Illness Perception and Treatment Adherence Among Patients With Hypertension in Nepal

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Abstract

Illness perception is regarded as an important factor associated with treatment adherence among patients with hypertension. This descriptive correlational study aimed to assess the level of illness perception, the level of treatment adherence and the relationship between illness perception and treatment adherence among patients with hypertension. Eighty-five patients with diagnosis of hypertension registered at the out-patient department of Sahid Gangalal National Heart Centre, Bansbari, Kathmandu, Nepal were recruited by using the purposive sampling method. Data were collected using the Demographic and Health Related Data Questionnaire (DHRDQ), the Extended Brief Illness perception questionnaire (EBIPQ) with the Open Ended Questionnaire (OEQ), and the Modified Treatment Adherence Questionnaire for Patients with Hypertension (MTAQPH). The internal consistency was tested before data collection and the values for Cronbach's alpha were .72 for the EBIPQ and .89 for the MTAQPH. Descriptive statistics were used to analyze demographic data, level of illness perception and treatment adherence. Spearman's rank correlation was used to assess relationship between illness perception and treatment adherence.

The mean score for total illness perception was 40.35 (SD = 14.53) representing moderate threatening perception about hypertension. The answers obtained from the OEQ supported the score. The median score for total treatment adherence was 140 (IQR = 17) representing moderate level of treatment adherence. There was a significant positive relationship between illness perception and treatment adherence (r_s = .26, p < .05) among the patients with hypertension. The findings from the study can be used as baseline information to understand illness perception of the patients with hypertension in Nepalese community and then develop illness perception-based interventions to enhance treatment adherence in Nepal.

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Chapter 1

Introduction

In this section, background and significance of the problem, objectives of the study, research questions, research hypothesis, conceptual framework, definition of terms, scope of the study, and significance of the study are presented.

Background and Significance of the Problem

Hypertension is an alarming public health problem and leading cause of death and disability all around the world. The estimated global prevalence of hypertension is 40.7% of total population (Chow et al., 2013). It is projected that hypertension will increase in proportion and reach to 1.56 billion by the year 2025 (Kearney, Whelton, Reynolds, Muntner, et al., 2005). In United States of America, it is stated that one out of every three adults, that is 67 million population have hypertension and more than half of them do not have their blood pressure under control (World Health Organization, 2011). The numbers of adults with uncontrolled hypertension are higher in low and middle income countries, including Nepal (World Health Organization, 2013). A cross sectional study by Vaidya, Pathak, and Pandey (2012) showed that prevalence of hypertension in Nepalese community tripled in 25 years since 1981. The review by Dhital and Karki (2013) reported that the prevalence of hypertension in Nepal ranged from 18.8 % in the year 2003 to highest 33.9 % in the year 2011.

Hypertension is a serious condition which might develop without any known cause but there are various risk factors contributing in occurrence of hypertension,

such as advancing age, gender, race, positive family history, alcohol consumption, smoking, obesity, consumption of salty and fatty diet, and so on. Hypertension causes numerous complications to cardiovascular, renal, visual, and neurological systems, which if not controlled, leads to rapid and progressive end organ damage (Go et al., 2013).

Hypertension is the major modifiable risk factor for heart failure, myocardial infarction and other coronary vascular diseases, and accounts for nearly 45% of deaths caused by cardiovascular disease. Similarly, complications of hypertension associated with stroke alone caused an estimated 9.4 million deaths internationally in 2008 (World Health Organization, 2013). Nevertheless, with proper treatment, this vast number of associated deaths and complications can be hindered by achieving the optimal blood pressure control.

Despite its lifelong, chronic and non-curable nature, hypertension can be alleviated by controlling blood pressure through effective treatment adherence. Hence, it is regarded as utmost important in the area of hypertension. Cohen (2009, p. 33) defined treatment adherence as ‘persistence in practice and maintenance of desired health behaviors and is the result of active participation and agreement.’ Treatment adherence comprises adherence to a holistic treatment approach that includes pharmacological and non-pharmacological management recommended by health care providers (Sabate, 2003). Treatment adherence, in terms of hypertensive patients includes adherence to medication and lifestyle modifications (dietary modifications, moderation of alcohol consumption, smoking cessation, physical exercise and weight maintenance) (Chobanian et al., 2003; Mancia et al., 2013).

Treatment adherence can improve blood pressure control, reduce rates of complications and is reported to prevent hypertensive end organ damage and death

(Chiu & Wong, 2010; Sabate, 2003). Unfortunately, overall treatment adherence is found to be poor, ranging from approximately 20 to 50% (Banning, 2009; Ma, Chen, Zhou, & Huang, 2013; Shaw & Bosworth, 2012). Many studies explored only one aspect of treatment adherence which is medication adherence. Medication adherence is reported to be around 50 to 70% globally (Andrade, Vilas-Boas, Chagas, & Andrade, 2002; Sabate, 2003). Some of the studies reported medication adherence rate to be 50% (Hekler et al., 2008), 39.2% (Sung et al., 2009), and 18.8% (Rajpura & Nayak, 2014). In Nepal, there is no record of studies measuring treatment adherence but adherence to medication ranged from only 35.4% (Khan et al., 2013) to 56.5% (Bhandari et al., 2015).

