) had a family history of HBP (i.e., HBP in parents or siblings). More than 1 of 10 participants in that study had diabetes. In addition, about 1 in 20 reported that they had had a stroke (Han et al., 2007).

Genetic factors contribute to an estimated 30 percent of cases of essential hypertension, which is defined as high blood pressure of unknown cause. In the United States, high blood pressure occurs more frequently among African Americans than among Caucasian or Asian Americans. Genes are not responsible for all family histories of high blood pressure. Families tend to share the same lifestyle choices and behavior patterns. A family that leans towards sedentary activities, eats an unhealthy diet, or has many members who smoke will have higher rates of hypertension than a family that engages in healthy activities and eats sensibly (health tree, July 2010).

An estimated 3% of kids have high blood pressure. In babies, it's usually caused by prematurity or problems with the kidneys or heart. While hypertension is far more common among adults, the rate among kids is on the rise, a trend that experts link to the increase in childhood obesity.

2.2.9 Health Perception (Individual History of Hypertension)

Hypertensive individuals represent a vulnerable population that's merits special attention from health care providers and systems. This is especially important given that low health related quality of life can be a risk factor for subsequent cardiovascular events or complications (Li et al., 2005).

The most common perceived problem was related to lack of motivation for follow-up of hypertension (72%). Many patients had difficulties to accept being hypertensive (66%). A careless attitude towards hypertension was also common (63%). Lack of information was experienced by 56% of the patients. About 33% felt hopeless about their hypertension, reported adverse effects of hypertension treatment on sexual functions and lack of support by health care personnel. The least frequent problems were reimbursement problems and modification of dosage instructions. The number of problems identified per person varied between zero and 14 with a mean of 4.9 +/- 2.6 (s.d.). Hence, Perceived problems concerning hypertension, negative attitudes and experiences are very common among hypertensive patients in primary health care. (Jokaisalo et al., 2001).

2.3 Socio Demographic Factors;

The prevalence of hypertension in the Kathmandu valley among >_60 age group was very high. This result compared the prevalence of hypertension before and during the survey. The burden of both hypertension and diabetes was found higher during the survey than diagnosed before the survey (Muni Raj Chhetri, 2008). The result of the current study indicated that prevalence of both diseases as diagnosed during the survey were about 10% higher than as diagnosed before it. Shrestha et al. (2006) also predicted that one quarter of all participants age >_ 40 years were found hypertensive in urban areas.

The hypertension among elderly identified with demographic factor found that male could develop hypertension more than female. Among male group, 35.5% of male respondents develop hypertension. On the other hand, 30.5% of female respondent develop hypertension. In terms of age, late aged elderly (75 or more) had more

potential in developing hypertension than early aged elderly (60-74 years old). 40.0% of late aged elderly respondent developed hypertension while only 30.7% of early aged elderly respondents developed hypertension (Kusai eat al, 2007).

A cross sectional study on period prevalence and socio demographic factors of hypertension in rural Maharashtra revealed that the overall prevalence was 7.24%. the prevalence of hypertension increased gradually with increase in age, BMI, additional salt intake, alcohol consumption and with diabetes Mellitus (Todkar et al., 1998).

2.4 Prevention, Control and Management of HT;

Margaret Allen (2009) initiated steps to streamline the management decision of hypertension, in her paper, She stated that life style modifications are the cornerstones of overall BP management but are often inadequate to achieve control. At least one in three (73 million) adults in the United States has hypertension, making it the most common primary care diagnosis in the country. Prevalence of hypertension in African-Americans (more than 42%) is among the highest in the world (American Heart Association. Heart Disease and Stroke Statistics 2009) and 75% of people with hypertension are older than 50 years (Williams et al., 2008).

Hypertension can be prevented by complementary application of strategies that target the general population and individuals and groups those are vulnerable to HBP. Lifestyle based interventions are seen more imperative and the absolute reductions in risk of hypertension are likely to be greater when targeted in persons who are more vulnerable to develop hypertension compared with their counterparts who are less vulnerable. However, prevention strategies applied early in life provide the greatest long-term potential for avoiding the precursors that lead to hypertension and elevated blood pressure levels and for reducing the overall burden of blood pressure related complications in the future (U.S Dept. of Health and Human Services, NIH, NHLABI).

Mayo clinic staff has stated that our life style plays crucial role in treating our HBP, if we adapt to healthy life style and keep our BP under control, we may avoid, delay or reduce the need for medication. Increase in weight is more or less the indication of BP elevation, loosing just few kilos/pounds will immensely benefit us in reducing our BP.

Besides shedding weight, we must keep watching our waist circumference, carrying to much weight around waist line will put us in danger to develop hypertension.

- Men are at risk if their waist measurement is greater than 40 inches (102 centimeters, or cm).
- Women are at risk if their waist measurement is greater than 35 inches (88 cm).

Overall, weight loss, reduced intake of dietary sodium, moderation in alcohol consumption, and increased physical activity as the best proven interventions for prevention and control of hypertension. In addition, potassium supplementation and modification of eating patterns has been shown to be beneficial in prevention of hypertension ((U.S Dept. of Health and Human Services, NIH, NHLABI).

In Canada, reducing sodium consumption to the recommended levels would likely decrease the prevalence of hypertension by 30%, reduce hypertension related cardiovascular events by 8.6% and save about 2 billion dollars annually in health care costs even without considering the impact of other sodium-related health risks. Health care professionals worldwide, including in Canada, have played important roles in reducing dietary sodium (Joffres et al., 2007).

The initiation of the worksite health promotion programs that involve physical oriented activities have shown positive effects on the health status, which has helped in decreased health care visits to clinics, and decreased bed rest and work absenteeism (Haines et al., 2007).

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design

This is Cross-sectional descriptive study aimed at studying the prevalence of Hypertension among the monks residing in Tashi-cho-Dzong (The house of central monastic body) and to assess the risk factors associated with the development of high blood pressure.

3.2 Study Area

The study was carried out in Tashi-Cho-Dzong (Central Monastic body) and Simtokha Shedra both locate located in Thimphu Valley. Currently, Bhutan has almost 10,000 registered monks. Majority of monks reside in and around Thimphu, the capital city of Bhutan. Thimphu Tashi-Choe-Dzong is house of central monastic body, where all high level officials in central monastic body live. It also houses the Throne room of our beloved King.

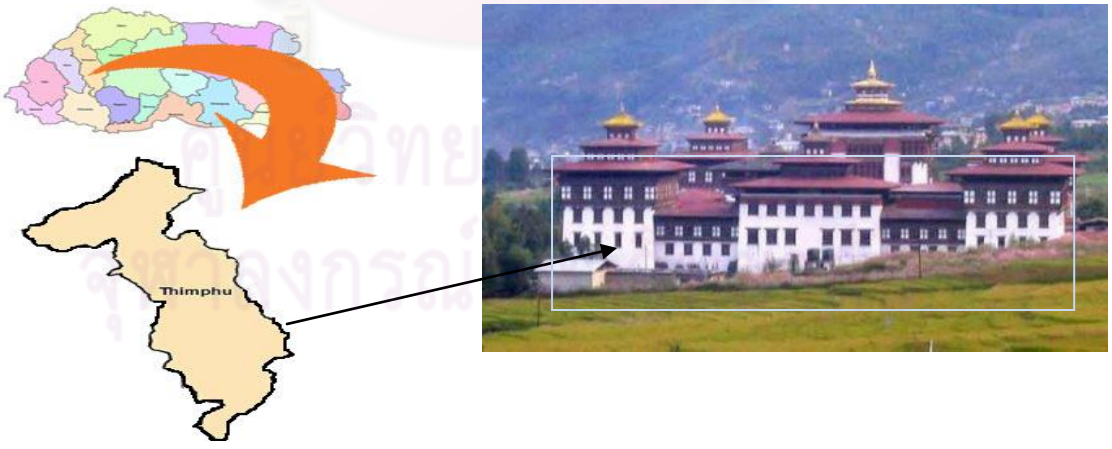

Figure 6: Study Area (Thimphu Tashi-Choe-Dzong)

3.3 Study Population;

Monks reside in Thimphu Tashi-Cho-Dzong. The inclusion criteria for the subject are; the subject has to be above age of 20 years and monks residing in Tashi-Choe-Dzong. The study subjects were the monks left behind in Thimphu Tashi-Choe-Dzong after the central monastic body left to Punakha for its winter residence.

3.4 Sampling Technique:

Researchers rarely survey the entire population for two reasons (Adèr, Mellenbergh, & Hand, 2008): the cost is too high, and the population is dynamic in that the individuals making up the population may change over time. The three main advantages of sampling are that the cost is lower, data collection is faster, and since the data set is smaller it is possible to ensure homogeneity and to improve the accuracy and quality of the data.

Since little more than 150 monks are left behind in winter once the central monastic body leaves for its winter residence to Punakha, the **Purposive sampling with census** technique was used in this study and therefore every monk in the Dzong was surveyed.

3.5 Measurement tools;

3.5.1 Measurement of Blood Pressure:

Readings of the blood pressures were taken from all the subjects, In order to record the blood pressure, subjects were seated quietly for at least 5 minutes in a chair (rather than on an exam table) with their backs supported and their arms bared and supported at heart level. Two or more readings, separated by 30 minutes were then averaged. In cases, where the first two readings differed by more than 5 mm Hg, an additional reading was obtained and averaged with the previous reading.

The blood pressure readings were taken by the trained (validated) health workers using WHO recommended Mercury Sphygmomanometer.

*3.5.2 **Measurement of Height to Weight (BMI):***

In recent years, BMI has become the medical standard used to measure over weight and obesity. The current WHO BMI cut-off points of <16 kg/m^2 (severe underweight), 16·0–16·9 kg/m^2 (moderate underweight), 17·0–18·49 kg/m^2 (mild underweight), 18·5–24·9 kg/m^2 (normal range), ≥25 (overweight), 25–29·9 kg/m^2 (pre-obese), ≥30 kg/m^2 (obesity). 30–39·9 kg/m^2 (obese class I), 35–39·9 kg/m^2 (obese class II), ≥40 kg/m^2 (obese class III) should be retained as international classification. But the cut-off points of 23, 27·5, 32·5, and 37·5 kg/m^2 (figure 2) are to be added as points for public health action (Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies; WHO expert Consultation).

