

**KNOWLEDGE, ATTITUDE AND PRACTICE ABOUT  
HYPERTENSION AND DIETARY PRACTICES IN HYPERTENSIVE  
PATIENTS OF ITAHARI**

by

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**Knowledge, Attitude and Practice about Hypertension and Dietary  
Practices in Hypertensive Patients of Itahari**

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**Approval letter**

This *dissertation* entitled *knowledge, attitude and practice about hypertension and dietary practices in hypertensive patients of Itahari* presented by Supriya Pradhananga has been accepted as the partial fulfillment of the requirement for the Bachelor degree in Nutrition and Dietetics.

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## **Abstract**

Hypertension is one of the most crucial health problems and most chronic disease in the developed and underdeveloped countries which is further expanded due to ignorance and lack of knowledge. The study was carried out to assess the knowledge, attitude and practice about hypertension and their dietary practices among hypertensive patients of Itahari, Sunsari. Among total 29 wards, 5 wards were selected by using simple random sampling technique. 148 clinically diagnosed patients of hypertension who are taking anti hypertensive drugs of age group 18-59 years were taken. Anthropometric measurements and well designed structured questionnaire was used to collect information.

The study revealed that 77%, 48.4% and 42% of the patient had a good knowledge, attitude and practice score respectively. The main associating factor with KAP score ( $p < 0.05$ ) was education level and physical activity of the patient. Age group and genetic history was not found statistically significant ( $p < 0.05$ ) with KAP score. No significant relation was found between knowledge and blood pressure level. Dietary practice shows that diet rich in fruits and vegetables were consumed by the patients, however salt intake was found to be higher. Overall, the study revealed good knowledge and attitude score but has poor practice score among hypertensive patient. Despite of having good knowledge and attitude of participant towards healthy life style habits, the practice regarding lifestyle modification among hypertensive patients were generally low. Therefore, awareness programs and educational interventions programs targeting hypertensive patient should be launched.

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## **List of Abbreviations**

<b>Abbreviations</b>	<b>Full form</b>
ISH	International Society of Hypertension
CVD	Cardio Vascular Disease
ESH	European Society of Hypertension
WHO	World Health Organization
ESC	European Society of Cardiology
NIH	National Heart ,Lung and Blood Institute
SCD	Sudden Cardiac Death
LVH	Left Ventricular Hypertrophy
CAD	Coronary Artery Disease
CHF	Congestive Heart Failure
IDDM	Insulin-Dependent Diabetes Mellitus
NIDDM	Non-Insulin-Dependent Diabetes Mellitus
CKD	Chronic Kidney Disease
ESRD	End Stage Renal Disease
PIH	Pregnancy-Induced Hypertension
DASH	Dietary Approaches to Stop Hypertension
HTN	Hypertension
NCDRFS	Non-Communicable Disease Risk Factor Survey
EBP	Elevated Blood Pressure
MoHP	Ministry of Health and Population
IOM	International Organization for Migration
IHD	Ischemic Heart Disease
COPD	Chronic Obstructive Pulmonary Disease
WHR	Waist Hip Ratio
WC	Waist Circumference
BMI	Body Mass Index
SBP	Systolic Blood Pressure
DBP	Diastolic Blood Pressure
DB	Diabetes Mellitus
KAP	Knowledge, Attitude and Practice
SEA	South East Asian

UNDP	United Nation Development Programme
NDHS	Nepal Demographic and Health Survey
BP	Blood Pressure
USA	United States of America
UK	United Kingdom
AHA	American Heart Association
PAL	Physical Activity Level
ISH	Isolated Systolic Hypertension
IDH	Isolated Diastolic Hypertension

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# Part I

## Introduction

### 1.1 General Introduction

Hypertension is one of the most crucial health problem and the most chronic disease in developed and underdeveloped countries. It is called as silent killer which is usually diagnosed incidentally. Although hypertension is preventable and treatable condition but without treatment it leads to serious and life threatening complication such as heart, kidney and brain disorder (Singh *et al.*, 1997). The prevalence is expected to increase considerably in the coming years. Lifestyle factors, such as physical inactivity, a salt-rich diet with high processed and fatty foods, alcohol and tobacco use, are reasons for this increased disease burden (ISH, 2015).

Overall, approximately 20% of the world's adult are estimated to have hypertension when hypertension is defined as BP in excess of 140/90 mmHg and the prevalence dramatically increase in patient older than 60 years (Dreisbach, 2014). In SEA region, approximately one-third of the populations are hypertensive and hypertension is responsible for nearly 1.5 million deaths every year. Nepal is one of the least developed countries in SEA countries ranked 145 among 185 countries in human development index (UNDP, 2014). The first scientific study on hypertension, in Nepal was done in 1981 by Mrigendra Samjhana Trust. The prevalence of HTN according to them using WHO criteria (160/95 mmHg) in the various part of the country was as follow: 5.3% in Mountain (Jumla), 6% in Kathmandu (Bhadrabas and Alapot), 8.1% in Terai plains and 9.9% in urban Kathmandu. A blood pressure study in Dharan town of Eastern Nepal in 2005 has found a prevalence of almost 23% (Vaidya *et al.*, 2012).

Hypertension remains a major health problem, causing high mortality and morbidity rate all over the world. It is considered as a major risk factor to both cerebro-vascular accidents and coronary artery disease. In the year 2001, high blood pressure accounted for 54% of stroke, 47% of ischemic heart disease, 75% of hypertensive disease, and 25% of other cardiovascular disease worldwide (Parmar *et al.*, 2014).

Prevention plays significant role in controlling this disease which is achieved by increasing the knowledge and awareness of the public and changing their attitude and

practice (Sabouhi *et al.*, 2011). According to WHO data published in 2014, the death in Nepal due to hypertension has reached 3584 i.e. 2.26% of the total death. Overall, prevalence of it in various parts of Nepal in recent years seems to range from 19.7% to 22.7%. Hypertension already has affected one billion populations worldwide leading to heart attacks and strokes. Researchers have estimated that raised blood pressure currently kills nine million people per year (WHO, 2014). The increasing prevalence of a hypertension in developing countries is a major concern among South Asian countries, Nepal reported the second highest proportion of hypertensive people (27.3%) after Afghanistan (29%) (Dhungana *et al.*, 2016).

The prevalence of hypertension varies between 15-35 % in urban adult population of Asia and compared to rural and urban population the prevalence is two to three times lower than in urban area. Untreated hypertension and diabetes mellitus are the major risk factor of CVD (Singh *et al.*, 1997). The rapid changes in lifestyle and migration from rural to urban areas is also influencing in increased risk of hypertension in many countries. Prevalence of hypertension and diabetes mellitus increases with age and these condition are common risk factor for CVD (Propakkham *et al.*, 2008).

## **1.2 Statement of the problem**

People suffer from high blood pressure in pandemic proportions worldwide. The effect of the disease and its life-long impact represents a significant burden for many health care settings, and a number of ill people struggle to accomplish healthy outcomes (ISH, 2015). Patients knowledge and awareness of hypertension are important factors in achieving blood pressure control (Alexender, 2003). The prevalence of hypertension rises with age, approximately 30% of population between age 60-65 years and 40% above 65 years people has hypertensive level of blood pressure. Prevention plays a significant role in controlling hypertension which is achieved by increasing the knowledge and awareness of the public and changing their attitude and practice (Sabouhi *et al.*, 2011).

Hypertension is an emerging health problem in developing world with the consumption of energy dense diet and inactive lifestyle. The problem is further expanded due to ignorance and lack of knowledge. The KAP scores of hypertensive patients on hypertension were found to be low (Shrestha *et al.*, 2016). Regarding the level of awareness, obtaining information about hypertension in a population is the prior step in formulating a prevention program for hypertension. A very few hospital based studies have

been done on knowledge regarding hypertension among hypertensive patients in Nepal. The aim of the study is to assess the knowledge of hypertension among hypertensive patients and their dietary practices residing in urban area Nepal. This study is expected to reveal the gap of knowledge that needs to be reinforced, thereby providing data for formulating prevention programs for hypertension. A recent study done in Egypt reported a poor level of knowledge about hypertension and low perception towards life style modification (Seham *et al.*, 2015).

However, the attitude of patients towards hypertension is modifiable. Diet control and quality of life among hypertensive patients can be improved with intensive education and proper implementation of awareness programs. If the characteristic of the patients in terms of knowledge, their attitude and practices about hypertension is known, education is likely to be effective. However, very few studies have focused on this aspect and there is paucity of the knowledge, attitude and practices (KAP) data among hypertensive patients.

There is sparse literature on KAP about hypertension among diagnosed hypertensive patients in Nepal. Such type of studies is significant for the use of control and prevention of disease consequences strategies in poor countries. As hypertension can be caused as a result of unhealthy lifestyle, assessment of KAP of hypertensive patient is essential. Therefore, this study aims to assess the KAP of hypertensive care among the hypertensive patients residing in the urban area. The information gained could subsequently be helpful to design and initiate comprehensive education programs, for control of hypertension and its complications with self-care and community support as its major components. Also, it will be helpful for taking preventive measures and lifestyle modifications by the general population.

### **1.3 Objectives of a study**

#### **1.3.1 General objective**

The general objective of the study is to investigate the knowledge, attitude and practice about hypertension and dietary practices in hypertensive patients of Itahari.

#### **1.3.2 Specific objectives**

- a) To assess the association between knowledge and blood pressure level.
- b) To assess the behavioral factors and dietary practices.

c) To assess the factor associated with KAP score of hypertensive patients.

#### **1.4 Research questions**

a) What is the knowledge and attitude of hypertensive patient regarding hypertension?

b) What is the practice status of hypertensive patient about the care of hypertension?

c) What is their dietary practices regarding hypertension?

#### **1.5 Significance of the study**

a) The knowledge and practice of the hypertensive patient have the direct and significant impact on their health and health seeking behavior.

b) This study will be conducted to explore the demographic and socio-economic feature of hypertensive patients and the existing situation of their knowledge, attitude and practice.

c) Obtaining information regarding the level of awareness about hypertension in a population is the first step in formulating a prevention program for hypertension.

d) It can contribute as reference in the future for evaluating quality of hypertension care for community people and provide insight related to hypertensive patients health action at Itahari.

#### **1.6 Limitations of the study**

The study had the following limitations:

a) Since this research will be carried out only in Itahari, it might not represent the whole population of the country, or other districts.

b) The responses depended on the memory and truthfulness of the respondents which was assumed to be reliable.