Treatment adherence can determine the success of every therapeutic regimen (Khan et al., 2013). Hence, identification of determining factors for adherence of hypertensive patients to treatment is of vital importance. Several factors underpinning treatment adherence in patients with hypertension have been studied and identified in previous studies (Hsiao, Chang, & Chen, 2012; Wang, Lau, Loo, Chow, & Thompson, 2014). Treatment adherence was positively associated with age (Kang et al., 2015), hypertension related knowledge (Karakurt & Kaşikçi, 2012; Ramli, Ahmad, & Paraidathathu, 2012), presence of comorbidities (Al-Ramahi, 2015; Karakurt & Kaşikçi, 2012; Wang, Lau, Loo, Chow & Thompson, 2014), duration of hypertension (Dennis et al., 2011; Li, Kuo, Hwang & Hsu, 2012) and illness perception (Kang et al., 2015; Rajpura & Nayak, 2014).

Illness perception is regarded as one of the important modifiable factors positively associated with treatment adherence ($r = .332$, $p < .001$) (Rajpura & Nayak, 2014) as it helps in understanding the adherence from the patient's perspectives. Illness perception refers to the patient's own implicit beliefs about their illness. In

other words, it is the cognitive illness representation of an individual's idea along the five dimensions (identity, cause, timeline, consequences and cure/ control of illness) and emotional illness representation (Leventhal et al., 1997). The study by Leventhal, Meyer, and Nerenz (1980) has confirmed that the Common Sense Model (CSM) is useful in exploring the illness perception and that illness perception in turn influences the coping outcome of an individual. Treatment adherence can be conceptualized as coping strategy (problem-focused coping) of the individual to the hypertension in this study. Patients might have their own view about hypertension which influences their decisions to regulate the treatment adherence behaviors and thereby making the illness perception an essential factor influencing treatment adherence (Chen, Tsai, & Lee, 2009; Hsiao, Chang, & Chen, 2012).

However, only a few studies addressed illness perception in hypertensive patients and most of these scientific studies were conducted in the western and/ or developed countries, such as Taiwan (Chen, Tsai & Chou, 2011; Hsiao et al., 2012) and America (Kucukarslan, 2012; Ross, Walker, & MacLeod, 2004). There is no record of any such studies in Nepal till date. Lifestyle (salty, spicy and oily diet), culture (their belief in traditional and herbal medicines), health care accessibility, education system, and living standards in Nepal are largely different from other countries. The culture, traditions and religious rituals in Nepal strongly influence the lifestyle of people in Nepal and their belief about illness (Oli, Vaidya, Subedi, & Krettek, 2014). Therefore, the findings from previous studies might not be generalized with the hypertensive patients in Nepal, suggesting that associations between illness perception and treatment adherence in hypertensive patients are yet to be explored in Nepal.

Moreover, treatment adherence is multidimensional but the majority of previous literature only focused on association between illness perception and only one component, medication taking behavior of patients with hypertension (Hekler et al., 2008; Hsiao et al., 2012; Kang et al., 2015; Kucukarslan, 2012; Rajpura & Nayak, 2014; Ross et al., 2004). The treatment guidelines for hypertension stated that components of lifestyle modifications play equally important role in the management of hypertension (Chobanian et al., 2003; Mancia et al., 2013). Hence, health care providers, particularly nurses are responsible to reinforce lifestyle modifications along with medication adherence. Nevertheless, no empirical evidence has been found for the relationship between the overall dimensions of treatment adherence and cognitive and emotional dimensions of CSM. Hence, there is a need for a study assessing the relationship between illness perception and treatment adherence based on the CSM in patients with hypertension.

Therefore, the researcher was interested to explore patient's illness perception and its relationship with treatment adherence in patients with hypertension in the developing country like Nepal where such study has never been attempted despite the rising prevalence of hypertension. This study might offer health care providers important information for designing the intervention to improve treatment adherence in patients with hypertension in the future.