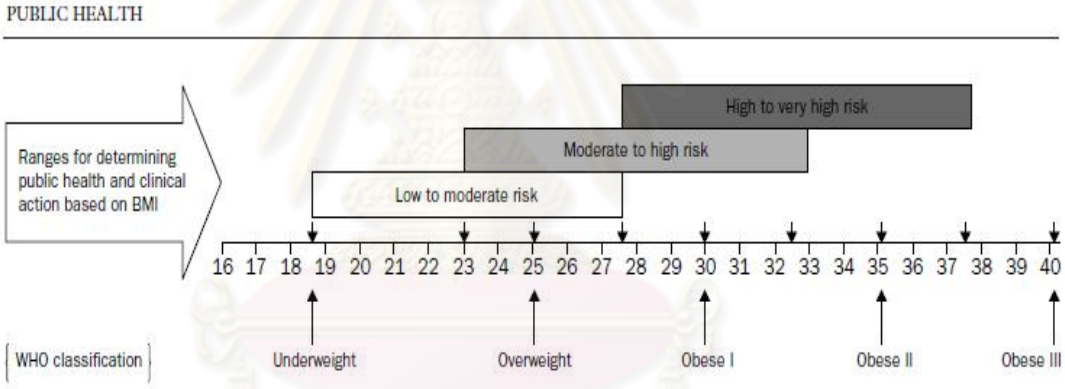

Figure 2: **Body-mass index (BMI) cut-off points for public health action**

*3.5.3 **Measurement of stresses:***

The stress was measured using set of questionnaire; the reliability test was performed to make sure that modified questions are reliable. Hence reliability test was conducted for 32 monks before the actual survey.

*3.5.4 **Self administered questionnaires:***

The self administered questionnaires in two categories, first the general questionnaires built on to gather information on socio demographic characteristics, preventive behaviors and knowledge and second questionnaire will be of perceived stress questionnaire. The questionnaires were tested for

validity and reliability and interviewers were recruited for the execution of the questionnaires. The one day orientation class was conducted for the interviewers to train them with the basic skills of conducting research using self administered questionnaires and communicating effectively with the respondents in local language (Dzongkha).

To ensure **Validity;** the questionnaire in this study was developed from review of the published articles and research report. Similarly, the standard and valid instrument was used for blood pressure measurement.

To ensure **Reliability;** the questionnaire pretest was performed in 32 (thirty two) participants among the sample above the prescribed age group (>20 yrs. Old) or more individuals outside the study site before doing the actual data collection.

Part 1: Socio Demographic characteristics of the sample including the age, income and educational level. The questions relate the risk of hypertension with regards to age, income and education level.

Part 2: The questions assessing their individual preventive behavior with regards to dietary habits, physical exercises and alcohol consumption in any form. The data to be gathered in this section will be mixture of Categorical data and continuous data. For the continuous data the assessments were made based on the Likert rating scales as follows:

But for the Categorical data; the frequency of the practice can be put in as the:

Statement of practice

Totally correct	=	2 point
Partially correct	=	1 point
Incorrect	=	0 point

Positive statement **Negative statement**

Daily practice	= 3 point	Daily practice	= 0 point
Mostly (4-6 Days/ weeks)	= 2 point	Mostly (4-6 days/week)	= 1 point
Sometime (1-3 days/week)	= 1 point	Sometime (1-3 days/week)	= 2 point
No practice	= 0 point	No practice	= 3 point

Part 3: the question assessing individual knowledge and perception on the hypertension, this is aimed at understanding their level on knowledge and to see whether the subjects are aware of hypertension. For this, their level of knowledge will be assessed in three different categories; poor, fair and good.

Level in percentage	**Meaning**
≤12	poor
13-17	fair
≥ 18	good

3.6 Procedures of Data Collection in Bhutan;

The data were collected from the monk population in Tashi-Choe-Dzong and within the domain of Tashi_Choe-Dzong in Thimphu Valley. As per the planned schedule, the data was collected in two phases, once in second week of the schedule and another in fourth week of the schedule; this was done to get all the residents of the study area.

Two broad steps were taken to carry out the data collection process;

3.6.1 Preparation Stage;

a. The researcher (I) referred to many local and international documents, books, concepts, theory, and research papers to incorporate all knowledge and experiences in doing the research.
b. Submitted research proposal to the Research & Ethical Board of Health, Ministry of health, Royal Government of Bhutan.

c. Coordinated with officials who will responsible for the central monastic body to explain the objectives of the study and to get full cooperation for program implementation (Data Collection).

d. Researcher explained steps and procedures of the data collection procedures for co-researcher.

e. Prepared for data collection and data recoding.

3.6.2 Implementation Stage (Data Collection Exercise)

Week-1:

Meeting with the key focal persons in the Ministry of Health, Central Monastic Body (Dratsang Lhentsog) and process to acquire formal written approval from the Research and Ethical Board of Health (REBH) was initiated, that includes incorporation of recommended changes, submission of the translated version of the informed consent form to the REBH secretariat.

Week-2:

After acquiring the approval from REBH, formal approval was sought from the Dratsang Lhentsog to carry out the study. Validation and reliability testing of the questions were carried out for atleast 30-32 monks from within and outside the study area. Research assistants (7 person) and 8 clinical nurses were recruited to carry out the data collection process (measurement of BP, measurement of Height and Weight and to preside over the self administered questionnaires). They were oriented on the basic issues of the essential processes while undertaking field research and finally data collection was initiated for two working days in Thimphu Tashi-Choe-Dzong.

Week-3:

Questionnaires and necessary information were stored in EPI Info version 5.6 and data entry process was initiated using EPI-info. Missing information were scrutinized and revisited to get maximum accuracy.

Week-4:

Since the researcher could only mobilize 98 subjects in the first week, this time based on the recommendation from the Dratsang Lhentsog (Central Monastic Body) the second phase of data collection was carried out in Simtokha Shedra under domain of Thimphu Tashi-Choe-Dzong. In total researcher could mobilize 154 monks out of which only 138 could meet the eligible criteria to participate in the study.

3.7 Data Analysis

The data were analyzed by using level of significance at 0.05.

1. Descriptive statistics: The socio-demographic characteristics and general information were presented by frequency, percentage, mean and standard deviation.
2. Inferential statistics: Bivariate analysis of the relationship between the independent variables and dependent variable were analyzed using chi-square test (Cross tabulation).
3. Independent sample t test was used to compare means between various independent variables.
4. Binary Logistic Regression Analysis was used to assess the importance of all those independent variables which were found to be associated with the dependent variable during the bivariate analysis.

3.8 Ethical Consideration:

The proposal was submitted to the Research Ethical Board of Health (REBH), under Ministry of Health, Royal Government of Bhutan for further consideration on the proposal to undertake the study as proposed after the endorsement from the university (chief investigator/advisor). The proposal was refined and reshaped as desired by the ethical committee board after the full board review. Formal approval from the REBH was secured only after the necessary corrections were done with the translated version of the informed consent form.

The participants (study subjects) were briefed on the nature of study and possible scope of this study. They were also sensitized on the risk of developing hypertension and possible risk associated with future complication of hypertension. Informed consent forms were distributed to seek their individual willingness to participate in the study.

Written consent was also sought from the Central Monastic Body to carry out the study as proposed.

3.9 Limitations:

This study was the first of its kind to look at the prevalence of hypertension in the specific group of people in the country. Owing to the time limitation and moreover due to the non-availability of enough study subjects, the researcher could only recruit 138 who meets the eligible criteria from total number of 154. Hence, the findings from this study could not be generalized to the monks in other districts except for the central monastic body (Pung_Thim Dratsang).

The respondents with the past history of hypertension were also recruited in the study and most are initially diagnosed through their own sign and symptoms without the medical interventions. Hence, the respondents with high blood pressure are inclusive of the ones with individual history of hypertension.

3.10 Expected Benefits:

This research finding was expected to explore the prevalence of hypertension and other chronic illness caused as result of HBP in monks and to further strengthen the research development for NCDs in the country.

We expected to know the determinants of High Blood Pressure and accordingly be able to guide the policy formulation and strategy development for addressing NCD problems in the country for specific target groups beyond monks. We also looked at providing counseling on the self care mechanisms if were found with elevated blood pressure and to some extent advice to visit the nearest health center for clinical advice from accredited physicians.

CHAPTER IV

RESULTS

Results from the quantitative methods (bivariate analysis, independent sample t test and multivariate analysis) of hypertension were described. The prevalence, knowledge and preventive behaviors of the hypertension were analyzed with 36 different independent variables. Owing to the normal distribution trend of the variables the researcher used parametric test statistics. The Correlation between the dependent variable i.e. Hypertension and various independent variables were derived using bivariate analysis, Chi-Square and in-depth associations were derived using logistic regression and independent sample t test.

4.1 Study Process

Based upon the census method of sampling, the actual numbers of 154 monks were recruited, out of which only 138 met the inclusion criteria (≥ 20 years) to participate in the study. The general objectives and benefits of the study were briefly informed to the study subjects. They were also briefed that the participation is not compulsory.

The reliability test was carried out with 32 monks from within and outside the study area. Every individual subjects were made to understand the rationale and benefit of the study and informed consent forms were accordingly signed before they were actually intervened.

The subjects were satisfied with the study and diagnosed individuals were counseled on their dietary habits and the importance of maintaining their blood pressure at constant level.

4.2 General Characteristics

The age of the participants varied from 20 years to 63 years, the mean age of the respondents was 31. The maximum respondents 74 (53.6%) were within the age group of 20-30 years and minimum 10 (7.2%) were within the age frame of 54-63 years.

The maximum number of years served as monk was 50 and minimum was one 0. Out of 138 respondents 18 (13%) has served the maximum term ranging from 32-50 years as monk. More than one third of the monks or 61 (44.2%) has served the term ranging from 1-10 years.

Of their education background, almost half or 66 monks (47.8%) has achieved the tertiary level of monastic education followed by 33 monks (28.3%) for secondary level. Only 33 (23.9%) of respondents were in their primary level of monastic education. However, the level of monastic education cannot determine the individual respondent's knowledge on the preventive aspects of the hypertension as it is noticed that some of the respondents have joined the monk body only at the later age after completion of 6-12 years of modern schooling education.