## Part II

### Literature review

#### 2.1 Introduction

Hypertension, commonly referred as “high blood pressure,” is a medical condition where the blood pressure is chronically elevated. Persistent hypertension is one of the risk factors for stroke, heart attack, heart failure and is a leading cause of chronic 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 applied 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: hypertension caused by the result of disease. Mostly the secondary hypertension is caused by the renal disease, disorders of endocrine gland and other diseases (WHO, 2002).

**Table 2.1** Categorization of blood pressure level

Category	Blood pressure level
Normal	Systolic: Less than 120 mmHg Diastolic: Less than 80 mmHg
At risk (Pre-Hypertension)	Systolic: 120-139 mmHg Diastolic: 80-89 mmHg
High	Systolic: 140 mmHg or Higher Diastolic: 90 mmHg or Higher

**Source:** WHO (2002)

Hypertension is a serious public health problem in many societies due to its high prevalence and the associated growth in the risk of cardiovascular and renal disease. Most of the hypertensive patient are facing problems to control their blood pressure through the extensive use of anti-hypertensive drugs so, it is assumed that improving diagnosis, treatment and control of hypertension, overall mortality and stroke incidence can be reduced (Bosworth *et al.*, 2003). Hypertension is an important affiliate of diabetes and the

study has shown among the diabetic patients 37% were also hypertensive (Shera *et al.*, 2006).

Hypertension and ageing of the population are two most important problem faced by public health and clinical medicine. The disease has affected more to the Asians and Africans above all hypertension in elderly serves as a major risk factor for several disease situations leading to a better survival for those with lower values of blood pressure (Strulov *et al.*, 1990). The single largest independent risk factor for cardio vascular disease is elevated blood pressure (Mackay, 2004).

A study carried out in Spain among the people of 60 years and older showed higher mean blood pressure and greater frequency of hypertension among people of lower socio economic status and the role of education in hypertension prevalence was also assessed (Regidor *et al.*, 2006). Study conducted in Belgium states that a large number of older hypertensive men are treated with anti-hypertensive drug in primary care, but the goal blood pressure was not achieved in substantial number of patients due to under treatment. Patients with higher risk are treated more frequently than patient at lower risk, blood pressure itself remains an important factor for the initiation of anti-hypertensive drug therapy (Duprez *et al.*, 2002).

Mrigendra Samjhana Medical Trust did one of the early scientific hypertension surveys in Nepal in 1981 (Pandey, 1987). The prevalence of hypertension in adults of 21 years or older according to WHO criteria at that time (160/95 mmHg) WHO, Arterial Hypertension. Report of a WHO Expert Committee 1978 was 9.9% in urban Kathmandu, 6% in rural Kathmandu, 8.1% in Plains and 5.4% in mountain region. A study of blood pressure in the eastern Nepalese town of Dharan in 2005 reported 23% prevalence of hypertension according to Jet Navigation Chart VII guidelines (Vaidya *et al.*, 2012). Hypertension was observed in 33.9% of the participants in a study conducted in Eastern Nepal (Sharma, 2011).

In UK, it was estimated that there are 62000 needless deaths per year due to uncontrolled blood pressure, 1 with the condition presenting a particular problem among Asian immigrant communities (West, 2014). In June 2013, the European Society of Hypertension (ESH) and the European Society of Cardiology (ESC) released new guidelines for the management of hypertension, recommending that all patients, except

special populations such as patients with diabetes and the elderly, be treated to below 140 mmHg systolic BP.

Life style modifications plays a significant role in controlling hypertension and to prevent its complications (Durai, 2015). Assessment of knowledge, attitude and practice (KAP) is a crucial element of hypertension control, but little information is available from developing countries where hypertension has lately been recognized as a major health problem (Aubert *et al.*, 1998). Hypertension is an over whelming global challenge. Appropriate lifestyle changes are the cornerstone for the prevention of hypertension (Tesema *et al.*, 2016).

## **2.2 Symptomatology:**

High blood pressure itself is usually a symptomatic, meaning that patients do not experience any direct symptoms of the condition. This is why hypertension is often referred to as "silent killer" as it can quietly cause damage to the cardiovascular system (Sabouhi *et al.*, 2011). If blood pressure is extremely high, there may be certain symptoms to look out for, including:

- Severe headache
- Fatigue or confusion
- Vision problems
- Chest pain
- Difficulty breathing
- Irregular heartbeat
- Blood in the urine
- Pounding in your chest, neck, or ears (Webster, 2017).

## **2.3 Complication of hypertension**

Hypertension places stress on several organs (called target organs), including the kidneys, eyes, and heart, causing them to deteriorate over time. High blood pressure contributes to 75% of all strokes and heart attacks. It is particularly deadly in African-Americans. Risk of complications or rapid progression of hypertension become more likely in the presence of other risk factors, including significant elevation of blood pressure, increasing age, smoking, abnormal cholesterol, family history of premature heart disease, diabetes,

coronary artery disease, and other evidence of vascular disease (Simon, 2013). The complications of hypertension are as follows:

#### a) Heart Complications

Hypertensive heart disease can be defined as the response of the heart after load imposed on the left ventricle by the progressively increasing arterial pressure and total peripheral resistance produced by hypertensive vascular disease. Hypertension can cause or is related to various cardiac manifestations, among them left ventricular hypertrophy, congestive heart failure, cardiac dysrhythmias, and ischemic heart disease (Edward *et al.*, 1992). Epidemiological studies have shown that hypertension and left ventricular hypertrophy increase the risk of sudden cardiac death in patients with severe coronary artery diseases (Allen *et al.*, 1996).

Uncontrolled and prolonged elevation of BP can lead to a variety of changes in the myocardial structure, coronary vasculature, and conduction system of the heart. These changes in turn can lead to the development of left ventricular hypertrophy, coronary artery disease, various conduction system diseases, and systolic and diastolic dysfunction of the myocardium, complications that manifest clinically as angina or myocardial infarction, cardiac arrhythmias (especially atrial fibrillation), and congestive heart failure (Riaz, 2014).

#### b) Stroke

About two-thirds of people who suffer a first stroke have moderate elevated blood pressure (160/95 mm Hg or above). Hypertensive people have up to 10 times the normal risk of stroke, depending on the severity of the blood pressure in the presence of other risk factors. Hypertension is also an important cause of so-called silent cerebral infarcts, or blockages, in the blood vessels in the brain (mini-strokes) that may predict major stroke or progress to dementia over time (Lago *et al.*, 2007).

Hypertension is the most important modifiable risk factor for ischemic stroke, and antihypertensive treatment is of paramount importance to reduce the incidence of stroke mortality and morbidity. Stroke is the third leading cause of death in Western populations after coronary heart disease and cancer. Furthermore, stroke is the most common life-

threatening neurological disorder, and the resulting disability is the most important single cause of inability among these populations (Semplicini *et al.*, 2004).

#### c) Diabetes and Kidney Disease

Data from several epidemiologic studies have suggested that the prevalence of hypertension in patients with diabetes mellitus is 1.5-2 times greater than in an appropriately matched non diabetic population. In patients with insulin-dependent diabetes mellitus, hypertension is generally not present at the time of diagnosis. As renal insufficiency develops, blood pressure rises and may exacerbate the progression to end-stage renal failure. In non-insulin-dependent diabetes mellitus, many patients are hypertensive at the time of diagnosis (Donald and Simonson, 1988). The overlap between hypertension and diabetes substantially increases the risk of ischemic cerebrovascular disease, retinopathy, and sexual dysfunction (Lago *et al.*, 2007).

The presence of hypertension in diabetic patients substantially increases the risks of coronary heart disease, stroke, nephropathy and retinopathy. When HTN coexists with DM, the risk of CVD is increased by 75%, which further contributes to the overall morbidity and mortality of already high risk population. DM and HTN are interrelated diseases that strongly predispose people to atherosclerotic cardiovascular disease, and hence have been referred to as “the bad companions” (Afzal, 2013).

HTN has been reported to occur in 85% to 95% of patients with CKD (stages 3–5). The relationship between HTN and CKD is cyclic in nature. Uncontrolled HTN is a risk factor for developing CKD, and is associated with a more rapid progression of CKD, and is the second leading cause of ESRD in the U.S.(Ricchetti, 2017).

#### d) Dementia

Isolated systolic hypertension may pose a particular risk for dementia (memory loss) (Simon, 2013).

#### e) Eye Damage

Hypertension produces cardiovascular risk by causing end-organ damage that includes retinopathy. Current studies have shown that the effects of systemic hypertension on the retinal, optic nerve head and choroidal circulation produce three distinct and independent

manifestations: (i) hypertensive retinopathy, (ii) hypertensive optic neuropathy, and (iii) hypertensive choroidopathy (Chatterjee *et al.*, 2002).

#### f) Sexual Dysfunction

Sexual dysfunction is more common and more severe in men with hypertension and in smokers than it is in the general population. Although older drugs used to treat hypertension caused erectile dysfunction as a side effect, more recent evidence suggests that the disease process that causes hypertension is itself the major cause of erectile dysfunction. Oral phosphodiesterase type 5 (PDE5) inhibitors, such as sildenafil (Viagra), do not appear to pose a risk for most men who have both high blood pressure and erectile dysfunction. However, men who have uncontrolled or unstable hypertension should not take erectile dysfunction pills. Men who take nitrate medications for heart disease cannot take erectile dysfunction drugs (Simonson, 1988).

#### g) Pregnancy and High Blood Pressure

Hypertension is the most common medical problem encountered during pregnancy, complicating 2-3% of pregnancies. Hypertensive disorders during pregnancy are classified into 4 categories, as recommended by the National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy:

- Chronic hypertension
- Preeclampsia - eclampsia
- Preeclampsia superimposed on chronic hypertension
- Gestational hypertension (transient hypertension of pregnancy or chronic hypertension identified in the latter half of pregnancy). This terminology is preferred over the older but widely used term "pregnancy-induced hypertension" (PIH) because it is more precise (Carson and Ronald, 2016).

## **2.4 Diet and hypertension**

Well-established dietary modification that lowers BP are reduced salt intake, weight loss, and moderation of alcohol consumption over the past decade, increased potassium intake and consumption of dietary pattern based have emerged as effective strategies that also lower BP. An increased intake of protein particularly plant protein may lower BP and

reduce the risk of CVD (Aubert *et al.*, 1998). Dietary behavior is an important lifestyle factor impacting on the risk of developing high blood pressure (Chan, 2015).

A number of different dietary factors have been shown to be positively related to hypertension including intake of animal protein, low potassium, low magnesium inadequate calcium, high alcohol and high coffee consumption (Geleijnse *et al.*, 2005).