Objectives of the Study

The objectives of the study are as follows:

1. To identify the level of illness perception in patients with hypertension in Nepal

2. To identify the level of treatment adherence in patients with hypertension in Nepal

3. To examine the relationship between illness perception and treatment adherence in patients with hypertension in Nepal

Research Questions

The research questions for the study are as follows:

1. What is the level of illness perception in patients with hypertension in Nepal?

2. What is the level of treatment adherence in patients with hypertension in Nepal?

3. Is there a relationship between illness perception and treatment adherence in patients with hypertension in Nepal?

Conceptual Framework of the Study

The conceptual framework for this study is derived from the Common Sense Model for illness proposed by Leventhal, Diefenbach, and Leventhal (1992), and treatment guidelines for hypertension provided by the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC) - 7 (Chobanian et al., 2003) and the European Society of Hypertension and of the European Society of Cardiology (ESH/ ESC) (Mancia et al., 2013).

The Common Sense Model (CSM) of illness, also synonymously known as self-regulatory model, is based on the assumption that every human individual when faced with a health threat or illness, they address the threat by adopting coping strategies based on what they perceive and believe as appropriate and necessary. In other words, individuals process, assimilate and integrate information related to the health threat creating own perspective or view of the illness which guides their coping behavior and appraisal (Leventhal et al., 1997).

The CSM comprises two independently occurring parallel processing systems known as, cognitive illness representations and emotional illness representations. Cognitive illness representations are an individual's objective or knowledge-based representation of health threat reflecting how he/ she understands or conceptualizes health threat. They are generated from interpretation of information assimilated from his/ her past and present knowledge, experience and communication with others, and guides cognitive-focused coping. Emotional representations are psychologically subjective response to the health threats and reflect their affective associations and responses to the cognitive-based illness representations and leads to emotion-focused coping. When an individual experience an illness, cognitive representations and emotional representations of the illness, or illness perception is constructed which

influence the coping procedures (Leventhal et al., 1992; Leventhal, Meyer, & Nerenz, 1980).

Coping procedure refers to the health behaviors and strategies adopted by patients to deal with the physical and psychological effect of an illness. The change in illness perception influences the selection of coping such as avoidance/ denial, cognitive reappraisal, expressions of emotions, problem-focused coping and social support seeking (Hagger & Orbell, 2003)

Leventhal, Brissette, and Leventhal (2003) defined five dimensions of cognitive illness representations that shape the coping procedures. They are: identity, cause, timeline, consequences and cure/ control. Identity refers to the label or symptoms an individual associates with the disease, cause refers to the individual's belief about etiology of disease, timeline refers to the individuals' belief about the duration of disease, consequences refers to belief about the impact of the disease on the individuals' life, belief about the course and time period of illness, and cure/ control refers to belief about whether something can be done to recover from the illness and efficacy of the treatment. New studies on illness perception modified the original scale by adding two dimensions of emotional representations: concern and emotion (Broadbent, Petrie, Main, & Weinman, 2006). Concern refers to the individual's perceived problem aroused from illness and emotion refers to the individual's affected feelings or response about the illness. Moss-Morris et al. (2002) have extended the assessments of illness perception by adding a dimension, illness coherence. Coherence refers to the individual's degree of understanding or comprehension about the illness.

Treatment adherence refers to carrying out required pharmacological and non-pharmacological behaviors continuously and persistently along with voluntary

willingness and active participation (Cohen, 2009), which contributes in achieving better health outcomes. In terms of patients with hypertension, treatment adherence includes adherence to behaviors, such as medication, dietary sodium restriction, adopting Dietary Approaches to Stop Hypertension (DASH) eating plan, moderating alcohol consumption, smoking cessation, performing exercise and weight maintenance (Mancia et al., 2013; Chobanian et al., 2003). This treatment adherence can be conceptualized as patient's coping strategy (specific problem-focused coping) influenced by illness perception (Hagger & Orbell, 2003, p. 163).

Figure 1 depicts conceptual framework of the study which is based on the Common Sense Model of illness and the treatment guidelines of hypertension provided by JNC-7 (2003) and ESH/ ESC Guidelines (2013). Treatment adherence in patients with hypertension (adherence to medication, dietary sodium restriction, adopting DASH eating plan, moderating alcohol consumption, smoking cessation, performing exercise and weight maintenance) is the specific problem-focused coping adopted by the patients which is influenced by their illness perception related to hypertension along the dimensions: identity, timeline, consequences, cause, cure/ control, concern, emotion and coherence.

In conclusion, the present study focused on patients' illness perception about hypertension which possibly influences their problem-focused coping namely, treatment adherence.