Regarding their financial income, monks were normally paid their monthly stipend based on their level or ranks in the monastic system. The minimum amount paid is Nu. 1000 or even lesser (where; 1 Thai Baht = 1.55 Bhutanese Nu.). Interestingly the study has revealed that 37% of the respondent's income ranges from Nu. 1000-Nu. 2999 followed by the lowest income earner 32 (23.2%), income ≤ Nu 1000. 29(21%) Twenty-one percent of respondents have the highest income the amount ranging Nu. 5000 and above.

For knowledge on hypertension, since most of the Bhutanese have the general conception of thoughts that hypertension is genetic disease, the respondents were asked about the status of their family history of hypertension and their own history of hypertension. Among the 138 subjects 22 (15.9%) of the respondents said their parents had the history of hypertension and almost two thirds or 72 monks (52.2%) said that their parents do not have the history. However, 30 (21.7%) of the respondents reported that they have the hypertension history based on diagnosis from the nearest health centers. Surprisingly only 9 (6.5%) of the respondents were currently under treatment.

Table 4.2.1; Socio Demographic Characteristics of the study subjects

Variables	Numbers	Percentage
Total number of studied-monks	**138**	**100**
SOCIO DEMOGRAPHIC		
Age in Years;		
≤20	11	8.0
20-30	74	53.6
31-41	25	18.1
42-52	18	13.0
54-63	10	7.2
Total years as monk;		
≤1	2	1.4
1-10	61	44.2
11-20	34	24.6
21-30	23	16.7
32-50	18	13.0
Monastic Education Level;		
Primary (up to 6 years)	33	23.9
Secondary(6-10 years)	39	28.3
Tertiary (Above 10 years)	66	47.8
Monthly Income;		
≤Nu. 1000	32	23.2
Nu. 1001-Nu. 2999	51	37.0
Nu. 3000-Nu. 4999	26	18.8
≥Nu. 5000	29	21.0

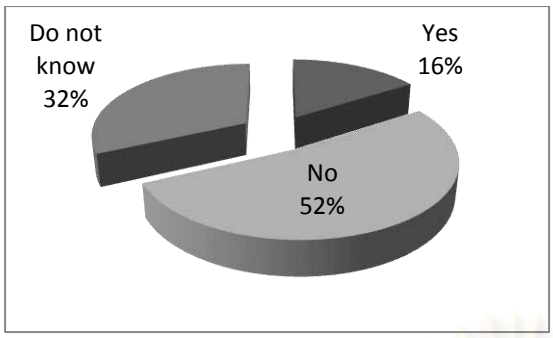

Figure 1 Family History of Hypertension

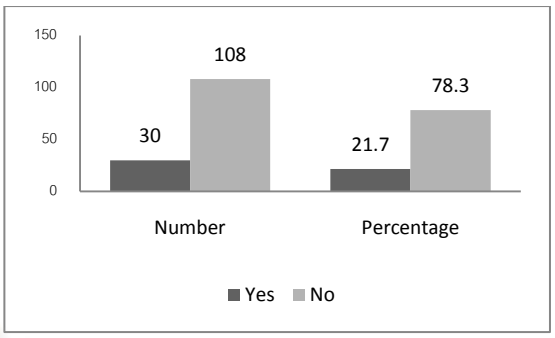

Figure 2 Individual History of Hypertension

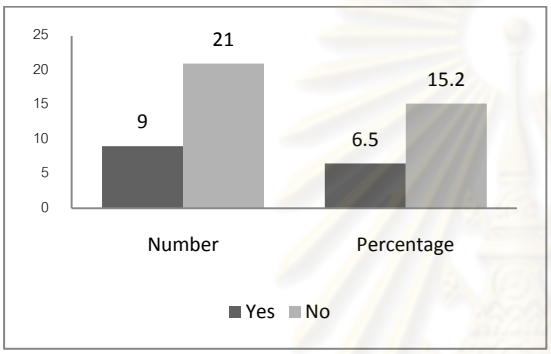

Figure 3 Currently under HT treatment

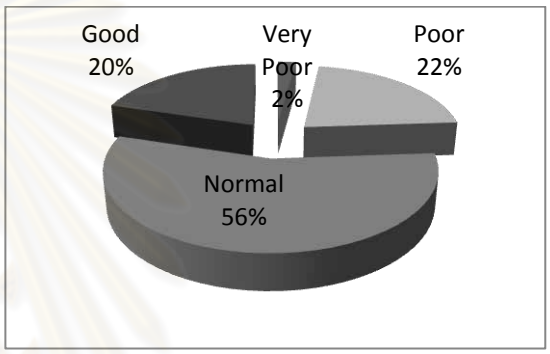

Figure 4 Current Health Status

Figure 8 ; Socio Demographic Characteristics of Study Subjects

Of their health status, the respondents were also asked about their current health status and the majority of them (77 monks or 55.8%) reported that it is normal and only 3 of them (2.2%) reported of having very poor health status.

Regarding food consumption, the respondents were asked about their frequency and quantity of meal intake on per day per meal basis. Majority 133 (96.4%) reported of having only twice a day (morning and evening and remaining 5 (3.6%) have their meals from 3-4 times which is mostly 3 times (morning, noon and evening). Nonetheless 70(50.7%) and 63 (45.7%) of the respondents have only ≤1 bowl and 1-2 bowls of their daily meals.

For the "Suja" drinking, it was found that majority of surveyed-monks (111 or 84.4%) regularly take *suja* and the remaining of 27 (19.6%) don't. Out of total 111 positive respondents, 73 of them (52.9%) take *suja* sometimes (1-3 days/week), 23 (16.7%) take every day and 14(10.1%) mostly (4-6 days/week), respectively. Fifty-six monks (40.6%) take 1-3 cups (200ml), 39(28.3%) take only ≤1 cups (200 ml), respectively.

However, 4 monks (2.9%) take ≥5 cups (200ml), while 11 (8.0%) take 3-4 cups of *suja.*

Table 4.2.2; Eating Behaviors of the study subjects

Variables	Numbers	Percentage
Total number of Surveyed-Monks	138	100
PREVENTIVE BEHAVIORS		
Frequency of meals in one day ;		
≤3	133	96.4
3-4 times	5	3.6
4-5 times	0	
≥5 times	0	
Portion of rice intake per meal;		
≤1 bowl	70	50.7
1-2 bowl	63	45.7
≥3 bowl	5	3.6
Frequency of Veg. intake;		
Never	1	0.7
1-3 days/week	20	14.5
4-6 days/week	15	10.9
7 days/week	102	73.9
Frequency of Meat intake;		
Never	40	29
1-3 days/week	80	58
4-6 days/week	2	1.4
7 days/week	16	11.6

Table 4.2.3 Eating Behavior of study subjects (cont.)

Variables	Numbers	Percentage
Item of meat most preferred;		
Pork	21	15.2
Beef (Dried)	72	52.2
Chicken	7	5.1
Fish		
Frequency of fruits intake;		
Never	29	21
1-3 days/week	91	65.9
4-6 days/week	14	10.1
7 days/week	4	2.9
Total	138	100
***Suja* (Salted Butter Tea);**		
Yes	111	80.4
No	27	19.6
***Suja*- Frequency of intake;**		
Never	27	19.6
1-3 days/week	73	52.9
4-6 days/week	14	10.1
7 days/week	23	16.7
***Suja* – Quantity of intake;**		
Never	27	19.6
≤1 cup of 200 ml	39	28.3
1-3 cups of 200 ml	56	40.6
3-4 cups of 200 ml	11	8
≥5 cups of 200 ml	4	2.9

For alcohol consumption, respondents were screened in to three broad categories of current alcohol drinker, non-drinker and past habitual drinker. Nineteen monks (13.8%) revealed that they are current alcohol drinker, whereas the majority of them (98 or 71%) reported they are non-drinker. However, 21 monks (15.2%) were found

to be past habitual drinkers, but they had quitted their habits of drinking. Out of the 19 current alcohol drinker, 13 of them (9.4%) started drinking alcohol at the age of ≤20 years, 5 (3.6%) started drinking between 20-19 years and 1 (0.7%) started between 30-39 years, respectively. Among the drinkers, 10 of them (7.2%) drinks beer, 7 (5.1%) drinks local brewed, 2 (1.4%) each for wine and spirits, respectively.

11 out of 138 monks (8%) used alcohol sometimes (1-3days/week), while 3 of them (2.2%) used alcohol once a week and mostly (4-6days/week) and 4 (2.9%) respondents said others, which mean they drink only on special occasions and festivals. Out of 21(15.2%) past habitual drinker, 7 (5.1%) quitted before 3 years, 6 (4.3%) quitted between last 1-2 years, 4 (2.9) before 6 months, 2 (1.4%) each quitted drinking between last ½-1 year and 2-3 years, respectively.