## **2.5 Dietary pattern and hypertension**

People eat food that contains thousands of constituents, which may affect health. So, it is also necessary to study the effects of dietary patterns in addition to the effects of single nutrient on health (Jacobs, 2007). Evaluating the relationship between hypertension and dietary patterns may be particularly useful because the effect of single food is often small, and a high correlation among foods makes reductive approaches problematic (Hu, 2002). Furthermore, foods are not consumed in isolation, and there is likely to be important synergy among and within foods, where the joint effect of the diets constituent parts is greater than the individual effects of single foods and nutrient (Steffen, 2005).

The Dietary Approaches to Stop Hypertension (DASH) intervention study (Appel *et al.*, 1997). The Oxford Fruit and Vegetable study (John *et al.*, 2014) have both shown that a diet rich in fruit, vegetables and low-fat dairy products and low in saturated fats can substantially lower both systolic and diastolic blood pressure. The Mediterranean diet, composed of nine components: high consumption of olive oil, legumes, cereals, fruits, vegetables; moderate-to-high consumption of fish; moderate consumption of wine, dairy products (mostly as cheese and yogurt), and beans, and a low consumption of meat and meat products, has also been reported to lower blood pressure (Kokkinos *et al.*, 2005).

## **2.6 Socio-demographic factors**

The population is ageing and increasing number of individual is reaching their eight decades of life. Blood pressure increased with age reaching more than 60% at the age rank of 65 years (Cesarino *et al.*, 2008). Urban people have the higher prevalence of hypertension than the rural population. Total prevalence of hypertension was 21% in urban areas and only 7% in rural areas. This suggest that environmental factors are important determinates of blood pressure and lifestyle/behavior change may help lower the blood pressure (Sarraf, 1997).

Study conducted in rural Nepal jointly by Nepalese and Japanese doctor reported the prevalence of hypertension 4.9% in woman and 10.9% in man (Sasaki *et al.*, 2005) reported that the prevalence of diabetes as well as hypertension is escalating in the urban areas but number of undiagnosed cause of hypertension and diabetes is expected to be high in rural areas of Nepal, similarly the "urban health penalty" the greater prevalence of large number of health problems and risk factors in cities than sub urban and rural areas have been reported (Leviton *et al.*, 2000).

A cross sectional survey was carried out to examined the relationship between the educational level and knowledge about their chronic diseases and treatment among the hypertensive and diabetes patient and found that in adequate functional literacy possess a major barrier to educating patient about chronic diseases (Mark *et al.*, 1988). (Cesarino *et al.*, 2008) states that socio economic status is strongly related to access of preventive care, ambulatory care and high technology procedure. In a Dutch study, the prevalence of hypertension was found higher among educated man (Gaudemaris *et al.*, 2002).

Study in china has shown the association of blood pressure with education level body weight and the intake of total energy fat and protein both genders, all the chronic condition occur more frequently in middle aged and older people and occur more frequently in urban than in rural setting expect cancer. Some chronic disease risk factor such as hypertension, sugar levels, high blood pressure and lipid can present without any sign or symptoms. Patient with stroke, heart attack, coma and diabetes presence as medical emergencies requiring immediate hospitalization to ensure a high rate of survival. Thus, regular screening will be an important tool for early diagnosis and prevention. A study in Kiribati has stated that modernized urban migrants have more elevated blood pressure (David, 2005).

## **2.7 Behavioral factor**

MoHP reported that 41% of total respondents were found consuming tobacco similarly, alcohol drinking was reported among 38% of the respondents in their life time and out of total drinker, 37% were the current drinker, 51.5% were physically inactive at work and higher prevalence of physical inactivity was observed among female and older age groups. Tobacco use whether it is chewing or smoking increase as the risk of CVD and HTN and diabetes (Ronald, 2006). A study in Asia also observed 27% of the male and 42% female

were overweight and 20% male and 17% of female were found hypertensive (Singh *et al.*, 2000).

Smoking and alcoholism were independently associated with both systolic and diastolic blood pressure. In a study, about 75% of the senior citizen reported financial problem and difficulty in meeting a basic needs of life further more suffering from tension and anxiety for variety of socio-psychological as death of spouse, presence of unmarried daughter, new values and norms like disobedience towards them by younger generation (Kabir, 1992). Pandey has stated the synergetic interaction of tobacco smoking with hypertension and high blood cholesterol which also increase the risk of coronary heart disease and sudden death (Pandey, 1987).

Alcohol was positively associated with hypertension, persons drinking large amounts of alcohol were found to have higher blood pressure (Friedman *et al.*, 1982). However, no clear relationship between smoking and hypertension and or diabetes was observed. Moreover, nicotine in cigarette may endanger the life of hypertensive and diabetic patients exceeding the risk of stroke. Therefore, excessive alcohol intake was reported as an important risk factor for high blood pressure and diabetes (Fung *et al.*, 2001)

A study done in Chicago for 7 years blood pressure follow up study of middle aged employed men shows higher intake of vegetables and fruits were related to less increase of blood pressure. Whereas, higher intake of red meat showed significantly greater increase in blood pressure and higher fish intake were found lesser increase of blood pressure. Similarly, high intake of fruits and vegetables were associated with lower risk of developing heart disease and stroke (Miura, 2004).

## **2.8 Health perception**

The association of hypertension and stress are noted clearly in different studies such as (Milne *et al.*, 1985) reported that diagnosis and treatment of hypertension had a negative impact on health perception and activities of daily living. Similarly, (Fries, 1980) also reported physical, mental and especially emotional stress elevate the blood pressure and physical and mental rest lowers the blood pressure diagnosis and treatment of hypertension had a significant and sustained negative impact on health perception and activities of daily living even among actively employed, relatively healthy, medicated hypertensive for whom there were no medical indications to restrict their life-style (Miura, 2004).

Hypertensive individuals represent a vulnerable population that merits special attention from healthcare 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 (Lee, 2005).

## **2.9 Lifestyle environment**

The places in which people work and live have enormous impact on their health. The characteristics of place include the social and economic environments as well as the natural environment and the built environment which may include transportation, building, green spaces roads, and other infrastructure (IOM, 2001). Environmental hazards in the working places and communities both in urban and rural areas may influence the prevalence of many diseases. A variety of political, socioeconomic and environmental factors shape the health status of the cities and their residents by influencing health behaviors such as exercise, diet, sexual behavior, alcohol and substance used (Freudenberg, 2010). This suggests that the association of certain chronic disease like hypertension and diabetes with environmental factors is devastatingly clear.

A number of environmental factors have been playing role in the development of hypertension, including salt intake, obesity, occupation, alcohol intake, family size, exercise, excessive noise exposure, overcrowding and psychosocial environment (Perry *et al.*, 1994). Study conducted in USA reported that most religious activities were associated with lowering the blood pressure (Koeing *et al.*, 1998).

## **2.10 Medical History**

Old age all over the world is marked by poverty and social isolation. Most people enter the old age in poor health as a result of lifelong exposure to health risks, deprivation, lack of knowledge and resources and poor access to health services. Forty five percent of elderly Indians have chronic disease and disabilities. The number increases up to 95% among those who seek health screening. Sufficient information on acute health problems and service requirement is not available in Nepal, So, due to similar life style and closest neighbor elderly health problems can be compared with India. The common disease among the ambulatory elderly are: Hypertension, cataract, osteoarthritis, IHD, COPD, Diabetes etc. which accounts for 85% of the burden of ill health. Among the very old persons, stroke, dementia, osteoporosis and physical dependence are the main problem. The

commonest diseases of Indian elderly are Bronchitis, pneumonia, IHD, cancer and Tuberculosis (Sharma, 2011).

It has been found that in the next twenty years as recent projection by WHO, over three quarters of death in the developing world will be due to non-communicable disease surpassing communicable disease and injuries. This remarkable transformation in the profile of ill health requires the provision of costly services. The heavy load of non-communicable disease that produce considerable disability and require costly treatment, along with killer communicable disease will have to borne by a health care system, which is not geared to do so (Sharma, 2008).

Study carried out in urban Nepal shows that hypertension was less common in subjects with non-diabetic subjects than those with diabetes (18.8% vs. 36.7%). Similarly, of all subjects with hypertension 29.1% had diabetes (known or newly diagnosed) and 30% had glucose tolerance of some forms. Overall, the result indicates that diabetes mellitus and hypertension are significant and related public health problems in those aged 40 or more in urban Nepal (Shrestha *et al.*, 2006). Similar study, in Nepal shows that 32% of hypertensive was diabetic and 22% of diabetic also had COPD. Only 19% of the hypertensive had their blood pressure controlled and the rest had uncontrolled hypertension. It shows the strong association of diabetes and hypertension and also with COPD (Dhungel and Shrestha, 2004).

A New York study reported that reserve capacity of heart is impaired in people with diabetes and hypertension, the researchers found that the heart's main primary chamber, the left ventricle had less in reserve among subjects with hypertension and those with diabetes and the co-existence of both conditions appeared to have an additive detrimental effect. The same study also provides more evidence that diabetes itself can cause heart failure. The challenge from a clinical point of view is to screen those patients to prevent long-term cardiac complication in this high-risk population (Fries, 1980). Framingham heart study shows blood pressure control is particularly difficult to achieve in older women, recent data from the current study shows poor blood pressure control was reported for elderly women in the screening phase of the women's health initiatives. Clinical advisory issued by the National huge blood pressure education program states that physician pursue a more aggressive treatment approach to lower the blood pressure of people who have both hypertension and diabetes and an increase in renal disease. There

will be a rapid increase in the prevalence of chronic diseases such as hypertension and diabetes as a consequence of ageing population (Menon *et al.*, 2006).

Study to investigate the complication of hypertension in adult urban Liberians in medical ward of hospital reported that 15.8% were admitted due to the complications of hypertension, among them, 72.4% were from lower socio economic status and complications were heart disease 55.2%, stroke 31.4% and hypertensive retinopathy was seen among 4 people. Rest of the people developed congestive cardiac failure without CHD (Nijoh, 1990).

### **2.11 Overweight and obesity**

Hippocrates recognized that sudden death is more common in those who are naturally fat than in the lean. The etiology or cause of obesity is an imbalance between the energy ingested in food and the energy expended. The relationship of insulin secretion to BMI is closely related, both insulin secretion and insulin resistance result from obesity. Similarly one estimate has suggested that control of overweight would eliminate 48% of the hypertension in whites and 28% in blacks (Bray, 2004).