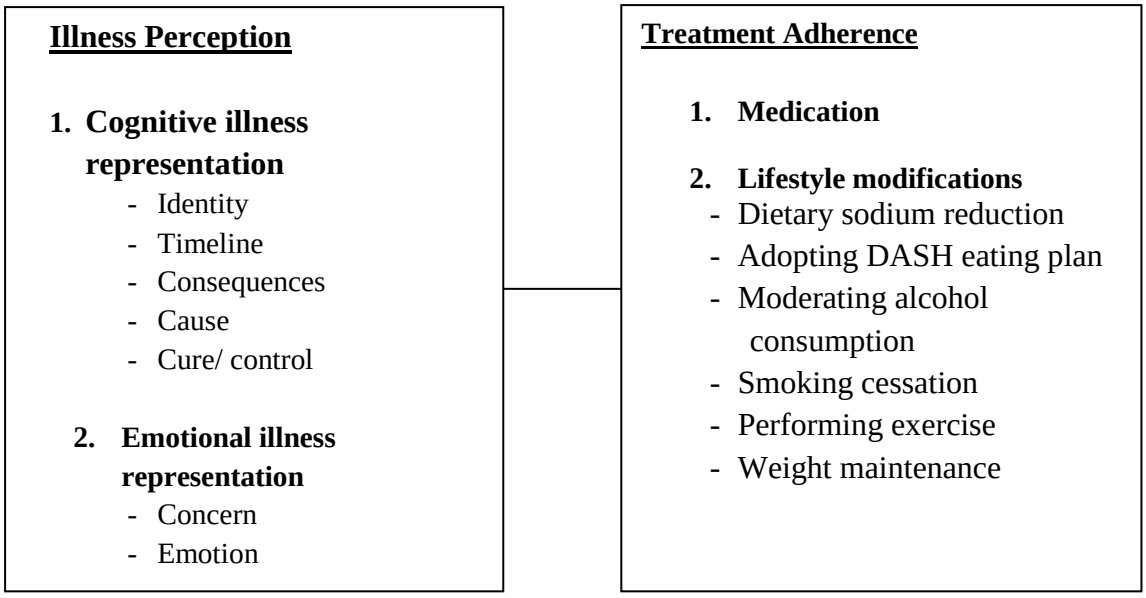

Figure 1: Conceptual Framework of the Study

Research Hypothesis

The research hypothesis for the study is as follows:

There is positive relationship between illness perception and treatment adherence in patients with hypertension in Nepal.

Definition of the Terms

Illness perception. Illness perception refers to patient's integrative cognitive belief and emotional response about the hypertension that affect patients' problem-focused coping with hypertension along the dimensions: identity, cause, timeline, consequences, cure/ control, concern, coherence and emotion. Identity refers to the symptoms he/ she experiences or the label the individual associates with the hypertension, cause refers to the belief about the etiology of the hypertension, timeline refers to the patients' belief about the duration of hypertension, consequences

refers to belief about the impact of the hypertension on the patients' life, belief about the course of and time period of hypertension, cure/ control refers to belief about whether something can be done to recover from hypertension and efficacy of the treatment, concern refers to something the patient thinks is a problem aroused from hypertension that needs attention, coherence refers to degree of understanding about hypertension and emotion refers to feelings or response aroused in the patient by hypertension. Illness perception is measured by using the Extended Brief Illness Perception Questionnaire (EBIPQ) adapted from Broadbent, Petrie, Main, and Weinman (2006). Higher score from the tool indicates higher threatening illness perception about hypertension.

Treatment adherence. Treatment adherence refers to problem-focused coping behavior of patients with hypertension in actively participating with voluntary willingness and persisting to the health care provider's recommendations on treatment of hypertension which includes medication taking, dietary sodium restriction, adoption of DASH eating plan, moderation of alcohol consumption, smoking cessation, performing exercise and weight maintenance. Treatment adherence is assessed by using the Modified Treatment Adherence Questionnaire for Patients with Hypertension (MTAQPH) adapted from Ma, Chen, You, Luo, and Xing (2012). Higher score indicates that a patient has higher treatment adherence.

Scope of the Study

This study was conducted to identify the level of illness perception and treatment adherence among patients with hypertension and to examine the relationship between illness perception and treatment adherence in patients with hypertension in Nepal. The patients visiting the out-patient department of Sahid

Gangalal National Heart Centre, Kathmandu between the months of January and March, 2016 were recruited for this study.

Significance of the Study

The findings from this study, as being the first in this area in Nepal can be used as basic information regarding the direction of relationship between illness perception and treatment adherence for designing the interventional studies that aim to enhance treatment adherence behaviors among patients with hypertension in future. Furthermore, the study will help to explore and understand the perception of hypertension in the context of Nepalese community, which benefits nurses in dealing with patients with hypertension and minimizing the barriers to treatment adherence. As a final point, the study aids in alleviating the problem of non-adherent patients with hypertension and thereby helps in preventing the burden of complications caused by uncontrolled hypertension in developing countries like Nepal.