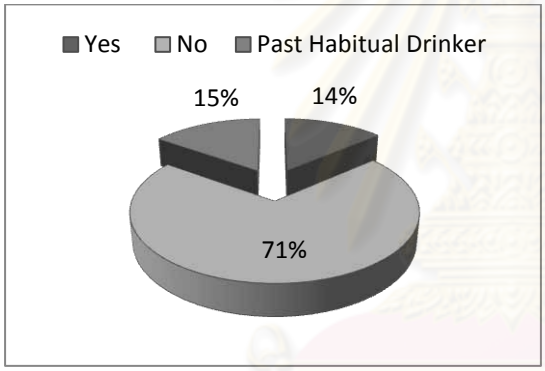

Figure 5 Alcohol Consumption

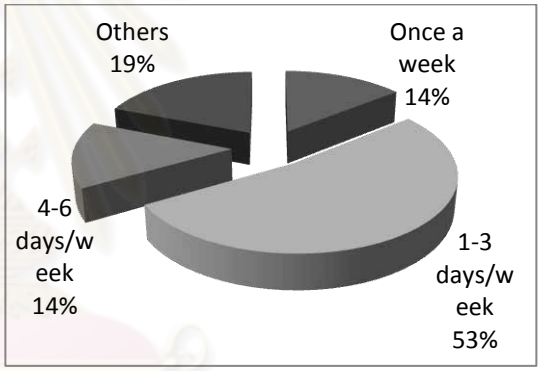

Figure 6 Frequency of Alcohol Consumption

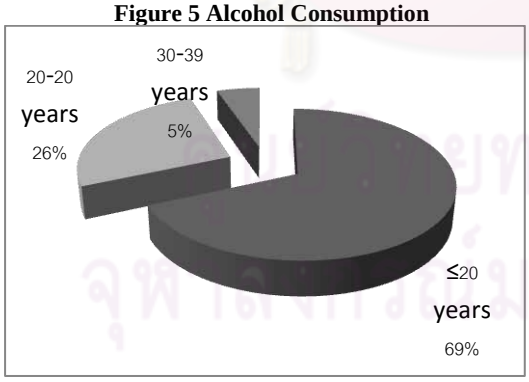

Figure 7 Initiated drinking

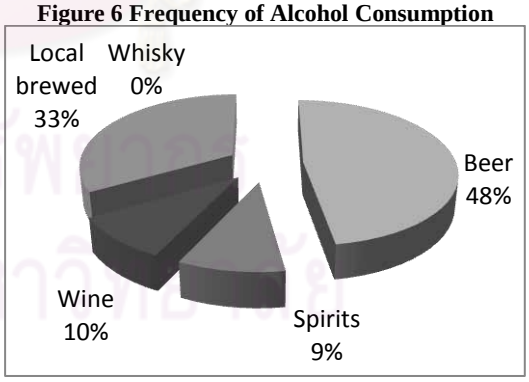

Figure 8 Type of Alcohol most preferred

Figure 9; Alcohol Consumption pattern of study subjects

The study also found that out of 138 surveyed monks 116 (84.1%) responded that they engage in doing physical exercise. Out of this figure 54 (39.1%) engaged in moderate physical exercise at least 30 minutes in 1-3 days/week, 35 (25.4%) in

moderate exercise on regular basis and 18 (13%) for at least 30 minutes in 4-6 days/week. 27 (19.6%) in vigorous physical exercise for at least 30 minutes for 1-3days/week, 10 (7.2%) in vigorous exercise for at least 30 minutes on regular basis and remaining 2 (1.4%) in vigorous exercise for at least 30 minutes for 4-6 days/week, respectively. 76 (55.1%) of respondents never engage in vigorous physical exercise and 10 (7.2%) of respondent never engage in moderate physical exercise.

Of the 138 surveyed monks, 122 (88.4%) respondent practice meditations and remaining 16 (11.6%) do not practice meditation for one reason or the other. Out of 122 positive respondents, 89 (64.5%) practiced meditation on regular basis, whereas 22 (15.9%) and 11 (8%) of the respondent practice meditation 4-6 days/week (Mostly) and 1-3 days/week (sometimes), respectively.

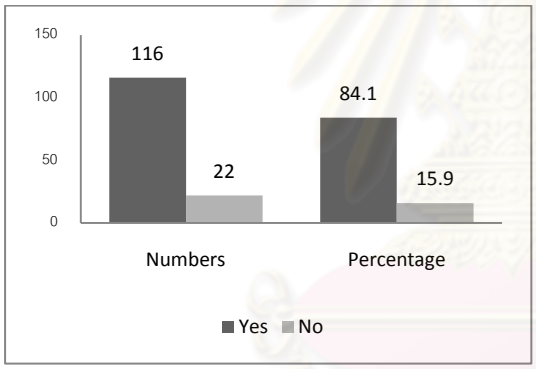

Figure 9 Physical Exercise

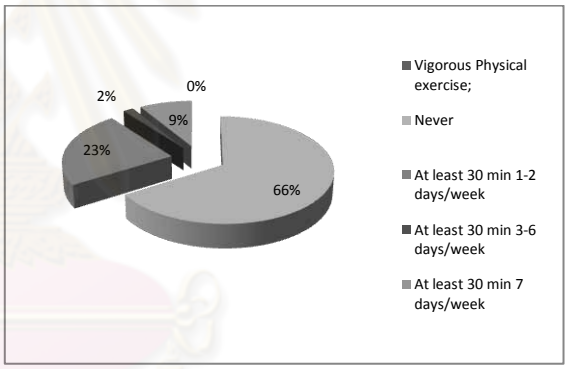

Figure 10 Vigorous Excercise

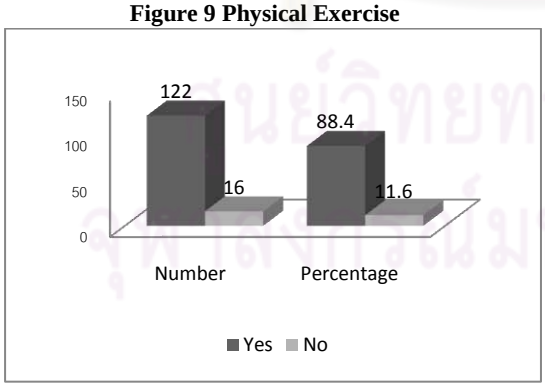

Figure 11 Meditation

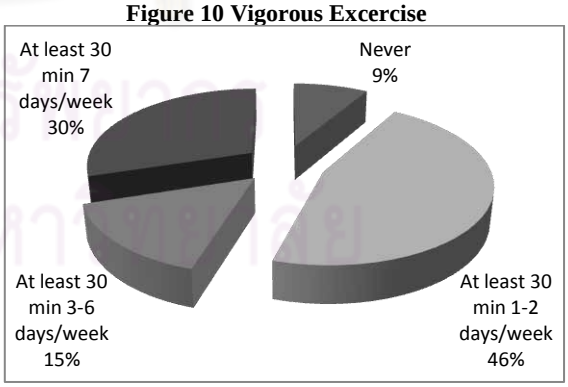

Figure 12 Moderate Exercise

Figure 10; Physical Exercise & Meditation Practice

Table 4.2.4; Knowledge, BMI and Blood Pressure Category

Variables	Numbers	Percentage
PREVENTIVE KNOWLEDGE		
Poor	62	44.9
Fair	76	55.1
Good		
BMI Category;		
Normal Weight(18.5-22.9 Kg/ m^2)	80	58.0
Over weight (23-24.9 Kg/ m^2)	15	10.9
Obese (≥25 Kg/ m^2	43	31.2
BP Category;		
Optimum (120/80 mm Hg)	62	44.9
Normal (121/81 – 130/85)	31	22.5
Normal SBP (131/86-140/90)	31	22.5
Mild HT (141/91 – 160/100)	11	8.0
Moderate HT (161/11 – 180/110)	3	2.2
Severe HT (≥181/111 mm Hg)		

Regarding knowledge on hypertension, it was found that no '0' respondent possess good knowledge on preventive and curative aspects of hypertension, however 76 (55.1%) respondent possess fair knowledge on hypertension followed by 62 (44.9%) possessing poor knowledge on hypertension (Table 4.2.4 see table above).

It was found that from 138 total study subjects 43 of them (31.2%) were obese as per the WHO recommended BMI cut-off for Asians and 80 (58%) had normal weight followed by 15(10.9%) overweight (see table above).

Two separate blood pressure readings was averaged and final result was categorized in to six broad groups i.e. Optimum, Normal, Normal systolic, Mild hypertension, Moderate hypertension and severe hypertension. Sixty two of (44.9%) of respondents were with optimum level of blood pressure whereas 3 (2.2%) were moderate hypertensive, 11(8%) were mild hypertensive and 31 (22.5%) with normal systolic value but elevated diastolic pressure, respectively. Hence, the overall prevalence of hypertension among the study subject is 32.7%, taking in to consideration the

accumulative figure of respondents having normal systolic value but diastolic pressure above the normal level.

Table 4.2.5: Perceived Stress Score

Table; Quality of Life scores in (%)

		Very Dissatisfied (%)	Dissatisfied (%)	Neither satisfied nor dissatisfied (%)	Satisfied (%)	Very Satisfied (%)
1	How satisfied are you with your sleep?	0	0.7	36.2	34.5	19.6
2	How satisfied are you with your ability to perform your daily living activities?	0	3.6	4.3	76.8	15.2
3	How satisfied are you with yourself?	0	1.4	29.7	56.5	12.3
4	How satisfied are you with the support you get from your friends?	0	2.2	28.3	37.7	31.9
5	How Satisfied are you with wellbeing of your family and relatives?	0.7	2.9	1.2	48.6	16.7
6	How satisfied are you with the Conditions of your living place?	0	8.7	28.3	37	26.1
7	How satisfied are you with your career as monk?	0.7	1.4	23.2	42.8	31.9

		Not at all (%)	A little (%)	A moderate Amount (%)	Very much (%)	An extreme Amount (%)
8	How much do you feel that you are relaxed?	1.4	7.2	52.2	37	2.2
9	How much do you feel that you are a happy person?	0	2.9	54.3	42.8	0
10	How well are you able to concentrate?	0	3.6	37	54.3	5.1
11	How much you feel tired over your tasks as a monk?	2.9	24.6	36.2	31.9	4.3
12	How much do you think about the wellbeing of your parents and relatives back home?	11.6	26.8	39.9	16.7	5.1
13	How much do you feel that you have enough physical exercise?	21	36.2	34.1	8.7	
14	Have you ever been anxious, worried, or upset?					

		Not at all (%)	A little (%)	A moderate Amount (%)	Very much (%)	An extreme Amount (%)
15	How tensed you felt about your performance as monk?	15.2	37.7	34.1	11.6	1.4
16	How demanding is your responsibility as monk?	0.7	13.8	61.6	20.3	3.6
17	How well you adapt to the rules (do's & don'ts) of monk body?	2.2	14	29	55.1	12.3
18	How often you feel pressured about your future career?	12.3	18.8	48.6	10.9	9.4

Of Sleepiness, it was found that 60 surveyed monks (43.4%) were satisfied with their sleep, 50 (36.4%) were neither satisfied nor dissatisfied with their sleep, 27 (19.6%)

were very satisfied, but however only 1 (0.7%) were reported dissatisfaction with their sleep, respectively.