Obesity and overweight is not uncommon in Nepali population and is related with the higher incidence of hypertension & diabetes and IHD (Acharya *et al.*, 2006). A Chinese study reported that with increment of age, prevalence of overweight, obesity and its co-morbidities were all elevated. The prevalence of hyperglycemia, hypertension and dyslipidemia was two to three times higher among the subjects who had higher WHR and WC compared to those with a lower WC and WHR. About one third of the population was more than 60 years of age and higher BMI, WC and WHR was related with the increased age (Jia *et al.*, 2002).

Study carried out in Spain has revealed higher prevalence of overweight/obesity among 55-64 age groups. A study done on the elderly subjects in Boston has shown the relationship of physical in activity and obesity in development of diabetes. Weight gain since 20 years and elevated adiposity may contribute significantly to the rise in blood pressure in normotensive individual has emphasized the importance of weight control throughout adulthood (Yang, 2006). Obesity, being the emerging burden of risk factors for chronic non-communicable disease, blood pressure, thus, has become a major public health

problem for all age groups especially elderly people living in rural area, and rural people are facing increased burden from hypertension being overweight or obese. Prevalence of sustained hypertension is on the rise in urban area even in younger age groups. Blood pressure is frequently elevated in obese children as compared to lean subjects. This is possibly related to their sedentary lifestyle, altered eating habits, increased fat content of diet and decreased physical activities.

A cross sectional study done in urban area of India has shown the prevalence of hypertension 54.5% and associated factors recorded were higher body mass index and older age and an occupation also has some role in hypertension prevalence (Zachariah, 2003). Study report of US shows that isolated systemic hypertension is a highly prevalent disorder and its major determinants are: sex, increasing level of blood pressure and obesity in women. Obesity is an important biological risk factor for cardiovascular disease both directly and increasing the risk for other biological risk factors such as high blood pressure, type 2 diabetes high serum lipid levels. Different studies have revealed that obesity and low level of education are associated with other risk factors for CVD such as high blood pressure and high cholesterol (Anderson, 2006).

Obesity and higher BMI as a strong independent marker of systolic and diastolic blood pressure. According to BMI 36.5% subjects were found over weight and 23.7% of them were found obese. Accordingly, waist hip ratio 16.6% and to waist circumference measurement 32.3% were in relative high CVD risk groups. In conclusion, 12% of the SBP and 11% of the DBP elevation could be explained by anthropometric variables in men while 30% SBP and 22% DBP in women (Yalcin, 2005). A study done in Pakistan has revealed the prevalence of obesity and its relation with hypertension, which reports, prevalence of higher BMI was found in 13.5% men and 14.1% women and strong association of obesity and overweight with hypertension was found (Syed, 2004)

An African study reveals the effect of BMI on blood pressure higher in males than in females regression coefficient 0.64 and 0.38 respectively (Mufunda, 2006). A study in Ghana has shown that the adjusted ratios for developing hypertension for overweight or obesity were 5.8 and 8.9 respectively (Addo, 2006). Similar study to investigate the association in between body mass index and blood pressure across Africa and Asia shows the risk of hypertension more among the people who are overweight and obese (Mishra, 2008). A study report of Thailand highlights that, overweight men are 1.88 times more

likely to be hypertensive. Similarly, overweight women had 1.74 increased risks for hypertension (Lee, 2006).

### **2.12 Prevention, control and management**

Macmahon (1987) demonstrated that uncontrolled hypertension occurs commonly among elderly patients and blood pressure control is influenced by choice of medication, presence of concomitant disease, and availability of insurance. Therefore, strict control of both hypertension and diabetes is essential to avoid the development of clinical syndromes. Similarly, treatment for the elderly health problems is the demand of the time (Quintana, 2006). Strict control of both hypertension and diabetes is essential to avoid the development of clinical syndromes (Quintana, 2006). In India and Nepal, most of the old people live in their community and they depend on community health services for most of their health problems. At least half of the most common chronic diseases are undetected, that half of those detected are not treated, and half of those treated are not controlled: the rule of halves. In 1972 Wilber and Barrow studying the diagnosis and treatment of hypertension in southern USA added the rule of halves. Similarly, Doney added the second term of rule of halves in diabetes in 1976 (Wilber and Barrow, 1972).

There is a constant need for regular health care, supervision, monitoring of blood pressure, early detection and treatment of chronic illness among the reasonably healthy adults and health care workers should possess the knowledge of what is normal in old age and what can realistically be expected as a good standard of health. Quality of care for elderly residing in nursing home and their homes was inadequate when judged against the quality indicators, irrespective of where patient lived. The population of patients with heart disease or diabetes who had their blood pressure measured in past two years was lower among those living in nursing homes (Montgomery and Barnes, 2003).

### **2.13 Literature review on knowledge attitude and practice about hypertension**

Studies similar to this current study were done and aimed at evaluating the knowledge attitude and practice about hypertension but little information is available from the developing countries where hypertension has lately been recognized as a major health problems. The KAP study on hypertension in a random sample of 1067 adults aged 25 to 64 years from the Seychelles island (Indian Ocean) shows that among hypertensive persons 50% were aware of the condition 34% were treated 10% had controlled BP. Most of the

persons whether non hypertensive aware/unaware hypertensive person had good knowledge related to hypertension determinants and consequences. However positive attitude and appropriate practice for hypertension were found in smaller portion of participants with little difference between non hypertensive and aware/unaware hypertensive (Aubert *et al.*, 1998).

Similar study done in Gujarat, India states that a suitably designed and validated KAP questionnaire was administrated and responses were coded and analyzed which shows most of the respondent were of age group 31-40 years and 98% of the respondents knows that hypertension is a disease state. They also stated that they had poor attitude and practice towards hypertension but repeated reinforcement and motivation along with health education will definitely bring a positive change in attitude and practice (Parmar, 2014).

The cross sectional study about KAP on hypertension among 107 sample at sireki, shows that 52.5% had adequate knowledge 57.4% has positive attitude and 61.4% had good preventive practices of hypertension. They also revealed there was a significant association between the level of knowledge with education level and family history ( $p < 0.05$ ) for the attitude there was a significant association between the level of attitude and education level (Aubert, 1998).

The cross-sectional study done in Dhulikhel, Nepal based on Dhulikhel heart study which include 1073 adults shows 43.6% of patients were aware of their hypertension status, hypertension awareness was associated with increasing age ( $p < 0.001$ ) more than 76.1 % of those who were aware about their status was under the treatment. There were significant differences in treatment status by se, education, age, and BMI. Only 35.3% had blood pressure control (Vaidya *et al.*, 2012).

## **Part III**

### **Materials and Methods**

#### **3.1 Materials**

Equipments needed for performing the survey are:

- a) Weighing machine: The weighing machine had the capacity to measure to the nearest 0.1 kg and had the maximum capacity of 100 kg.
- b) Height measuring stand (Stadiometer): The height machine had the capacity to measure to the nearest 0.1 cm and had the maximum capacity of 6 ft.
- c) Questionnaire: A well-designed set of questionnaire were used to collect information on household characteristics, food consumption, health facility etc.
- d) Blood pressure measuring instruments: - The type of machine used was ALP K2 sphygmomanometer and stethoscope from Japan Corporation which was provided by college. Stethoscope was used to listen the pulse while releasing air from the cuff while sphygmomanometer having capacity to measure to the nearest 10 mmHg and had the maximum capacity of 300 mmHg.

#### **3.2 Methods**

##### **3.2.1 Research design**

A cross sectional descriptive study was conducted over a period to assess information on knowledge, attitude and practice of hypertensive patient and their dietary practices. Information was collected by administrating the standardized and pretested questionnaire. Anthropometric measurements were conducted using standardized instruments.

Household interview with the help of set questionnaire: A set of questionnaire to assess the knowledge, attitude and practice on hypertension was asked among hypertensive patient. Data was collected on household, socioeconomic, dietary characteristics and about their knowledge, attitude and practice for high blood pressure.

##### **3.2.2 Target population**

The target populations of the study are the patients suffering from hypertension who are taking antihypertensive medicines.

**Inclusion criteria:** Already diagnosed hypertensive patients

**Exclusion criteria:** Non hypertensive patients, pregnancy.

### 3.2.3 Study area

The study was conducted in Itahari, Sunsari which is one of the largest city of Nepal. It is inhabited by different people.

### 3.2.4 Study variable

Study variable were dependent and independent variables. Dependent variable of the study was hypertension of the people. Whereas, independent variables of the study were:

- Socio demographic: age, sex, education
- Behavioral: smoking, alcohol exercise
- Diet: salt, fat, green vegetables

### 3.2.5 Sampling technique

The cross sectional, population based study was carried out in Itahari, Municipality. Among total 26 wards of Itahari, only 5 wards (i.e. 1, 5, 7, 8 and 9) were selected by using Simple Random Sampling Technique and subjects of age group of 18-59 years was included for study from the selected wards. The basic criterion for the selection of household sample was that the household with at least one patient was included in the study. In households with more than one patient, patient was chosen by lottery method.

### 3.2.6 Sample size

The sample size was calculated by using the statistical formula, with the prevalence rate of hypertension 23% (Vaidya *et al.*, 2012), 95% confidence interval, 7% margin of error (d) and 10% non response rate which was added to the total calculated sample size.

For Infinite population,

$$\text{Initial sample size } (N_0) = \frac{Z^2 \times P(1-P)}{d^2}$$

Z= confidence interval at 95% (standard value of 1.96)

P= prevalence of hypertension (23%)

d= margin of error (7%)

Now,

$$N_0 = \frac{1.96^2 \times 0.23(1-0.23)}{(0.07)^2}$$

**Source:** Sthapit *et al* ( 2017)

$N_0 = 138$

Thus, calculated sample size was adjusted for non-response rate and the new adjusted sample size was 148.

### **3.2.7 Pre- testing**

The equipments were tested before the actual survey by measuring the people. Since no fault was found on the equipment they were confirmed for the actual survey. The questionnaire was pretested among the people to see if there was any ambiguous questions or not and also to see if all the questions and options present on the question was easily understandable by the community members or not. By taking the suggestions from the community people the questions were modified to achieve most practical format.

### **3.2.8 Validity and Reliability**

Questionnaire in this research was prepared from review of published articles and research report (Shrestha *et al.*, 2016). Similarly, equipments for anthropometric measurement and blood pressure measurement, standard and valid instruments were used and quality control was assured. For reliability of questionnaires, pretest was performed in 5 persons among the 18-59 years individuals outside the site of study before doing the actual data collection. The questionnaires were revised in the light of pretest of result.

### **3.2.9 Data collection**

Data obtained from the respondents was collected on a structured form of questionnaire in which each questionnaire was given a unique identity number for each people.