Chapter 2

Literature Review

In the section of literature review, details on hypertension, treatment adherence, illness perception, the common sense model and interrelationship between them will be addressed. The review will cover the following topics:

1. Overview of Hypertension
    1.1 Definition of hypertension
    1.2 Types of hypertension
    1.3 Risk factors contributing to hypertension
    1.4 Treatment for hypertension
    1.5 Situation of hypertension in Nepal
    1.6 Health care system for patients with hypertension in Nepal
2. Overview of Nepalese Community
3. Treatment Adherence Among Patients With Hypertension
    3.1 Definition of treatment adherence
    3.2 Dimensions of treatment adherence
    3.3 Impact of treatment adherence
    3.4 Factors associated to treatment adherence
    3.5 Measurement of treatment adherence
4. The Common Sense Model (CSM) of Illness Perception
    4.1 Overview of CSM
    4.2 Measurement of illness perception

4.3 Illness perception among patients with hypertension

5. Relationship Between Illness Perception and Treatment Adherence Among Patients With Hypertension
6. Summary of Literature Review

Overview of Hypertension

Definition of hypertension. The correct definition of hypertension is still argued by experts due to the debatable level of blood pressure (BP) that is considered as abnormal. Even though the level of BP of 140/90 (systolic/diastolic) mmHg is considered as universal cut-off point for hypertension, some still argue that it is arbitrary as it would be obviously irrational to leave a patient with the BP of 139/ 89 mmHg unattended when he/ she is not hypertensive as per the standard classification (Kaplan & Victor, 2010). Operationally, hypertension is defined as systolic blood pressure equal to or higher than 140 mmHg with or without diastolic blood pressure equal to or higher than 90 mmHg (Mancia et al., 2013).

The Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC) has established a classification for hypertension with various levels of BP which can be used as criteria for medical practice and therapy. The JNC-6 divided hypertension into 7 categories according to levels of BP as follows: optimal (< 120/ 80 mmHg), normal (120-129 mmHg/ 80-84 mmHg), borderline (130-139 mmHg/ 85-89 mmHg), hypertension stage 1 (140-159 mmHg/ 90-99 mmHg), hypertension stage II (160-179 mmHg/ 100-109 mmHg) and hypertension stage III (≥ 180/ 110 mmHg) (Kaplan & Victor, 2010). In JNC-7, the normal and borderline levels of BP (i.e. BP ranging from 120 to 139 mmHg/ 80 to 89 mmHg) were classified as prehypertension and defined as the individuals at high risk

of developing hypertension (Chobanian et al., 2003). The JNC- 8 continued the definition of hypertension and prehypertension as in JNC-7 (James et al., 2014).

The treatment guidelines by ESH/ ESC had also classified blood pressure levels into 7 categories for the patients belonging to three different age groups (young, middle aged and older adulthood) as mentioned below (Mancia et al., 2013):

1) Optimal blood pressure is defined as systolic blood pressure (SBP) below 120 mmHg and diastolic blood pressure below 80 mmHg.

2) Normal blood pressure is defined as systolic blood pressure 120-129 mmHg and diastolic blood pressure (DBP) 80-84 mmHg.

3) High normal blood pressure is defined as systolic blood pressure 130-139 mmHg and diastolic blood pressure 85-89 mmHg.

4) Grade 1 hypertension is defined as systolic blood pressure 140-159 mmHg and diastolic blood pressure 90-99 mmHg.

5) Grade 2 hypertension is defined as systolic blood pressure 160-179 mmHg and diastolic blood pressure 100-109 mmHg.

6) Grade 3 hypertension is defined as systolic blood pressure above or equal to 180 mmHg and diastolic blood pressure above or equal to 110 mmHg

7) Isolated systolic hypertension is defined as systolic blood pressure above or equal to 140 mmHg and diastolic blood pressure below 90 mmHg.

In this study, hypertension will be defined as systolic blood pressure equal to or higher than 140 mmHg with or without diastolic blood pressure equal to or higher than 90 mmHg as per JNC-7 and ESC guidelines.

Types of hypertension. Hypertension can be classified into two major types according to the cause as: primary hypertension and secondary hypertension.

Primary, idiopathic or essential hypertension. It is the type of hypertension whose cause is unknown and when the blood pressure rises without the presence of any pathological condition. It is estimated that 90% to 95 % of cases of hypertension are primary and cannot be treated completely (Dewit & Kumagai, 2013).

Secondary hypertension. It is the type of hypertension that develops due to the presence of another disease such as renovascular disease, sickle cell disease, arteriosclerosis, coarctation of aorta and aortis endocrine diseases, neurologic diseases, etc. Acute stress, excessive alcohol intake, and use of drugs including amphetamines, non- steroidal inflammatory drugs can cause secondary hypertension. The contraceptive hormonal drugs can also cause increase in blood pressure in some cases. The next important cause of the secondary hypertension is reported to be eclampsia induced by pregnancy. Secondary hypertension can be treated by eliminating the underlying disorder (Dewit & Kumagai, 2013; Kaplan & Victor, 2010).

Risk factors contributing to hypertension. As discussed in earlier section, 90 % of the cases of hypertension is caused by unknown factors. However the risk factors of the primary hypertension can be identified and broadly categorized into two types: non-modifiable and modifiable risk factors.