Regarding satisfaction with ability to perform daily living activities; 106 of them (76.8%) were reported very satisfied, 21 (15.2%) satisfied, 6 (4.3%) neither satisfied nor dissatisfied and 5 (3.5%) very dissatisfied, respectively. The respondents were also asked about their satisfaction level with themselves, the study revealed that 78 (56.5%) were satisfied, 41 (29.7%) neither satisfied nor dissatisfied, 17 (12.3%) very satisfied and 2 (1.4%) dissatisfied, respectively. Satisfaction with support from friends and satisfaction with the wellbeing of their family and relatives revealed that 52 (37.7%) and 43 (31.2%) were satisfied, 44 (31.9%) and 67 (48.6%) were very satisfied, 39 (28.3%) and 4 (2.9%) were neutral whereas only 3 (2.2%) and 1 (0.7%) were dissatisfied, respectively. When asked about their satisfaction with their living conditions, 51 (37%) were satisfied, 36 (26.1%) were very satisfied, 39 (28.3%) neutral and 12 (8.7%) dissatisfied with their living conditions, respectively. Satisfaction with the career as monk revealed that 59 (42.8%) were satisfied, 44 (31.9%) were very satisfied 32 (23.3%) neutral, 2 (1.4%) dissatisfied and 1 (0.7%) said they are very dissatisfied.

The respondents were also asked about ‘how much’ they feel on particular issues in last two weeks; when asked how much they feel relaxed, 3 (2.2%) responded an extremely relaxed, 51 (37%) very much relaxed, 72 (52.2%) a moderately relaxed followed by 10 (7.2%) a little and 2 (1.4%) reported not at all relaxed, respectively. When asked the individuals level of self-containment and individual happiness level, the majority of them (75 monks or 54.3%) revealed that they are moderately happy followed by 59 (42.8%) very happy, and 4 (2.9%) respondents are not very happy with themselves. The respondents were also intervened on the ‘how well they can concentrate and how tiring they are as monk’, 75 (54.3%) and 33 (23.9%) monks reported that they can very much concentrate and the task as monk is very much tiring. Contradicting to the above fact, only 5 (3.6%) respondent can concentrate a little as monk for last two weeks and 13 (9.4%) of them said they are not at all over the task as monks. Six (4.3%) monks were having an extreme amount of feeling preceded by 44 (31.9%) thinking very much for the welfare of their parents and

relatives. About 16 (11.6%) of the respondents feel that they don't have enough physical exercise, noticeably only 12 (8.7%) of the total respondents are revealed to have had deterring mood or getting worried and upset.

4.3 Statistical Analysis of Data

4.3.1 Bivariate Analysis (*Chi*-square)

The high blood pressure was significantly lower in all age groups except in the age group between 42-63 years. It was observed that hypertension is significantly associated with the growing age with the p-value=0.038 and lower in the younger and mid younger age groups. Statistically significant association was observed between the total number of years as monk and hypertension with p-value=0.006 (<0.05).

Table 4.3.1.1 Association between the high blood pressure and individual age and individuals terms served as monks

Age in Years:	BP Category		Total	Chi-square **(χ2)**	P-value
	NBP	HBP			
20-41 years	102 (93%)	8(7.27%)	110		
42-63 years	22 (79%)	6 (21%)	28	4.906	0.038*
Total years as monk:	BP Category		Total	Chi-square	P-value
	NBP	HBP			
01-20 years	90 (95%)	05 (5%)	95		
21-50 years	32 (78%)	09 (22%)	41	8.63	0.006*

*p-value at α<0.05 [NBP=Normal Blood Pressure, HBP=High Blood Pressure]

Significant difference was also observed in the blood pressure of the different earning groups in monks, hence, significantly associated with p-value of 0.048.

Table 4.3.1.2 Association between the high blood pressure and Individual monthly income

Monthly Income:	BP Category		Total	Chi-square (χ2)	P-value
	NBP	HBP			
Nu. 1000- Nu.2999	78 (94%)	5 (6%)	83		
Nu. 3000-Nu.5000	46 (84%)	9 (16%)	55	3.879	
0.048*					

*p-value at α<0.05

There was also a significance difference in the blood pressure among the respondents having individual history of hypertension and respondents those who don't have the earlier history of hypertension (before survey), hence the association was statistically significant with p-value of 0.001 (p<0.05).

Table 4.3.1.3 Association between the high blood pressure and individual Hypertension history

Individual History of HT:	BP Category		Total	Chi-square ((χ2)	P-value
	NBP	HBP			
Yes	18 (60%)	12 (40%)	30		
No	106 (98%)	2 (2%)	108	37.482	
0.001*					

*p-value at α<0.05

In the BMI category, there was significant difference in the blood pressure levels (see table below) and it was observed that blood pressure level varies with different BMI category, Higher the BMI more likely to develop high blood pressure. However, the association between the blood pressure and BMI is not significantly associated with p value of 0.262 >0.05.

Table: 4.3.1.4 Association between the high blood pressure and Body Mass Index (BMI) Category

BMI Category;	BP Category		Total	Chi-square ((χ2)	P-value
	NBP(%)	HBP(%)			
Normal Wt. (18.5-22.9Kg/m^2)	92.5%	7.5%	80(n)		
Over wt. (≥23/m^2)	86%	14%	58(n)	1.461	0.262

*p-value at α >0.05:

No significant difference was observed in the blood pressure levels between the literate (up to Primary) and Educated (Secondary to tertiary) monks. Similar results was found with the family history of hypertension, no significant difference was observed in blood pressure levels between the respondents those who have family history of hypertension and those who don't have the family history of hypertension. However, significant difference was observed in terms of current treatment of hypertension, out of 30 declared hypertension only 9 cases were currently under treatment and rest 21 are not complying with the treatment.

Table: 4.3.1.5 Non-Significant Association between the high blood pressure and Education, Family HT history and Current HT treatment

Educational;	BP Category		Total	Chi-square ((χ2)	P-value
	NBP	HBP			
Literate	94%	6%	33(n)		
Educated	89%	11%	105(n)	0.794	0.518
Family HT History					
Yes	91%	9%	22(n)		
No	90%	10%	116(n)	0.032	1.00
Current HT Treatment					
Yes	33%	67%	9(n)		
No	71%	29%	21(n)	3.81	0.102

*p-value α>0.05

The following table didn't show significant association with the high blood pressure partly. However, out of 138 surveyed- subjects almost 80% drank *suja* and 20% did not. But some difference was observed in the blood pressure levels between the people who drink and who don't drink *suja*. With regards to current alcohol use, 13.7% were current alcohol users and 86.2 % were non user with some past habitual alcohol users. Significant difference in blood pressure levels were observed in between the two groups and it was ~~is~~ seen that non -alcohol users have 14% of elevated blood pressure (HT) partly because this group was inclusive of the past habitual alcohol users. Therefore no statistical significant association was derived in between these variables and the high blood pressure.

Table; 4.3.1.5 Non significant Association between the high blood pressure and

	BP Category		Total	Chi-square ($\chi 2$)	P-value
	NBP	HBP			
Current Health Status					
Poor	85%	15%	33(n)		
good	91%	9%	105(n)	1.193	0.322
Veg. intake					
No	100%	-	1(n)		
Yes	90%	10%	137(n)	0.114	0.899
Meat Intake					
No	93%	7%	40(n)		
Yes	89%	11%	98(n)	0.432	0.377
Fruits intake					
No	86%	14%	29(n)		
Yes	91%	9%	109(n)	0.536	0.333

Table 4.3.1.5: Non significant Association between the high blood pressure and variances

	BP Category		Total	Chi-square ($\chi 2$)	P-value
Suja Drinking					
Yes	92%	8%	111(n)		
No	81%	19%	27(n)	2.582	0.109
Current Alcohol user					
Yes	100%	-	19(n)		
No	88%	12%	119(n)	2.488	0.112
Physical exercise					
Yes	91%	9%	116(n)		
No	82%	18%	22(n)	1.855	0.162
Meditation Practice					
Yes	89%	11%	122		
No	94%	6%	16	0.301	0.496

*p-value at $\alpha>0.05$
*NBP=Normal Blood Pressure/ HBP= High Blood Pressure

No significant difference was observed between the blood pressure and the respondent's level of satisfaction over various aspects of life, however the number of respondents with high blood pressure was observed constant with the different level and category of satisfaction. Therefore no statistical significant association is observed between the blood pressure category and different satisfaction level. P-value >0.05.

Table: 4.3.1.8 How Satisfied you are with certain things in last two weeks

	BP Category		Total	Chi-square (χ2)	P-value
Satisfied with sleep	NBP(%)	HBP(%)			
Dissatisfied	1	0	1		
Satisfied	89	10	99	0.114	0.899
Satisfaction with ability to perform daily living					
Dissatisfied	4	0	4		
Satisfied	86	10	96	0.586	0.581
How satisfied with self					
Dissatisfied	1	0	1		
Satisfied	88	10	99	0.229	0.807
Satisfied with support from friends					
Dissatisfied	2	0	2		
Satisfied	88	10	98	0.346	0.724
Satisfied with wellbeing of parents and relatives					
Dissatisfied	3	1	4		
Satisfied	9	9	19	0.553	0.419
Satisfied with condition of living					
Dissatisfied	9	0	9		
Satisfied	81	10	91	1.484	0.262

Unlike satisfaction level, some significant difference in blood pressure is observed in various aspects of intensity of living aspects i.e. ‘how much and how well’. Some form of statistical significance is observed when asked ‘have you ever been anxious, worried or upset’. Nevertheless, the significance level was >0.05 hence not significantly associated with high blood pressure.

Table: 4.3.1.9 How much you have experienced certain things in last two weeks;

	BP Category		Total	Chi-square (χ2)	P-value
How much you feel that you are relaxed	NBP(%)	HBP(%)			
A little/not at all	7	2	9		
Very much	83	8	91	3.182	0.106
How much you feel you are happy person					
A little/not at all	3	0	3		
Very much	87	10	97	.465	0.649
How well are you able to concentrate					
A little/not at all	3	1	4		
Very much	87	9	96	0.553	0.419
how much think about the welbeing of parents					
A little/not at all	25	3	28		
Very much	65	7	72	0.008	0.573
How much you feel you have enough P Exercise					
A little/not at all	33	6	38		
Very much	57	4	62	2.312	0.11
Have you ever been anxious, upset or worried					
A little/not at all	53	4	57		
Very much	37	6	43	1.318	0.194

In the ‘tensed / pressured’ category, there was no significant difference in the blood pressure levels between the one feeling pressured and ones not. Interestingly, it was observed that there is a significant difference in the blood pressure levels and demanding responsibility but statistically it is not significant with p-value >0.05 (0.099). The same trend in observed in the pressure about their future career but again the association here was also statistically not significant.