The instruments used for data collection were as follows:

#### **Questionnaire for household survey:**

A questionnaire given in annex was used to collect the various kinds of information. The self-administered questionnaire has following parts:

Part 1: Demographic factors

Part 2: Questions related to knowledge

Part 3: Questions related to attitude of patients about hypertension.

Part 4: Questions related to practices of hypertensive patients towards its care.

Total 50 questions were asked, out of which 10 were knowledge related questions, 10 were practice related questions and 9 were attitude related question along with socio

demographic, diet related questions. Each correct answer was given a score of “one” and the wrong answer was given a score of "zero".

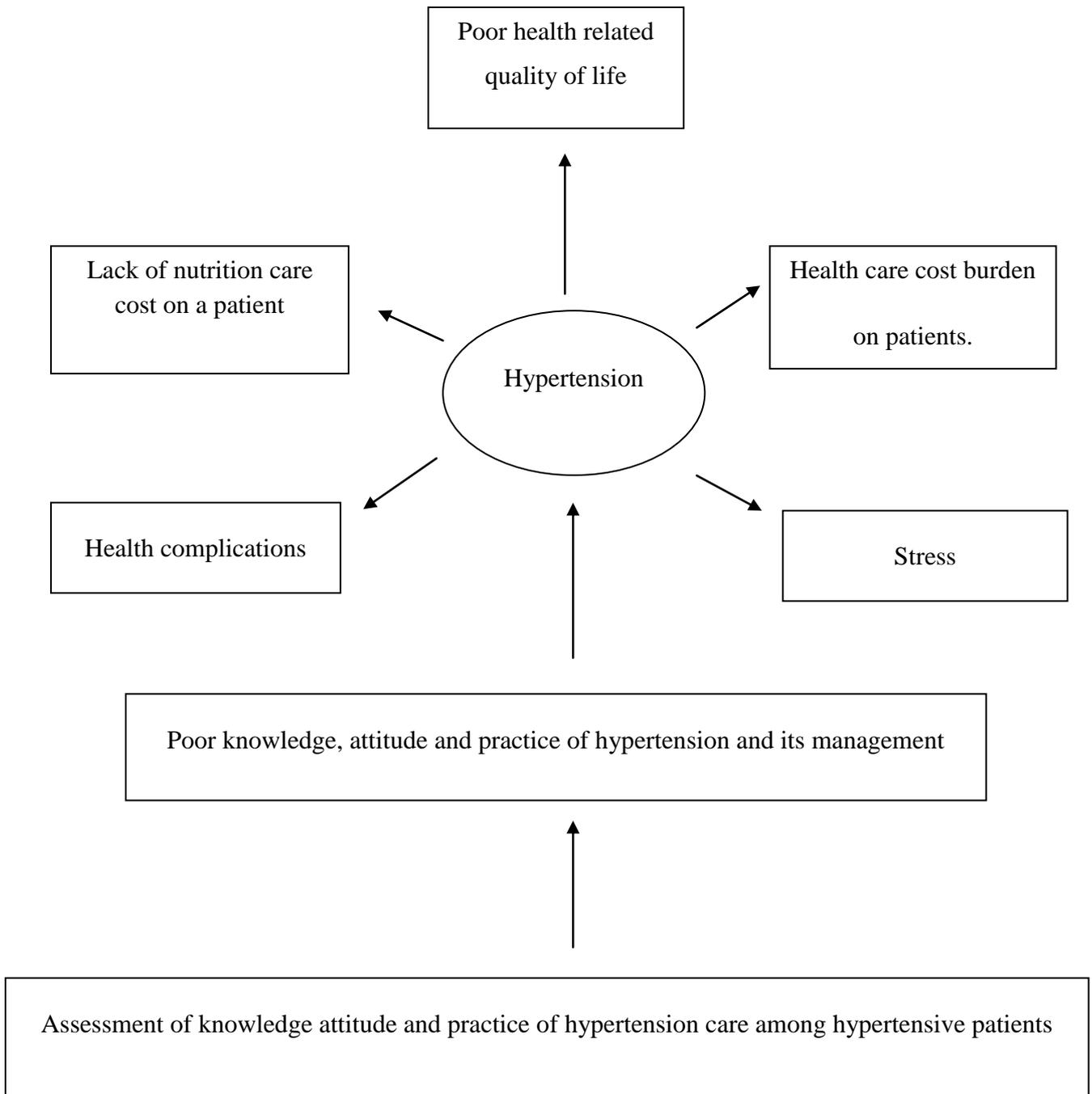
### **3.2.10 Data analysis**

Quantitative data was first coded and was entered in SPSS version 20 and Microsoft Excel 2007. Similarly, qualitative data was transcribed and coded by assigning labels to various categories. Chi-square test was used to find association. Verified test parameters were used to establish the relationships between the variables and hypertension status of people.

### **3.2.11 Logistical and ethical considerations**

Permission to conduct survey in Itahari, Sunsari was obtained from Central Campus of Technology, Dharan. Verbal consent from studied population was obtained and the objective of the study was explained lucidly to them. Privacy and confidentiality of collected information was ensured at all level.

### 3.2.12 Conceptual frame work



**Fig 3.1** Conceptual frame work

## Part IV

### Results and discussion

This study was carried to find out the knowledge, attitude and practice of hypertensive patient their dietary practices and association of the knowledge and blood pressure level of selected patients. This study was also carried out to find the association between KAP score and physical activity level, education level, age and genetic history of the hypertensive patient and their dietary practices. 148 patients were asked the well structured questions related to socio economic status, life style modification, dietary modification and medication.

#### 4.1 Socio-demographic characteristics of the study population

##### 4.1.1 Classification of age of patients

The patients who were enrolled in the study were from the age group 18-59 years. The age wise categorizations of patients in different age groups are shown in the Table 4.1

**Table 4.1** Age distribution

Age group	No. of patients	Percent (%)
20-30	6	4.1
31-40	38	25.7
41-50	60	40.5
51-59	44	29.7
Total	148	100

Out of 148 patients who were enrolled in the study, 6 (4.1%) patients were of age group 20-30 years, 38 (25.7%) patient were of age group 31- 40 years, 60 (40.5%) patients were of age group 41-50 years and 44 (29.7%) patient were of 51-59 years.

Majority of the patients were from the age group 41-50 years i.e. 40.5%. Increased in age is significantly associated with increase in prevalence of hypertension and especially of systolic hypertension. This finding is consistent with the study done in general population of Guntur, India on silent killer disease hypertension and diabetes, where it was found that most of the respondents in KAP study were of age group 40-5 years (Bollu *et al.*, 2015).

#### 4.1.2 Gender distribution

Information about the gender distribution of the studied population is presented in the Table 4.2

**Table 4.2** Gender distribution

<b>Sex</b>	<b>No. of patients</b>	<b>Percent (%)</b>
Male	66	44.6
Female	82	55.4
Total	100	100

The study shows that, majority of the participants in the study were female 82 (55.4%) as compared to male 66 (44.6%). Similar study done in Dhulikhel, Nepal has shown that majority of the participants were women i.e. 58.4% (Karmacharaya, 2017). It revealed that the most of the female were affected by high blood pressure in study area. This may be due to most of the woman being housewife and having sedentary lifestyle which leads to obesity, Diabetes Mellitus, Hypertension.

#### 4.1.3 Classification of marital status

Marital status of the patients who were enrolled in the study is shown in the Table 4.3

**Table 4.3** Marital Status

<b>Marital</b>	<b>No. of patients</b>	<b>Percent (%)</b>
Married	143	96.6
Unmarried	5	3.4
Total	148	100

From the survey it was found that the majority of the surveyed patients were married i.e. 96.6% and only 3.4%, were found unmarried.

#### 4.1.4 Literacy status

Education status of patients varied from illiterate to higher education. The detail regarding the literacy status is given in the Table 4.4

**Table 4.4** Education Status

Education level	No. of patients	Percent (%)
Illiterate	31	20.9
Class 1-5	8	5.4
Class 6-SLC	55	37.2
High school	33	22.3
Bachelor	18	12.2
Master	3	2
Total	148	100

Out of 148 participants, 55 (37.2%) had studied up to SLC, 33 (22.3%) patient had gone to high school, 18 (12.2%) patient had done bachelor, 3 (2%) had done masters where as 31 (20.9%) were illiterate. Similar KAP study done in Chitwan, Nepal has shown that 21.2 % were illiterate (Yadav *et al.*, 2015) which was similar with the finding of this study.

#### 4.1.5 Classification of employment

Information about the employment of the studied population is presented in the Table 4.5

**Table 4.5** Employment status

Classification	No. of patients	Percent (%)
Employed	129	87.2
Unemployed	19	12.8
Total	148	100

Among the patients who were attending the study, most of them were employed i.e. 129 (87.2%) and 19 (12.8%) were unemployed.

#### 4.1.6 Classification of occupation

Occupation of the population varied from house wife, officer, agriculture etc. The detail regarding the classification of occupation is shown in the Table 4.6

**Table 4.6** Occupation distribution

<b>Classification</b>	<b>No. of patients</b>	<b>Percent (%)</b>
Officer	21	14.2
Agriculture	2	1.4
Housewife	63	42.6
Foreign Employments	2	1.4
Business	41	27.7
Unemployed	19	12.8
Total	148	100

Most of the patient attending the study were housewife i.e. 63 (42.6%), people involved in business were 41 (27.7%), 21 were service holder were as farmer and foreign employment were 2 (1.4%). Since most of the patients were house wife and service holder and both groups of patients have sedentary lifestyle which is one of the main factors that leads to obesity and further high blood pressure. Similar study done in Dhulikhel, Nepal has shown that majority of the participants were housewife (50.4%) (Karmacharaya, 2017).

#### 4.1.7 Classification of genetic history

Genetic history is an important non-modifiable risk factor for hypertension. The classification of genetic history was carried out. The result is tabulated in Table 4.7

**Table 4.7** Family History

<b>Genetic history</b>	<b>No. of patients</b>	<b>Percent (%)</b>
Present	82	55.4
Absent	66	44.6
Total	148	100

Among the hypertensive patients attending in the study, majority (55.4%) of the patients have genetic history of hypertension whereas genetic history was absent in 44.6% patients. The finding is consistent with the study done in general population of Guntar toward silent killer disease hypertension and diabetes, where it was found that genetic history was directly related with hypertension (Bollu *et al.*, 2015).