Non-modifiable risk factors are age, gender, ethnicity or race and family history. Modifiable risk factors are alcohol consumption, cigarette smoking, diabetes, obesity, stress, elevated serum lipids, excess dietary sodium and lower socio-economic status.

Age. Older age is the significant risk factor for developing hypertension. The prevalence of HTN was found to be highest in the age group of 60 to 69 years (Erem,

Hacihasanoglu, Kocak, Deger, & Topbas, 2009). Zhang et al. (2013) reported that the systolic blood pressure was comparatively lower in the age group of 50 to 59 years than the population over 60 years. Also, age above 35 years was significantly associated with hypertension (Kaur, Rao, Radhakrishnan, Rajasekar, & Gupte, 2012).

Gender. Gender is considered as one of the factors associated with the occurrence of hypertension in the population older than 55 years, hypertension is more prevalent in females than males. For the age group below 55 years, hypertension is found to be higher in males than females (Dewit & Kumagai, 2013). Hajjar, Kotchen, and Kotchen (2006) illuminated that women have higher blood pressure after menopause. However, there was no statistically significant difference in blood pressure between men and women in the Chinese population (Zhang et al., 2013).

Ethnicity/ race. Race is also found to be associated with the occurrence of hypertension. Hypertension incidence was found to be more common in African American population than in other white population and minority groups (Dewit & Kumagai, 2013). Hajjar et al. (2006) indicated that the higher prevalence of hypertension in African Americans was related to obesity, excessive exposure to socioeconomic stressors, diet, and genetic factors.

Family history. Blood pressure is higher in people who have positive family history of hypertension. The person who has close relatives with hypertension had two fold higher risks for hypertension than the person without any family history (Hajjar et al., 2006). The family history of higher blood pressure increased the risk of developing hypertension as reported in the study conducted in Chinese population (*OR*= 1) (Zhang et al., 2013). Family history of hypertension showed significant association with hypertension in univariate analysis in a study in India by Kaur et al.

(2012). Also in another study in India by Madhumitha et al. (2014) family history was significantly associated with higher blood pressure (p = .009).

Alcohol consumption. Heavy alcoholics are reported to have a strong association with the occurrence of hypertension (Dewit & Kumagai, 2013). Alcohol consumption was reported to be significantly associated with hypertension in many studies (Erem et al., 2009; Madhumitha et al., 2014) and was the significant predictor of hypertension in population of China (Zhang et al., 2013).

Smoking. Smoking increases the risk for hypertension as the nicotine contained in cigarette develops arteriosclerosis and then contributes to hypertension (Dewit & Kumagai, 2013). Smoking tobacco or cigarette was positively associated with developing hypertension (Madhumitha et al., 2014; Zhang et al., 2013). Conversely, a study by Erem et al. (2009) determined that hypertension was more common in the non-smokers and ex-smokers than in the smokers.

Diabetes. Diabetes is closely associated with higher blood pressure. It was reported that the prevalence of hypertension is two times higher in diabetic population than non-diabetic population (Dewit & Kumagai, 2013). Nevertheless, the study on Chinese by Zhang et al. (2013) found that hypertension was not associated with diabetes mellitus.

Obesity. The risk for hypertension is predicted to be higher in people having central obesity (Dewit & Kumagai, 2013; Kaur et al., 2012). Similarly, overweight or obesity was identified as a significant risk factor of developing high blood pressure (OR > 1.0) (Zhang et al., 2013). Prevalence of hypertension was reported to be accelerated with the degree of obesity in a study by Erem et al. (2009). Loss of weight alone is anticipated to decrease the elevated blood pressure to normal (Dewit & Kumagai, 2013).

Stress. Excessive stress responses are assumed to increase the risk for hypertension due to its pathologic effect of increasing peripheral vascular response and thereby stimulating sympathetic nervous system activity (Dewit & Kumagai, 2013). Repeated exposure to any kind of psychogenic stresses steadily enhances the risk of developing hypertension (Kaplan & Victor, 2010).

Diet (excessive sodium and fat). Excessive intake of sodium and cholesterol in diet are regarded as the risk factors for hypertension. Elevated lipids in serum enhance the risk for athelesclerosis and contribute to hypertension (Dewit & Kumagai, 2013). Hypertension was positively associated with salt intake of more than 6 grams per day ($p = .009$) which clarifies that the risk of hypertension increases with the increment in sodium intake. Also, the significant association of hypertension was established with the less consumption of dietary vegetables and fruits ($p = .0001$ and $p = .06$ respectively) (Madhumitha et al., 2014).