Table: 4.3.1.10 How tensed or pressured you have experienced in last two weeks;

	BP Category		Total	Chi-square ($\chi 2$)	P-value
How tensed you feel about your performance	NBP(%)	HBP(%)			
A little/not at all	46	7	53		
Very much	43	4	47	0.811	0.27
How demanding is your responsibility					
A little/not at all	14	0	14		
Very much	75	10	86	2.641	0.099
How well you adapt to rules as monk					
A little/not at all	4	0	4		
Very much	86	10	96	0.586	0.581
How often you feel pressured about your future career					
A little/not at all	27	4	31		
Very much	63	6	69	0.994	0.24

p-value at $\alpha > 0.05$ [NBP=Normal Blood Pressure; HBP=High Blood Pressure]

4.3.2 Comparing Means (Independent Sample t test) between the dependent and independent variables

In the tables given below, given that the Levene's test has a probability lesser than 0.05, it was assumed that the population variances are relatively not equal. Therefore looking at the t-value, df and the 2-tailed significance value, we can conclude by saying that there is no significant difference between the age group (younger vs. the older age group), total number of years as monk (Junior vs. the senior)and individual monthly income (higher income vs. lower income) of the study population. The two groups came from the same population because no significant difference exist – t(32.5)= -1.710, p(0.097) > 0.05; t(50)= -2.405, p(0.20)>0.05 and t(83)

Table: 4.3.2.1 Comparing means of age groups (young and old)

BP	Age group	N	Mean	Std. Deviation	Std. Error Mean
	20-41years	110	6.0727	.26088	.02487
	42-63years	28	6.2143	.41786	.07897

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
BP	Equal variances assumed	17.779	.000	-2.239	136	.027
	Equal variances not assumed			-1.710	32.544	.097

Table: 4.3.2.2 Comparing means of Total number of years as monk

Group Statistics

BP	years_as_monk	N	Mean	Std. Deviation	Std. Error Mean
	1-20years	95	6.0526	.22448	.02303
	21-50years	41	6.2195	.41906	.06545

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
BP	Equal variances assumed	37.731	.000	-3.015	134	.003
	Equal variances not assumed			-2.405	50.193	.020

Table: 4.3.2.3 Comparing means of Monthly Income of Individuals

Group Statistics

	Monthly Income	N	Mean	Std. Deviation	Std. Error Mean
BP	≤Nu.1000-Nu.2999	83	6.0602	.23938	.02628
	Nu.3000-≥Nu.5000	55	6.1636	.37335	.05034

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
BP	Equal variances assumed	16.458	.000	-1.983	136	.049
	Equal variances not assumed			-1.821	83.353	.072

The tables below showed significant Levene's test for equality of variance with p-value at $\alpha<0.05$, hence population variances are relatively unequal. However, observing the two tailed significance value <0.05 of the following variances, we hereby accepted that there is statically significant difference in the individual history of hypertension with p-value of 0.001 <0.05.

4.3.3 Multivariable Analysis (Logistic Regression) between the hypertension the dependent variable and independent variables that showed significant association in bivariate analysis.

Table: 4.3.3.1 Binary Logistic Regression Analysis of the important factors that contribute to the development of high blood pressure (Hypertension).

Factors contributing to development of High Blood Pressure among Monks	Modeled Coefficient (B)	p-value	Modeled Odds Ratio (Exp B)
Individual Hypertension History	3.539	<0.001*	34.416
Age Group	0.154	0.887	1.166
Total number of years as monk	1.173	0.305	3.231
Monthly Income for individual	-0.17	0.859	0.843
BMI Category	-0.884	0.320	0.413

*significance at $\alpha \leq 0.05$

The table above showed the result of the binary logistic regression analysis of five key factors that affects the individual blood pressure level. As demonstrated from the table above, the odds of developing high blood pressure (hypertension) is 34.41 times higher in those who have the earlier history of hypertension compared to those who don't have the history or in other words, the people who had the earlier history of hypertension have 34.41 times the risk of developing high blood pressure (hypertension) compared to the people who don't.

However, the monks with older age above the age of 42 years were at higher odds (OR=1.166) of developing high blood pressure than those who are at the younger ages. Similarly, the odds of developing high blood pressure are 3.231 times higher in the senior monks (Above 21 years of monkhood) compared to the junior monks. The monks with higher incomes were at lesser odds (OR=0.843) of developing high blood pressure than the ones at the lower income strata. In the similar manner, the monks with higher BMIs were at the lesser odds (OR=0.413) of developing high blood pressure than those monks who are in normal BMI category.

Although the difference in age exhibited difference in the development of high blood pressure (P-value<0.05) during the bi-variable analysis, the age was found not a significant factor during the multivariable analysis with p-value (0.887)>0.05. Hence similar trend of significance is observed for the variables like; total number of years as monk (p-value=0.305) and Monthly income (p-value=0.859).

CHAPTER V

DISCUSSION, RECOMMENDATION AND CONCLUSION

5.1 Discussion

This particular study was aimed at assessing the prevalence of hypertension and to assess the possible risk factors of hypertension and associated knowledge on preventive aspects related to hypertension among the Buddhist monks residing in Thimphu Tashi-Choe-Dzong. This topic was broadly presented in to eight different aspects of the findings as follows;

1. Major findings of the study
2. Meaning of the finding and why the findings are important
3. Relating the findings with those of similar studies
4. Considering the alternative explanation of the findings
5. Relevance of the findings in policy making and other clinical aspects
6. Acknowledging the limitations of the study
7. Making suggestions for further research
8. Giving the 'take home' message as conclusion

The overall prevalence of the hypertension among the surveyed-monks (during the study period) was 10.2% (14 of 138), out of which 2.2% (3 monks) were moderate hypertensive, 8% (11 monks) were mild hypertensive. The study also found out that 55.1% of the study subjects possessed fair knowledge on hypertension whereas almost half 44.9% of the study subjects possess poor knowledge on hypertension.

From the study it was also found that 30 (21.7%) of the total respondents are having past history of hypertension (before the survey), but it was also found that only 9 (6.5%) were complying with the treatment. This was because it was reported that most of the subjects have dropped the treatment after achieving the desirable normal level of blood pressure and they were in to the strict diet and exercise regime to control their blood pressure at desired range.

Significant differences (p-value 0.048) were found between the knowledge levels of the respondents. Majority of the respondents possessed just fair knowledge on hypertension and association was found strong with the development of hypertension. Statistically significant association was also found in between the high blood pressure and the age group (p-value 0.038), total number of years as monk (p-value 0.006), Monthly income (p-value 0.048) and individual history of hypertension (p-value 0.001). However, significant difference were also found between the individual history of earlier hypertension with the variables like past alcohol use (p-value 0.005), drinking suja (salted butter tea) with p-value 0.003, family history of hypertension (p-value 0.006) and the individual knowledge on hypertension (p-value 0.048).

Majority possessed just fair knowledge on hypertension possibly because the awareness on life style diseases is very minimal owing to the country's present trend with the double burden of disease. Overweight and obese cases are mostly seen at the younger ages (20-30years).

The point prevalence of hypertension (10.2%) during the study period was not high given to consideration the inclusion of the past hypertensive subjects in the study (22%). Furthermore, the study had found that the majority of the respondents were in age range of 20-30 years old (53.6%) subsequently majority were serving in the monks for last 1-10 years (44.2%). The income levels of respondents were majorly grouped in the income range of Nu. 1001- Nu. 2999 (1 Baht = 1.55 Nu.). Almost 31% of the respondents were found obese as per the WHO recommended Asian BMI cut-off point and 11% were overweight.

Concerning these factors affecting the development of high blood pressure, the analysis revealed that the growing age, increasing term as monk, growing income, increasing BMI and earlier history of hypertension had significantly influenced on the development of high blood pressure (hypertension).

The most important factor that might be influenced high blood pressure could be the age factor, that with growing age one becomes highly susceptible to hypertension. Results of this present study exhibited that total years as monk was also found significantly associated with hypertension, however this variable is similar to the age factor. As revealed in the similar studies conducted by Shirakawa et al. (2006) which

demonstrated old age as a potential risk factor for high blood pressure. Similarly, World Health organization (WHO) in 2004 also stated hypertension as major public health concern in all ages but especially in the elderly people living in the developing countries. A longitudinal study done by Kannel et al., (1980) over the last 30 years found that prevalence of hypertension increases with the growing age.

Another important factor that was found significantly associated with high blood pressure was the financial status or an income. It was revealed that higher income level means high risk of contracting hypertension. This statement has been inversely revealed in studies conducted by Matthews et al., (2002), which reported that the decline in income from year 5 to 10 tended to be associated with hypertension with p-value of 0.07. It generally believed that people who are at higher income strata can afford to have rich diets and mostly live sedentary life; hence the possibility of developing hypertension is presumably high.

The present study revealed that there is no statistical association observed between hypertension and higher BMI index. This finding is in contradiction to the studies done by Bays et al., (2007) and Cercato et al., (2004), which documented an increase in body mass indexes generally associated with an increase in risk of metabolic disease such as hypertension, diabetes and dyslipidemia (an abnormal amount of lipids e.g. cholesterol or fat) in blood).

The current use of alcohol was not found moderately associated with the hypertension development (p-value 0.112) in this present study group. However, but however the past habitual drinking revealed strong association with the individual history of hypertension with p-value 0.003. This meant that the respondents who are reported to have earlier history of hypertension mostly attributable to past drinking habits. Similar association was also found with the suja (salted butter tea) drinking trend of surveyed subjects, their knowledge level and family history of hypertension. Most of the findings in this study found in consistent with the previous studies by Macmahon (1987) and Cairns et al., (1984) which documented that there is strong association of alcohol consumption with increased blood pressure.

Salted butter tea or suja is mostly composed of raw fat and sodium. Recent study by Webster J et al., (2009) supported the established fact that excess dietary salt is a well established cause of hypertension and other vascular diseases.

The fact on the surveyed-subject's knowledge level on hypertension helping to reduce the incidence of hypertension was supported by the findings by Oliveria S et al., (2005) to be involved to the hypertension knowledge, awareness and attitude in hypertensive patient. The WHO daily recommended intake of fat and sodium is 65 grams and 2400 mg for adults, whereas suja alone provides 1000mg of sodium and 28 grams of raw fat in butter.