#### 4.1.8 Socio economic characteristics of the study population

The study shows that among 148 patients in the study, 6 patients were of age group 20-30 years, 38 were of 31-40 years, 60 were of 41-50 years and 40 were of 51-60 years age group. Out of 148 patient enrolled in the study, 44.6% were male and 55.4% were female which shows most of the patient were female. In the study majority of the patient were married i.e. 143 and unmarried were only 5 patients. The educational status of patient was also assessed during the study, which reveals most of the patients were literate i.e. 31 were illiterate, 8 had passed primary level education, 55 had passed SLC, 33 had passed high school, 18 had done bachelor and 3 had master level education.

As far as occupational status of the patients was concerned, 87.2% were employed and 12.8 % were not employed. Most of the patients were housewife that is 42.6%. Patients involved in business were 27.7%, service 14.2%, agriculture and foreign employment were found to be 1.4%.

#### 4.2 Dietary practices

The dietary practices of hypertensive patients were assessed. Questions about their dietary practices like meat consumption, green leafy vegetables, fruits and salt intake were asked. The dietary practices of the patients is tabulated in Table 4.8

**Table 4.8** Types of food consumed

<b>Dietary factors</b>		
<b>Meat consumption</b>	<b>No. of patients</b>	<b>Percent (%)</b>
Vegetarian	18	12.2
Non vegetarian	130	87.8
<b>Green leafy vegetables</b>		
Regular	146	98.6
Some times	2	1.4
<b>Fruits</b>		
1 in a Day	49	33.1
As a Wish	58	39.2
No	7	4.7
Sometimes	34	23

### Salt Intake

Less	58	39.2
Medium	80	54.1
More	10	6.8

### Fats and oil

Sunflower oil	135	91.2
Soyabean oil	8	5.4
Mustard oil	5	3.4

The study shows that among 148 patients in the study, 130 (87.8%) patients were vegetarian and 18 (12.2%) were non vegetarian. From the survey, it revealed that the most of the patients consume green leafy vegetable regularly i.e. 146 (98.6%) and 2 (1.4%) consume sometimes only. It revealed that 58 patients consume fruits as their wish, 49 consume fruits regularly and 34 patients consume barely. Most of the patient consumed medium amount of salt i.e. 54.1 %, 6.8% consumed more and 39% consumed less amount of salt whereas most of the patients consumed sunflower oil 91.2% as compared to their oil.

A study done in Chicago for 7 years in middle aged employed men shows, higher intake of vegetables and fruits were related to less increase of blood pressure. Similarly, high intake of fruits and vegetables were associated with lower risk of developing heart disease and stroke (Miura, 2004).

### Salt intake per day

WHO recommends that salt intake should be less than 5 gm per day for adults. Salt intake of hypertensive patients was calculated and divided into two sections i.e. <5 gm and  $\leq$  5 gm. BP associated with salt intake was assessed which is shown in the Table 4.9

**Table 4.9** Association between salt and blood pressure

Salt intake	Blood pressure		Chi square	p value
	<140	$\geq$ 140		
< 5 gm	2	6	0.8	0.04*
$\geq$ 5 gm	37	92		

\*Statistically significant (p< 0.05)

Salt intake was found to be statistically significant ( $p=0.04$ ). Similar finding on Salt or sodium intake has been seen in the study done by Elliott in 2006 which shows salt is directly correlated with mean blood pressure levels and prevalence of hypertension in many populations. The intersalt study presented comprehensive evidence of a significant positive relationship between urinary sodium excretion and blood pressure across the 52 population sample included in the study (Elliott, 2006).

According to the study done on diet and lifestyle risk factors, it was found associated with hypertension. Many modifiable risk factors for hypertension have been identified, including being overweight or obese, not participating in physical activity, and having a poor diet (Forman *et al.*, 2012). The Dietary Approaches to Stop Hypertension (DASH) intervention study (Appel, 1997) and the Oxford Fruit and Vegetable study (John, 2002) have both shown that a diet rich in fruit, vegetables and low-fat dairy products and low in saturated fats can substantially lower both systolic and diastolic blood pressure.

### 4.3 Obesity

Classification of the obesity was done by the scheme endorsed by WHO according to BMI i.e. <25 normal, 25-29.9 Grade I obesity, 30-40 Grade II obesity, >40 Grade III obesity. The BMI of the patients was calculated and graded. The grade of obesity is tabulated in Table 4.10

**Table 4.10** Classification of obesity

<b>BMI</b>	<b>No. of patients</b>	<b>Percent (%)</b>
<25	51	34.5
25-29.9	60	40.5
30-40	27	18.2
>40	10	6.8

The study shows, majority of the patients were of Grade I obesity i.e. 40.5% where as 34.5% were normal, 6.8% have Grade III obesity. This findings was supported by the study done in India where the prevalence of hypertension 54.5% and its associated factors recorded were higher body mass index and older age and an occupation also has some role in hypertension prevalence (Zachariah, 2003).

## 4.4 Behavioral factors

### 4.4.1 Smoking

Information about the behavioral factors of hypertensive patients was collected. Questions about behavioral factors like smoking, drinking and exercise were asked to the patients and association between these factors and blood pressure was assessed. Blood pressure of hypertensive patients is categorized into parts i.e.  $<140$  mmHg and  $\geq 140$  mmHg. Table 4.11 shows the association between blood pressure and smoking.

**Table 4.11** Association between smoking and blood pressure

Smoking	Blood pressure		Chi square	p value
	$<140$	$\geq 140$		
Yes	1	7	1.07	0.3
No	41	99		

Smoking was not significantly associated with blood pressure level ( $p=0.3$ ). Many studies show that smoking has potential risk factors for hypertension. Similar finding was found in other study done in Japan, reported that there is no significant dose-effect relationships between smoking amount and blood pressure when lifestyle and other confounding factors were considered (Okubo, 2002).

### 4.4.2 Alcohol

Association between alcohol and blood pressure level was assessed. Blood pressure of hypertensive patients is categorized into parts i.e.  $<140$  mmHg and  $\geq 140$  mmHg. Table 4.12 shows the association between blood pressure and alcohol consumption.

**Table 4.12** Association between alcohol and blood pressure

Alcohol	Blood pressure		Chi square	p value
	$<140$	$\geq 140$		
Yes	6	24	0.05	0.8
No	36	82		

Alcohol consumption was not found statistically significant with blood pressure ( $p=0.8$ ). This finding was consistent with the study on alcohol consumption in

hypertension which confirmed that alcohol consumption is not associated with the risk of development of hypertension in both women and men. With regards to light to moderate alcohol consumption <20 g/dl had a potentially reduced risk of hypertension (Alexandros *et al.*, 2012).

#### 4.4.3 Exercise

Patients were asked about their daily exercise routine. Systolic blood pressure of hypertensive patients is categorized into parts i.e. <140 mmHg and  $\geq$ 140 mmHg and the association between exercise and blood pressure was carried out. The result is tabulated in Table 4.13

**Table 4.13** Association between exercise and blood pressure

Exercise	Blood pressure		Chi square	p value
	<140	$\geq$ 140		
Yes	21	43	1.29	0.02*
No	22	62		

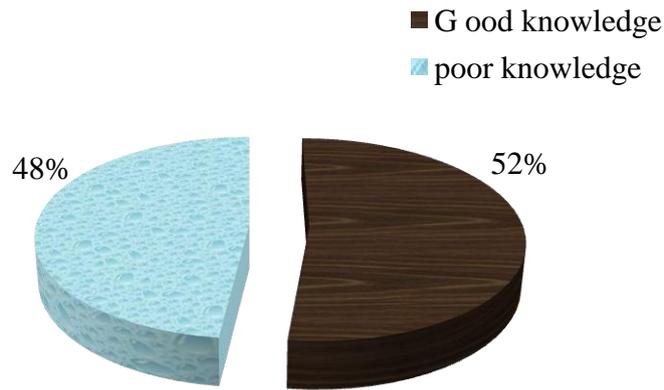
\*Statistically significant ( $p < 0.05$ )

The study shows blood pressure is significantly associated ( $p=0.02$ ) with exercise. Exercise as a lifestyle modification has many beneficial effect to many health condition. The benefits of exercise have been promoted by a number of organization and agencies (AHA, 2012). Study had shown similar findings where Systolic blood pressure (SBP) level was positively associated with physical activity level respondents with low or moderate level of PAL had significantly higher blood pressure level as compared to those who were highly active (Wallace, 2003).

#### 4.5 KAP of hypertensive patients

##### 4.5.1 Knowledge related score of the patients.

Questionnaires about the knowledge of hypertension were asked to hypertensive patients. There answers were analyzed based on the answer given by the patients to the questions related to the knowledge about hypertension.



**Fig: 4.1** Knowledge related score of the patients is shown above in the figure

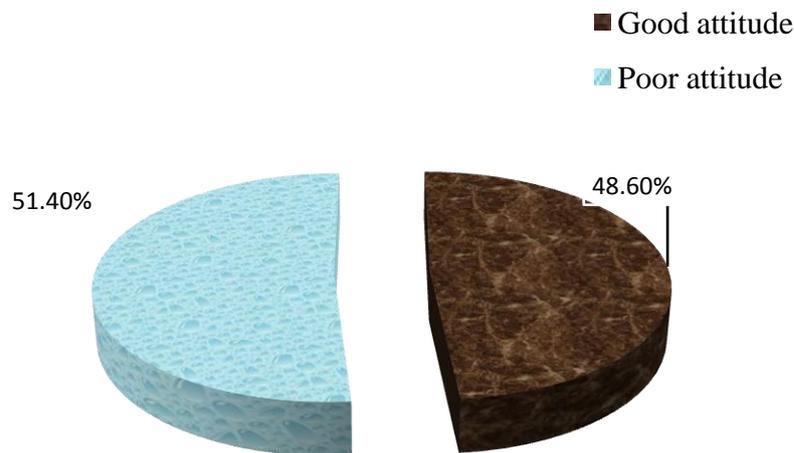
The study revealed that 77 (48%) patients had good knowledge and 72 (52%) patients had poor knowledge about hypertension. The similar KAP study on hypertension was done in Chitwan, Nepal where consistent findings about the knowledge on hypertension were found (Shrestha *et al.*, 2016). Table 4.14 shows the response of the participants towards the knowledge questions asked in the survey.

**Table 4.14** Response to knowledge questions

Questions	Number of patients	
	answering correctly	Percent (%)
Hypertension is a condition:	139	95.9
Causes of hypertension:	70	54
Symptoms of high blood pressure:	97	65.5
Hypertension is treatable:	78	52.7
In hypertension diabetes can increase or worsen blood pressure:	118	79.7
Lifestyle modification required for hypertensive patient are:	79	53.4
Normal blood pressure is:	66	44.7
In case of diabetes high blood pressure level is:	13	8.8
The important factors for controlling Blood pressure is :	36	24.3
Hypertension if not treated effect:	42	28.4

#### 4.5.2 Attitude related score of the patients

The patient attitude was assessed based on the answer given to the questions related to regular exercise, importance of medication. Fig 4.2 shows the attitude of patients towards hypertension.