Physical inactivity. Physical exercise was found to be significantly negatively associated with the prevalence of hypertension ($p < .0001$) indicating that decreased activity or lack of exercise increases the risk of developing hypertension (Erem et al., 2009). However, a study by Madhumitha et al. (2014) did not find significant association with physical activity.

Treatment for hypertension. The recommendations for the management of hypertension in adults provided by the U.S seventh (JNC-7)and eighth Joint Committee (JNC-8) and ESH/ ESC are followed globally for the treatment of hypertension (James et al., 2014). The JNC-8 provides nine evidence-based recommendations for the treatment of high blood pressure along with the new

algorithm that summarizes the guidelines for the management of all the categories of patients with hypertension.

The JNC-8 algorithm is suitable to use in the adults aged above 18 years with hypertension. Based on the algorithm, the treatment for hypertension can be categorized into two groups: pharmacological management or medication and non-pharmacological management or lifestyle modifications.

***Pharmacological management or medication*.** The JNC-8 recommends the use of 4 specific classes of antihypertensive drugs for the initial treatment of hypertension which are thiazide type diuretics, Angiotensin Converting Enzyme Inhibitor (ACEI), Angiotensin Receptor Blocker (ARB), and Calcium Channel Blocker (CCB).

Thiazide diuretics. The thiazide diuretics works by preventing the reabsorption of sodium and chloride in the initial segment of distal convoluted tubule in nephron resulting in increase in urine volume and reduction in plasma and extracellular fluid volume. Thus, cardiac output falls causing decrease in blood pressure (Kaplan & Victor, 2010). These diuretics are recommended as one of the first line drug choice in general black and non-black population, including those with diabetes. Moreover, these diuretic are recommended over ACEI in black population for their efficacy in improving cerebrovascular and cardiovascular outcomes, including heart failure. The drugs enlisted in the group of thiazide diuretics are Bendroflumethiazide, Chlorthalodone, Hydrochlorothiazide and Indapamide (James et al., 2014).

Angiotensin Converting Enzyme inhibitor (ACEI). ACEI helps in decreasing blood pressure by acting on the renin angiotensin aldosterone system (RAAS) in the body in various ways. Firstly, the ACEI inhibits the action of the Angiotensin converting enzyme (ACE) of converting Angiotensin I into Angiotensin II. Secondly

it reduces the secretion of renin from the juxtaglomerular cells. The third way is its ability to directly inhibit the activity of renin. Angiotensin II causes vasoconstriction, promotes release of aldosterone from adrenal cortex and ADH secretion from pituitary gland, improves sympathetic activity and facilitates tubular reabsorption of Na and Cl and also the retention of water. Thus, blood pressure is lowered following the inhibition of release of Angiotensin II (Kaplan & Victor, 2010). ACEI can be used as initial therapy in the general non-black population, including those with diabetes and CKD. Moreover, ACEI was specifically shown to effectively improve kidney outcomes in those patients with CKD and hypertension. Captopril, Enalapril and Lisinopril are the drugs included in this group (James et al., 2014). The possible side effects of ACEI are first dose hypotension, hyperkalemia, hypoglycemia, cough and bronchospasm, angioedema, interference with erythropoietin and deterioration of renal function (Kaplan & Victor, 2010).

Angiotensin II Receptor Blocker (ARB). ARB's act on the specific Angiotensin II (AII) type 1 (AT1) receptor. They displace AII from AT1 receptor and antagonize all the actions of AII such as vasoconstriction, aldosterone release, sympathetic activation, et cetera as discussed earlier and helps in decreasing blood pressure. No difference has been reported regarding the difference between ACEI and ARB's efficacy in treating hypertension (Kaplan & Victor, 2010). The JNC -8 uses ACEI and ARB interchangeably and all the recommendations for the use ARBs follow those for ACEI. Nevertheless, it is recommended to avoid combined use of ACEI and ARB together. There are 5 drugs enlisted under the group ARBs which are Eprosartan, Candesartan, Losartan, Valsartan and Irbesartan (James et al., 2014). It is reported that there is rare occurrence of rash, acute nephritis and candesaran, angioedema with the use of ARBs (Kaplan & Victor, 2010).

Calcium Channel Blocker (CCB). CCBs help to reduce calcium entry into vascular smooth muscle cells by interacting with the L-type voltage operated plasma membrane channel and cell membranes, which promotes vasodilation, inhibits AV conduction, depresses cardiac contractility or improves endothelial function resulting in the relaxation of smooth muscle. Hence, blood pressure is reduced due to decreases in cardiac output and heart beat (Kaplan & Victor, 2010). CCBs were found to be as potent as thiazide diuretics in improving the cerebrovascular, cardiovascular and renal outcomes except for heart failure outcomes in hypertensive Black population. However, CCBs are recommended as initial antihypertensive treatment along with thiazide diuretics over ACEI or ARBs, especially in Black population. The drugs included in this group are Amlodipine, Diltiazem extended release and Nitrendipine (James et al., 2014). The common side effects of CCBs are headaches, flushing, tachycardia and local ankle edema. Gingival hyperplasia, eye pain and cutaneous reactions were rarely reported in patients using this drug (Kaplan & Victor, 2010).