Regarding the family history of hypertension, this current finding implied that the surveyed-subjects who are having family history of hypertension in immediate family member (parents) showed increased likelihood of having hypertension before the survey. This result was supported by previous study done by Fries (1973) which revealed that essential hypertension tends to occur in families. Stamler et al., (1979) in their nationwide screening program identified the positive family history of hypertension as a strong risk factor for hypertension demonstrating high proportion of hypertension who had the family history of hypertension than those who did not possess family history.

However, no significant association found with the individual preventive behavioral aspects like vegetable intake, meat intake, fruits intake, physical exercise and meditation. In this study surveyed in Thimphu. 73.9% of the respondent reported to have vegetable almost every day (7 days/week) whereas 58% don't eat meat at all and only 11.6 % of the respondents eat meat that too is mostly the dried beef (52.2%) followed by pork 15.2%. Only 65.9% of the subjects have fruit items sometimes and 21% never take fruits.

From these findings it is evidently clear that the subjects who eat more vegetables and take more fruits and lesser meat items are likely to have lower blood pressure. However this statement is supported by the findings revealed by Prasitnarapun (2004) that the monks in northern Thailand ate rice, meat and vegetable according to nutrition flag 51.1%, 36.8% and 59.9% respectively, but 62.7% ate a small amount of fruits, about 60.5% ate uncooked meat and 48.8% drank tonic drinks. Kaplan (2008) and

Alanso et al., (2004) also reported that eating a vegetarian diet can reduce elevated blood pressure and protect hypertension.

Impressively almost 84.1% of the surveyed-subjects participated in physical exercise and out of which 84.8% do participate in the moderate exercise and 83.3% in the vigorous physical exercise. This variable showed inverse association in our study because from the finding it is evidently clear that physical exercise helps to lower or control the blood pressure. This statement is supported by the fact that exercise reduces the risk of hypertension. One of the studies conducted in India by Chaudhary et al., (2005) showed that there was significantly lower prevalence of hypertension among the subjects, who participate in physical exercise Similarly, Pescatelo et al., (2004) in the US illustrated exercise as corner stone therapy for the primary prevention, treatment and control of hypertension. However, some results for example by Gupta et al, (1995) showed conflicting facts that hypertension can sometimes be associated with the higher prevalence of hypertension and one example could be the study.Within the monks community in Bhutan, performing mask dances, prostrating and circumlating the stupas and giant prayer wheels were exercised by its nature that it involves the exertion of force and increases the heart beat rate. Prostrating 100 times a day is almost equivalent to running 500 meter dash. However, this study has revealed that monks do engage in other forms of formal exercise like taking a long walk, playing games (mostly soccer) and performing various physical stretches. The subjects with hypertension before the survey were practicing physical exercise to normalize their blood pressure; this is in line with the findings by Lu et al., (2000) stating higher prevalence of physical exercise among hypertensive subjects than normotensive patients.

In this study, the surveyed subjects had also scored fairly high in terms of practicing meditation and 88.4% were in the meditation and out of which 64.5% practice meditation every day. Presumably, meditation is often regarded as best remedy to lower the blood pressure and usually linked with the stress management. The *American Journal of Cardiology* published a report that combined the results of two randomized trials, which examined the effect of stress reduction on death rates in 202 people age 55 and older with pre-hypertension or mild hypertension. Some of them

participated in a transcendental meditation program, while the rest practiced other relaxation techniques (progressive muscle relaxation, mindfulness training, and mental relaxation) or were part of a control group. They were followed for an average of eight years. At the end of the follow-up period, those in the meditation group fared the best, experiencing a 30% decline in the rate of cardiovascular deaths, and a 23% reduction in the rate of death from all causes, compared to the control group. When compared with the other relaxation techniques, transcendental meditation was associated with a 32% lower incidence of cardiovascular deaths, and a 27% reduction in death from all causes.

5.2 Scope and Limitations of the Study

This study was confined within the monk body residing in Thimphu Tashi-Choe-Dzong (Pung-Thim-Dratsang) using purposive sampling and therefore this study could not be generalized to other monk bodies especially residing in other districts (Dzongkhags). Hence these findings did not represent the entire monk population in the country.

Though the study design was cross sectional and it was not supposed to describe the variations of some of the preventive behaviors over time, respondents were asked to look back in to their past, hence the results of such retrospective views might be subjected to recall bias.

Although the study was intended to find the prevalence of hypertension, no exclusion criteria was set to exclude the past hypertensive subjects from the study. However, most revealed that they have diagnosed through signs and symptoms without clinical interventions. Therefore this inclusion of past hypertensive subjects may possibly increase the prevalence rate.

It was also acknowledged that the studies of this nature may face the effects of a social desirability bias. Nevertheless, the entire data was collected anonymously with a self-administered questionnaire by data collectors who had no connection with the central monastic body. It was also noticed that the subjects had no problems in dealing with very personal and sensitive aspects of their life.

5.3 Recommendations and Conclusion

In overall this study has fetched 10.2% of prevalence rate with almost 21.7% hypertension before the survey. This study has revealed that there were no statistically significant difference in the prevalence of hypertension among monks due to current health status, dietary habits (i.e., frequency of meals, vegetables, meat, fruits) and physical exercise. No significant difference was found with the mediation practice, knowledge level on hypertension and the quality of life. However, some of the significant factors were: age total number of years as monk, monthly income, past history of hypertension (before the survey), and the BMI (Body Mass Index).

Findings and results in this study, in consistent with earlier studies but with different study subjects, revealed the fact that growing age is directly associated with high blood pressure and similarly higher the income, more vulnerable one is to hypertension. Hypertension history before the survey has also affected the finding with the positive association (i.e. one with earlier history of hypertension are more likely to have elevated high blood pressure). This study has also revealed that the higher the BMI the more vulnerable to development of hypertension and vice versa. However, the income factor was quite controversial. Some studies have shown that lower the income higher chances of high blood pressure, but in this study it is just contradictory. Therefore, further studies to find the association between hypertension and income level is recommended with other group of study subjects.

Significant associations were also found in between the hypertension history (before the survey), alcohol drinking, knowledge level, suja consumption and the family history of hypertension. Various studies has been conducted on the relation between alcohol drinking and hypertension and similarly the knowledge factor and family history with hypertension, but no studies have been conducted on the relation of hypertension with the suja consumption. Hence, findings on possible relationship suja consumption and hypertension was quite obvious as exhibited in this study that there is significantly associated (with p-value 0.003). Therefore, in Bhutan some recommendations are strongly needed in order to further studies on health impacts of suja consumption on hypertension, diabetes and other cardiovascular diseases.

Since majority of the study subjects' fall in the age group between 20-30 years, and this group being less vulnerable to develop high blood pressure, the prevalence rate of hypertension in this study was just 10.2%. But however, the actual prevalence might be higher.

Future researches were seen to have higher potential in the area of *Suja* Consumption leading to health impacts, chewing betel Nut and the nutritional aspects of dried meat items like dried beef and dried pork. As per the findings by Lin et al., (2008) Betel Nut chewing is associated with a greater risk of Cardio vascular Diseases.

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APPENDICES

APPENDIX A

དཔལ་ལྡན་འབྲུག་གཞུང་།
གསོ་བ་རིག་བག།

ROYAL GOVERNMENT OF BHUTAN
MINISTRY OF HEALTH
THIMPHU BHUTAN
P.O BOX: 726

REBH/Approval/10/2010/027 **Date 20th Jan 2011**

REBH Approval Letter

PI: Mr. Namgay Tshering **Institute: Chulalongkorn University** **Country: Thailand**	**Study Title**: Prevalence, Knowledge and preventive behavior towards hypertension among Bhutanese monks in Tashi-Choe Dzong, Thimphu Bhutan	
REBH's Decision **Approved with conditions**	**Protocol Version No** 002 Dated: 19th Jan 2011	**Informed Consent Version No:** 001 Dated: 19th Jan 2011
	Mode of Review: ✖ *Full Board Review Meeting No……* ☐ *Expedited Review*	

Conditions for Approval

1. *No biological material shall be used for other research purpose beyond which is specified in this protocol.*
2. *Any new research study with stored biological material from this study will need a new approval from the REBH before study begins.*
3. *Any adverse outcome during the course of the study must be immediately reported to the REBH.*
4. *In the event of any form of complaints/issues from the study participants received or communicated to REBH, the board will have the right to investigate.*
5. *Training to be provided to data collectors on informed consent.*
6. *Referral should be done to nearest health facilities for further examination in case of any disease detected in course of your study.*
7. *Final report of the study both in soft and hard copy must be submitted to REBH at the end of the study before publishing.*
8. *Any changes to the proposal or to the attachments (informed consent and research tools such as forms) should be approved by REBH before implementation*
9. *The approval for this proposal is valid ONLY for ONE year from the approval date.*
10. *You should submit the periodical report to REBH every 2nd Month.*

Chairperson
Research Ethics Board of Health
Ministry of Health

(Dr. Phuntsho Dorji)
Chairperson-REBH

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APPENDIX B

Self administered Questionnaire

QUESTIONNAIRE

1. Age; ……

2. Total Year as Monk ☐

3. Education;
   a) Primary [up to 6 years] ◯
   b) Secondary [6-10 years] ◯
   c) Tertiary [>10 years] ◯

4. Monthly Income;
   a) < Nu. 1000 ◯
   b) Nu. 1001-Nu.2999 ◯
   c) Nu. 2999- Nu.4999 ◯
   d) ≥Nu. 5000 ◯

5. Hypertension in immediate family history (parents/grandparents);
   a) No ◯
   b) Yes ◯
   c) Do not know ◯

6. Do you have a history of Hypertension? [If yes, go to Q.7 & 8]
   a) Yes ◯
   b) No ◯

7. How much was your BP reading?

a) 120/80 mm Hg. ⬭

b) 140/90 mm Hg. ⬭

c) 160/100 mm Hg. ⬭

d) 180/110 mm Hg. ⬭

e) Others……..