**Fig 4.2** Attitude related score of the patients is shown in figure

Fig 4.2 shows that, 48.6% of the total studied population had good attitude, whereas 51.4% of the total studied population had poor attitude which shows that patient were not conscious about the importance of exercise, balanced diet, regular checkup for proper normal blood pressure.

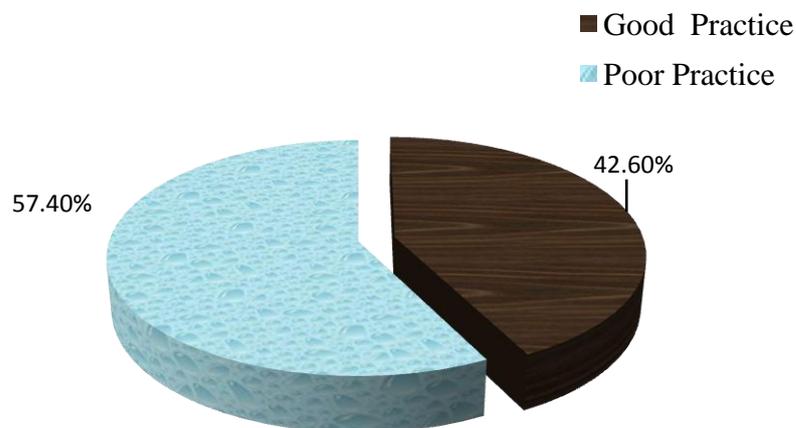
This study was found consistent with the study done by Aubert, where it was found that most of the persons whether non hypertensive, aware/unaware hypertensive person had good knowledge related to hypertension determinants and consequences. However positive attitude and appropriate practice for hypertension were found in smaller portion of participants with little difference between non hypertensive and aware/unaware hypertensive (Aubert *et al.*, 1998). The response of the participant towards the attitude questions asked in the survey is shown in the Table 4.15

**Table 4.15** Response to attitude questions

Questions	Number of a patient answering correctly	Percentage of a patient answering correctly
Do you exercise regularly?	61	41.9
Are you following a controlled and planned diet?	24	16.9
Do you miss taking the doses of your medication?	30	20.3
Are you aware of blood pressure levels falling normal when you are taking drugs	49	33.1
Do you think you should keep in touch with your physician?	146	98.6
Do you think stress cause high blood pressure?	135	91.2

#### 4.5.3 Practice related score

The patients practice was assessed based on the answer given to the questions related to practice, habits etc. Fig 4.3 shows the practice of a patient towards the care of hypertension.



**Fig 4.3** Practice related score is shown above in the figure

This study shows, 42.6% of the total studied population had good practice score for the proper management of high blood pressure whereas 57.4% of the total studied population had the poor practice score. This score represents that the patients are conscious about disease but are not alert for the appropriate practice for proper management of high blood pressure. These finding was supported by the study done Iran, despite high awareness and knowledge about HTN patient had poor practice for hypertension management. Being an urban area and having high number of literacy rate can play a significant role in increasing people's knowledge and attitude in this area (Sabouhi *et al.*, 2011). Table 4.16 shows the response of the participants towards the practice questions asked in the survey.

**Table 4.16** Response to practice questions

<b>Questions</b>	<b>Responses</b>	<b>Number of a patient answering correctly</b>
Last blood pressure checked	one week ago	16
	one month ago	61
	six month ago	30
	one year ago	12
	not done at all	27
Last eye examination	one month ago	12
	one week ago	1
	six month ago	42
	one year ago	11
	not done at all	80
Last urine examination	one month ago	11
	one week ago	1
	six month ago	19
	one year ago	7
	not done at all	109
Last visit to your physician	one month ago	64
	one week ago	16
	six month ago	30
	one year ago	10
	not done at all	27

Last blood sugar examination	one month ago	13
	one week ago	4
	six month ago	15
	one year ago	5
	not done at all	110
Last lipid examination	one month ago	10
	one week ago	8
	six month ago	9
	one year ago	3
	not done at all	117

#### 4.6 Classification of pressure

The blood pressure level of all the patients were assessed, systolic and diastolic pressure was noted. Systolic pressure was categorized into two sections i.e.  $<140$  mmHg and  $\geq 140$  mmHg. The number of patients who had their systolic pressure at normal level was assessed. Table 4.17 shows the number of a patients having systolic pressure less than  $<140$  mmHg and  $\geq 140$  mmHg.

**Table 4.17** Classification of systolic pressure

Classification	No. of patients	Percent (%)
$<140$ mmHg	42	28.4
$\geq 140$ mmHg	106	71.6

Patients enrolled in the study, majority of the patient 71.6% had pressure above 140 mmHg, only 42 (28.4%) patients had pressure below 140 mmHg This shows that even though patient have a good knowledge about care of high blood pressure but didn't emphasize in lifestyle modification.

Diastolic pressure was categorized into two sections i.e.  $<90$  mmHg and  $\geq 90$  mmHg. The number of patients who had their diastolic pressure at normal level was assessed. Table 4.18 shows the number of a patients having diastolic pressure less than  $<90$  mmHg and  $\geq 90$  mmHg.

**Table 4.18** Classification of diastolic pressure

<b>Classification</b>	<b>No. of patients</b>	<b>Percent (%)</b>
<90 mmHg	96	64.8
≥ 90 mmHg	52	35.2

The study shows, majority of the patient 64.8% had pressure less than 90 mmHg, only 52 (35.2%) patients had pressure above 90 mmHg. This shows that even though patients have a good knowledge about care of high blood pressure but most of the patients didn't emphasize in lifestyle modification which results in high blood pressure.

#### **4.7 Association between knowledge and blood pressure level**

The categorization of blood pressure was done i.e. less than 140 mmHg and greater or equal to 140 mmHg. The association between categorized blood pressure and knowledge of a patient were assessed. The association between knowledge and blood pressure level is shown in the Table 4.19

**Table 4.19** Association between knowledge and blood pressure level

<b>BP</b>	<b>Knowledge score</b>		<b>Chi square value</b>	<b>p value</b>
	<b>Good knowledge</b>	<b>Poor knowledge</b>		
<140	21	22	0.018	0.89
≥140	50	55		

Knowledge and blood pressure level were not statistically significant ( $p > 0.05$ ). There was no significant correlation between knowledge of the patients and blood pressure level which may be due to the lack of proper utilization of their knowledge in their day to day life. This also represents that persons who have good knowledge about blood pressure and the ways about controlling blood pressure level through medication, nutritional management, exercise and stress management is not enough to keep blood pressure level in normal unless it is brought in to regular practice with positive attitude towards it.

#### **4.8 Factor associated with KAP score of hypertensive patients**

In study, the total KAP score of hypertensive patients is categorized into high or low KAP. Factors associated with KAP score were assessed which is shown in the Table 4.20

**Table 4.20** Factor associated with KAP score of hypertensive patients

	KAP		Chi square value	p value
	KAP<18	KAP>18		
<b>Age</b>				
<40	32	9	0.281	0.596
>40	79	28		
<b>Exercise</b>				
Yes	40	25		
No	71	12	11.202	0.001*
<b>Genetic history</b>				
No	49	16		
Yes	62	21	12.79	0.07
<b>Education</b>				
Illiterate	25	6	8.8	0.0114*
Literate	86	31		

\*Statistically significant (p<0.05)

#### **4.9 Association between KAP and age group of patients**

Association between KAP and age group of patients was not found statistically significant (p=0.596). This represent that the age does not depend upon having good knowledge about care of hypertension to keep the blood pressure level in normal and to bring to the regular practice with the positive attitude towards it. If a person himself is conscious about his condition he /she can control his blood pressure level irrespective to age.

#### **4.10 Association between KAP and family history of a patient**

Association between KAP and family history was not found statistically significant (p=0.07).This represent that if a person has blood pressure in his family history, it does not mean that he/she is conscious about the disease in term of knowledge, attitude and practice.

#### **4.11 Association between KAP and PAL (physical activity level)**

Association between KAP and PAL was found to be statistically significant ( $p=0.001$ ). This represents if a person has a high level of knowledge, attitude and practice score about hypertension care, there is a possibility that they will do physical activity. It shows that the relative probability of having a highly satisfactory level of knowledge and practice is higher among those who do physical activities compared to those who do not do physical activities.

#### **4.12 Association between KAP and education level**

Association between KAP and education level was found to be significant ( $p=0.01$ ). This indicates a significant relationship that a highly educated person has a high level of KAP score about BP. In addition, it is possible that an educated patient could gather more information through different means of communication i.e. radio, television, manual, magazine.

#### **4.13 Important findings**

Some of the important findings of the study are:

- a) Hypertensive patients possessed good knowledge and attitude scores but have poor practice for management of high blood pressure.
- b) There was a significant correlation between KAP score and PAL.
- c) There was a significant correlation between KAP and education level.
- d) There was no significant correlation between KAP and genetic history.
- e) There was no significant correlation between KAP and age group.
- f) There was no significant relation between knowledge and blood pressure level.

This study revealed a good level of knowledge and poor level of practice score in the hypertensive population. Results similar to what the study revealed were shown by another study done by Susana where knowledge of hypertension was good but practice needed improvement (Oliveria, 2005). Findings showed the good level of knowledge which is also supported by other studies from India, reported that the findings that there is a poor score in attitude and practice score among hypertensive patients (Parmar, 2014).

According to findings of the study, patients' knowledge, attitude about HTN was good but had poor practice. These findings were also supported by the study done by Fakhri where despite high awareness and knowledge about HTN, patients had poor practice for hypertension management. Being an urban area and having a high number of literacy rate

can play a significant role in increasing peoples knowledge and attitude in this area (Sabouhi, 2011).

The study explored the relation between KAP and physical activity level (PAL). There was a significant correlation between KAP and physical activity of a patient ( $p>0.05$ ). This study has been supported by many literatures. According to the Keith there is a significant relationship between PAL and HTN as the favorable effects of exercise on blood pressure reduction have been well characterized in recent years (Keith, 2004). Similarly significant correlation was found between education level of the people and KAP score of the patients. There is a common assumption that education level of a people would have adequate KAP score for control of hypertension and the study is also supporting this. The study conducted in china also says that the lower level of education was associated with higher risk of hypertension in urban population low level of education may associate with not only unhealthy diet but also lack of physical activity.

In case of relation between age and genetic history of a patient it was found contradictory finding. There was no significant relation between age of the patient and KAP score of a patient. Thus KAP score does not depend upon the age of a patient or age does not affect the KAP score. No significant relation was there between genetic history of a patient and KAP score of a patients. Thus, if a person belongs to hypertensive family it does not mean that he/she should have good knowledge attitude and practice about hypertension.

## **Part V**

### **Conclusions and recommendations**

#### **5.1 Conclusions**

The study assessed the knowledge, attitude and practice of hypertensive patients about hypertension and their dietary practices in hypertensive patient of Itahari, Sub-Metropolitan city. The followings are the conclusions drawn from this study:

- a) The study revealed a high level of knowledge 52%, attitude 48.4% and low level of practice 42.6% in hypertensive patient of Itahari.
- b) 16.9% patients are following controlled and planned diet and 43.9 %patients gave the right answer of life style modification required for hypertensive patients which are the main factors that increase the blood pressure level in patients.
- c) Exercise was found to be significantly associated ( $p<0.05$ ) with high blood pressure.
- d) The total KAP score was found to be significantly associated with physical activity level and education level.

#### **5.2 Recommendations**

The study can be further continued with the following recommendations:

- a) Comparative study of KAP of old hypertensive patients and newly diagnosed hypertensive patients can be done.
- b) Further research with larger sample sizes and better measurement of diet to examine the extent to which fats, animal products and dietary pattern influence the high rate of hypertension in Nepalese people.
- c) Better assessment of diet using a validated food frequency questionnaire would enhance studies evaluating diet and risk of hypertension.

## **Part VI**

### **Summary**

As for most of non-communicable diseases change in behavior and adoption of the healthy lifestyles helps to prevent and slow down the increase in high blood pressure. Study was conducted to assess the KAP and lifestyle modification among the hypertensive patient of Itahari. Among 29 wards only 5 wards were selected by using simple random sampling technique and patients of age group 18-59 years hypertensive patient was selected. This cross-sectional study describes the knowledge, attitude and practice regarding lifestyle modification among 148 hypertensive patient of Itahari. A face to face interview using a structured questionnaire was carried out for data collections and anthropometric measurements were taken. Socio demographic characteristics of the participants were determined.

The knowledge, attitude and practice of participants were assessed as 77%, 48.4%, 42% had good knowledge, attitude and practice scores respectively. Majority of a participants were female i.e. 55.4% while male were 44.6%. Most participants were of age above 40 years, 79.1 % of participants were literate and majority of a patients were housewife 63%. There was no significant relation between blood pressure level and knowledge of a patient which may be due to lack of proper utilization of their knowledge in their day to day lifestyle. Salt intake and blood pressure was found significantly associated. A significant relation existed between KAP score and education level of a patient and with physical activity level of a patients. No significant relation existed between total KAP score and age group and with genetic history of a patient.

In conclusion despite of good knowledge and attitude of participants towards healthy life style habits, the practice regarding lifestyle modification among hypertensive patients were generally low. Nevertheless the positive attitude of participant should be encouraged and the implementation of a lifestyle intervention program will help to improve the practice of hypertensive patients for the better management and control of the current situation of hypertensive patients, community awareness program should reach the general population.

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## Appendices

### Appendix A

Informed Consent

Namaste!

I am Supriya Pradhananga, graduate student in Department of Nutrition and Dietetics conducting a dissertation work for award of bachelor's degree in Nutrition and Dietetics.

The topic for the study is **“KNOWLEDGE, ATTITUDE AND PRACTICE ABOUT HYPERTENSION AND DIETARY PRACTICES IN HYPERTENSIVE PATIENTS OF ITAHARI.”**

I have been told in a language that I understand about the study. I have been told that this is for a dissertation procedure, that my and my participation is voluntary and he/she reserve the full right to withdraw from the study at my own initiative at any time without having to give reason and that refresh to participate or withdraw from the study at any stage will not prejudice my/his/her rights and welfare. Confidentiality will be maintained and only be shared for academic purposes.

I hereby give consent to participate in the above study. I am also aware that I can withdraw this consent at any later date, if I wish to. This consent form being signed voluntarily indicates participate in the study until I decide otherwise. I understand that I will receive a signed and dated copy of this form.

I have signed this consent forms before my participation in the study.

Signature of patients \_\_\_\_\_

Sign of witness: \_\_\_\_\_

Date:

Date:

Place:

Place:

I hereby state the study procedures were explained in the detail and all questions were fully and clearly answered to the above mentioned participant /his/her relative.

Investigator's sign:

Date:

Contact address

## Appendix B

### Questionnaire

Full name:

Age: .....yrs

Gender: M /F

Caste:

Ethnic group:

Religion:

Address:

Phone number:

#### Part I. Demographic, sociological and economic information

1. Family type

Nuclear

Joint

2. Education:

Never gone to school (illiterate)

Can read and write simply (1-5)

6 to slc

11-12

Bachelor

Masters degree

3. Occupation

Service

Agriculture

Housewife

foreign employment

Others

4. Marital status

Married

Unmarried others

5. How many people live in your family?.....

6 Are you currently employed?

Yes

No

7 Do anybody in your family have hypertension?

- |                  |             |
|------------------|-------------|
| Grandfather      | Grandmother |
| Father           | Mother      |
| Siblings         | Children    |
| Others (specify) |             |

8. Current blood pressure level?

systolic.....mmHg  
diastolic.....mmHg

9. How long have you been suffered from hypertension?

- |                    |                    |
|--------------------|--------------------|
| Recently diagnosed | Less than 1 year   |
| 1 to 3 years       | 3 to 5 year        |
| 5 to 10 years      | More than 10 years |

## **PART II: KNOWLEDGE RELATED QUESTIONS**

1. Hypertension is a condition which is resulted by:
  - (a) A higher level of blood pressure than normal.
  - (b) A lower level of blood pressure than normal.
  - (c) Either a higher or a lower level of blood pressure than normal.
  - (d) I don't know
2. How do you know you have hypertension?
  - a) headache, dizziness
  - b) pounding in your neck, chest
  - c) during the checkup of other disease
  - d) vision problem
3. Can hypertension be cured?
  - a) It can be curable.
  - b) It cannot be cured.
  - c) Do not know
4. Hypertension if not cured.....
  - a) can lead to heart disease
  - b) can lead to diabetes
  - c) can lead to eye problem
  - d) can lead to kidney problems
  - e) I don't know

f) all of the above

5. In high blood pressure patient, diabetic patient can increase or worsen:

- (a) The risk of heart attack.
- (b) The risk of stroke.
- (c) The risk of eye problems.
- (d) The risk of kidney problems.
- (e) All of above.
- (f) I don't know

6. What lifestyle changes can prevent and treat high blood pressure?(G)

- a) control your blood sugar
- b) limit alcohol consumption and smoking
- c) maintaining healthy body weight
- d) limit salt intake
- e) visiting doctor regularly

7. Normal blood pressure.....

8. What should be the blood pressure level during diabetes?

120/80 mm/hg

130/80 mm/hg

140/80 mm/hg

Do not know

9. What is the major cause of hypertension?

- a) Intake of excess salt
- b) Obesity
- c) Heredity
- d) All of the above
- e) others (specify)

10. What are you doing to control hypertension?

- a) Diet control
- b) Intake of drugs
- c) Regular blood pressure check up
- d) Others(specify)

### **PART III: ATTITUDE RELATED QUESTIONS**

1. Do you do exercise regularly?

a) Yes

b) No

If yes, how often?

(a) Every day      (b) Once weekly      (c) Once monthly

2. Are you following a controlled and planned diet for hypertension?

a) Yes                      (b) No

If yes, how often?

3. Are you taking any drugs for hypertension?

a) Yes                      b) No

4. Do you have any idea about drugs that should be used by hypertensive patients?

a) Yes                      b) No

Name of medicine: (if yes)

If not, then why are not you taking?

- a) Physician didn't suggest me to take drugs if I use drugs, I will be habituated.
- b) I am controlling my diet I am doing physical exercises
- c) I am taking ayurvedic medicine
- d) Others

5. If yes, mention the following

Name of medicine:

Time for medicine:

- |                              |                              |
|------------------------------|------------------------------|
| a) 10-15 minutes before meal | b) 15-30 minutes before meal |
| c) Just before meal          | d) Just after meal           |

6. Do you miss taking the doses of your medication?

a) Yes                      (b) No

If yes how often?

( a) Occasionally      (b) Once a week      (c) Once a month

7. Are you aware of your blood pressure levels fall below normal (low blood pressure) when you are taking drugs?

(a) Yes                      (b) No

If yes, did you at any time experience any of the following symptoms?

- (a) Weakness      (b) Confusion      (c) Visual disturbances      (d) I don't know
8. Do you think you should keep in touch with your physician?  
a) Yes      b) No
9. Does stress cause high blood pressure?  
a) Yes      b) No

#### **PART IV: PRACTICE RELATED QUESTIONS**

1. When was your blood pressure last checked?  
(a) One week ago  
(b) Once every six months  
(c) Once every two months  
(d) Once every month  
(e) Need not check at all  
(f) I don't know
2. When was your last eye examination?  
(a) One month ago  
(b) Six months ago  
(c) One year ago  
(d) Two years ago  
(e) Not done at all
3. When was your last urine examination?  
(a) One month ago  
(b) Six months ago  
(c) One year ago  
(d) Not done at all
4. When was your last visit to your physician?  
(a) One month ago  
(b) Six month ago  
(c) One year ago  
(d) Two years ago  
(e) Not at all

5. When was your blood sugars last checked?  
(a) One month ago  
(b) Six months ago  
(c) One year ago  
(d) Two years ago  
(e) Not done at all
6. When was your lipids last checked?  
(a) One month ago  
(b) Six months ago  
(c) One year ago  
(d) Two years ago  
(e) Not done at all
7. Do you drink alcohol?  
(a) Yes (b) No
8. Do you smoke?  
a) Yes b) No
9. Do you take herbal medicines?  
(a) Yes (b) No

**PART V: Diet Related Questionnaire**

1. Do you eat green leafy vegetables?  
(a) Yes  
(b) Sometimes  
(c) No
2. Do you include salad daily in your meal?  
(a) Yes (b) Sometimes (c) No
3. How much fruit do you eat?  
a) 1 in no daily b) Whenever I get  
c) Whenever I like d) I do not eat
4. How many times do you take food in a day?



- c) It is more
- d) Do not know

## Appendix C Photo gallery of data collection

### Photo Gallery



## Appendix D

Map of the study area