8. Are you currently under treatment?

a) Yes ⬭

b) No ⬭

9. How do you rate your current health status?

a) Very poor ⬭

b) Poor ⬭

c) Normal ⬭

d) Good ⬭

----------END OF PART ONE----------
-----

2. Data on the **PREVENTIVE BEHAVIORS** of the interviewee please ⬭ **CROSS** in your fact.

2.1 How many meals you eat in one day?

a) ≤3 times ⬭
b) 3-4 times ⬭
c) 4-5 times ⬭
d) ≥5 times ⬭

2.2 What portion of rice you eat per meal?

a) ≤1 Bowl ◯
b) 1-2 Bowl ◯
c) ≥3 bowl ◯

2.3 How often do you eat green vegetables?

a) Never ◯
b) 1-3 days/week ◯
c) 4-6 days/week ◯
d) 7 days/week) ◯

2.4 How often do you take meat items?

a) Never ◯
b) 1-3 days/week ◯
c) 4-6 days/week ◯
d) Always (7 days/week) ◯
e) Other (Specify)…….

2.5 What item of meat you usually eat?

a) Pork ◯
b) Beef ◯
c) Chicken ◯
d) Fish ◯

2.7 How often do you take fruits?

a) Never ◯
b) 1-3 days/week ◯
c) 4-6 days/week ◯
d) Always (7 days/week) ◯

2.8 Do you drink *'suja'*? [*If yes go to Q 2.9 & 2.10*]

a) Yes ◯
b) No ◯

2.9 How often you drink *'Suja'* (Butter salted tea)?

a) Never ◯
b) 1-3 days/week ◯
c) 4-6 days/week ◯
d) Always (7 days/week) ◯

2.10 How many cups of *'suja'* you drink each day?

a) ≤1 cup (200 ml) ◯
b) 1-3 cups (200 ml) ◯
c) 3-4 cups (200 ml) ◯
d) ≥5 cups (200 ml) ◯

2.12 Are you current alcohol drinker? [If No, skip to 2.18]

a) Yes ◯

b) No ◯
c) Past Habitual drinker ◯
d) Others ◯

2.13 If yes, when did you start drinking alcohol?

a) <20 years ◯
b) 20-29 years ◯
c) 30-39 years ◯
d) >40 years ◯

2.14 What type of alcohol you mostly (4-6days/week) drink?

a) Whisky ◯
b) Beer ◯
c) Spirits ◯
d) Wine ◯
e) Local brewed ◯

2.15 How often you Drink?

a) Once a week ◯
b) 1-3 days/week ◯
c) 4-6 days/week ◯

d) Others (specify…….)

2.16 How many glass you drink in one day? [Please TICK your fact]

1 glass= 250 ml.

	Whisky	Local	Spirit	Wine	Beer
a) ≤1/2 glass					
b) 1/2 – 1 glass					
c) 1-2 glass					
d) 2-3 glass					
e) ≥ 4 glass					

2.17 If past drinker, when did you quit drinking alcohol?

a) ≤ 6 months ◯
b) ½ - 1 year ◯
c) 1-2 years ◯
d) 2-3 years ◯
e) ≥ 3 years ◯

2.18 Do you do any form of physical activity?

a) Yes ◯
b) No ◯

2.19 If yes, how often do you engage in vigorous physical exercise?

a) Never ◯
b) At least 30 min 1-2 days/week ◯
c) At least 30 min 3-6 days/week ◯
d) 7 days/week) ◯

2.20 If yes, how often do you engage in moderate physical activity?

a) Never ◯
b) At least 30 min 1-3 days/week ◯
c) At least 30 min 4-6 days/week ◯
d) 7 days/week) ◯

2.21 Do you engage in meditation?

a) Yes ◯
b) No ◯

2.22 If yes, how often do you engage in meditation?

a) 1-3 days/week ◯
b) 4-6 days/week ◯
c) 7 days/week ◯
d) Never ◯

----------END OF PART TWO----------

3. Data on **KNOWLEDGE** of the interviewee on Hypertension Please **TICK** in your fact;

Sl. No	Statement	Accept	Don't Accept	Not Sure
1	Hypertension is always symptomatic			
2	Hypertension is preventable			
3	Hypertension is NOT a genetic chronic disease			
4	Hypertension if not treated will lead to many complications			
5	Headache, nausea and nose bleeding are some rare symptoms of Hypertension			
6	There are 2 types of hypertension (Primary & Secondary)			
7	Life style modification is the best strategy to prevent Hypertension			
8	High sodium (Salt) intake causes Hypertension			
9	Raw butter "Ghee" contains saturated fat			
10	Saturated fats causes Hypertension			
11	Increased alcohol Consumption will NOT lead to Hypertension			
12	Regular physical exercise will control Hypertension			
13	Engaging in aerobic exercise will help to control Hypertension			
14	Hypertension can be controlled			
15	Hypertension is often referred to as 'Silent Killer' disease			
16	Anxiety and Stress also contributes to Hypertension			
17	Older people are more vulnerable to Hypertension			
18	Increased weight will not lead to Hypertension always			
19	Hypertension is highly contagious disease			
20	Hypertension is diagnosed only through BP Mea/^{n}			

APPENDIX C

Measuring Perceived Stress

Instructions:

This assessment asks how you feel about yourself, health, or other areas of your life. **Please answer all the questions.** If you are unsure about which response to give to a question, **please choose the one** that appears most appropriate. This can often be your first response. Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last two weeks.** For example, thinking about the last two weeks, a question might ask.

Age;

Date of Birth…../……/……..

The following questions ask you to say how **good or satisfied** you have felt about various aspects of your life over the last two weeks.

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
How satisfied are you with your sleep?	1	2	3	4	5
How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
How satisfied are you with yourself?	1	2	3	4	5
How satisfied are you with the support you get from your friends?	1	2	3	4	5
How Satisfied are you with wellbeing of your family and relatives?	1	2	3	4	5
How satisfied are you with the Conditions of your living place?	1	2	3	4	5
How satisfied are you with your career as monk?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last two weeks.

	Not at all	A little	A moderate amount	Very much	An extreme amount
How much do you feel that you are relaxed?	1	2	3	4	5
How much do you feel that you are a happy person?	1	2	3	4	5
How well are you able to concentrate?	1	2	3	4	5
How much you feel tired over your tasks as a monk?	1	2	3	4	5
How much do you think about the wellbeing of your parents and relatives back home?	1	2	3	4	5
How much do you feel that you have enough physical exercise?	1	2	3	4	5
Have you ever been anxious, worried, or upset?	1	2	3	4	5

The following questions ask about **how tensed/pressured** you have experienced certain things in the last two weeks.

	Not at all	A little	A moderate amount	Very much	An extreme amount
How tensed you felt about your performance as monk?	**1**	**2**	**3**	**4**	**5**
How demanding is your responsibility as monk?	**1**	**2**	**3**	**4**	**5**
How well you adapt to the rules (do's & dont's) of monk body?	**1**	**2**	**3**	**4**	**5**
How often you feel pressured about your future career?	**1**	**2**	**3**	**4**	**5**

APPENDIX D

Research time table and budget summary;

Sl. No	Activity Description	Time Frame (Sept. 2010-April 2011)								Budget in *(Thai Baht)*
		Sept.	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	
1.	Literature Review									0
2.	Proposal Development									0
3.	Prepare Data Collection Tools									0
4.	Travel Cost to Bhutan for Data collection									32,000.00
5.	Data Collection									15,500.00
6.	Data Compilation & Storing									2,000.00
7.	Data Analysis using SPSS 17.0									0
8.	Thesis Writing									0
9.	Journal Publication									2,500.00
10.	Final Thesis Submission									5,000.00

APPENDIX E

Standard Guideline for the measurement of Blood Pressure (BP)

**National Kidney Foundation*

 A Person should be seated quietly for at least 5 minutes in a chair (rather than on an exam table) with their backs supported and their arms bared and supported at heart level.

 Patients should refrain from smoking or ingesting caffeine during the 30 minutes preceding the measurement.

 Right arm is preferred for consistency and comparison with the standard tables. The bladder within the cuff should encircle at least 80% of the arm.

 Bell of the stethoscope should be lightly placed over the brachial artery pulse, proximal and medial to the cubital fossa, and below the bottom edge of the cuff (ie, about 2 cm above the cubital fossa).

 Cuff should be inflated to 30 mm Hg above palpated SBP and deflated at a rate of 2 to 3 mm Hg/second. Both SBP and DBP should be recorded. The first appearance of sound (phase 1) is used to define SBP. The disappearance of sound (phase 5) is used to define DBP in adults.

 Two or more readings separated by 2 minutes should be averaged. If the first two readings differ by more than 5 mm Hg, additional readings should be obtained and averaged.

 Elevated blood pressure must be confirmed on repeated visits before characterizing an individual as having hypertension. Blood pressure at the high levels tends to fall on subsequent measurement as the result of (1) an accommodation effect (i.e., reduction of anxiety by the patient from one visit to the next) and (2) regression to the mean, a non-biological phenomenon that derives, in part, from mathematical considerations. Blood pressure level is not static but varies even under standard resting conditions. Therefore, a more precise characterization of an individual's blood pressure level is an average of multiple blood pressure measurements taken repeatedly over several weeks to months.

 Blood pressure must be measured in older persons with special care as some older persons have pseudo hypertension (falsely high sphygmomanometer readings) due to excessive vascular stiffness as determined for example by using pulse wave pressure. In addition, older persons with hypertension, especially women, may have WCH and excessive variability in SBP.

VITAE

A. PERSONAL PARTICULARS

1. Name : Namgay Tshering
2. Date of birth : 01 January 1979
3. Marital Status : Married
4. Contact address: C/o Policy & Planning Division, Ministry of Health, Thimphu, Bhutan.

B. EDUCATION AND TRAINING

1. Bachelors of Science (BSc.), University of Madras, Chennai, Tamil Nadu, South India in 2003.
2. Undergone certificate level training on the Behavior Change Communication Management course at the Asian-Pacific Communication Development center (ADCC), Dhurakijpundit University, Bangkok in January 2006.
3. Undergone certificate level course on HIV/AIDS and Gender mainstreaming course in Denmark, Copenhagen University in May 2007.

C. WORKSHOPS/SEMINARS

1. Attended workshop for the Tobacco Control Managers of South-East Asia region organized by TFI, WHO SEARO office, Yangon, Myanmar, April 2007.
2. Attended the regional Consultation meeting on the Global Fund 9th Round Proposal Development for HIV/AIDS, Malaria and Tuberculosis (TB), WHO SEARO head office, New Delhi- 2009.

D. PROFESSIONAL EXPERIENCE

1. Project Coordinator for World Bank project for HIV/AIDS and STIs prevention Project [Grant of 5.71 million USD] from 2008-2010.