The antihypertensive medications are recommended to be initiated and adjusted based on age, diabetes, and kidney disease or other comorbidities. The drug treatment titration strategy is provided by the JNC-8 for the ease of clinical practice. It is recommended to maximize first line medication before adding second. However, the second medication group needs to be added before reaching the maximum dose of first medication. It is also recommended to start with 2 medications separately or as fixed dose combination drugs (single pill combination) together. Along with the pharmacological strategies, in order to reach goal blood pressure, lifestyle modifications are also encouraged (James et al., 2014).

Non-pharmacological management or lifestyle modifications. Lifestyle modification is recommended to continue throughout the management of

hypertension irrespective of the target BP goal, age, or presence of comorbidities in all population with hypertension. The primacy to follow lifestyle interventions was emphasized in the JNC- 8. Lifestyle modification was confirmed to promote BP control and decrease the number of antihypertensive medicine. The JNC-8 did not discuss the details of lifestyle treatment. Hence, other standard guidelines discussing the recommendations for the lifestyle modifications were reviewed and the components for non-pharmacological management were synthesized.

Based on the ESH/ ESC Guidelines (2013), JNC-7 (Chobanian et al., 2003) and recommendations by Lifestyle Work (Eckel et al., 2013), the lifestyle management that should be followed by patients with hypertension are: dietary sodium reduction, adopting DASH eating plan, moderating alcohol consumption, smoking cessation, performing exercise and weight maintenance.

Dietary sodium reduction. The positive relationship between lower sodium intake and reduced BP has been validated with strong evidences. With the reduction of dietary sodium intake, BP significantly decreased in the both older and young populations with hypertension and the progression of pre-hypertension to hypertension was prevented (Kaplan & Victor, 2010). Dietary sodium is suggested to be consumed not more than 2.4 gm of sodium in a day. The rate of BP reduction accelerates as the rate of sodium intake is decreased further. Moreover, it is strongly recommended to combine the DASH food plan with the low salt diet plan to get the best result of reduced BP from dietary modifications. To maintain the dietary sodium reduction for a long term in overall population, it is recommended to design the behavior educational interventions encouraging the various measures of sodium reduction (Chobanian et al., 2003; Eckel et al., 2013; Kaplan & Victor, 2010).

Adopting DASH eating plan. Dietary Approach to Stop Hypertension (DASH) is an eating plan rich in fruits, vegetables and whole grains including low fat dairy products, poultry, fish, legumes, et cetera, excluding sweets, sugar-sweetened beverages and red meats. Furthermore, it contains minimum dietary cholesterol, saturated and total fat while rich in potassium, magnesium, calcium and including protein and fiber content. It is reported that DASH helps patients with hypertension to reduce the SBP by 8 to 14 mmHg. The DASH diet lowered SBP by 5-6 mmHg and DBP by 3 mmHg (Chobanian et al., 2003; Eckel et al., 2013).

Moderating alcohol consumption. The JNC-4 does not recommend on the restriction of alcohol consumption completely but suggest limiting the alcohol drinking by less than two drinks in a day for men and less than one drink for women. The moderation of alcohol was associated with significant reduction of SBP by 2 to 4 mmHg (Chobanian et al., 2003). Two drinks of alcohol or usual portion is equal to 12 oz of beer, 4 oz of wine and 1.5 oz of whisky and contains about 10 to 12 ml of alcohol. Drinking more than 3 portions in a day is found to raise the blood pressure whereas drinking only one portion in a day was not associated with increase in BP. It is strongly recommended to avoid binge drinking and also, though there is adequate evidence for the benefits of protective drinking, it is not recommended to start drinking for non-drinkers. For moderate drinkers, it is suggested to carefully assess their alcohol intake and not to drink in empty stomach (Kaplan & Victor, 2010).

Smoking cessation. Smoking cessation was added by ESH/ ESC Guidelines (2013) as one of the mandatory lifestyle measure that patients with hypertension need to follow along with above lifestyle modifications. Cigarette smoking raises the ambulatory blood pressure and heart rate due to the stimulation of the sympathetic nervous system. BP values were found to be higher in hypertensive patients who

smoke than those who do not smoke. Hence, it is recommended to counsel all the hypertensive smokers to quit smoking and help them in the process (Mancia et al., 2013).

Performing exercise. Aerobic physical activity is beneficial among adults with BP of any class as it can decrease both SBP (2-5 mmHg) and DBP (1-4 mmHg). Aerobic physical activity may include moderate to vigorous physical activity regarded as tolerable by patients, for 12 weeks. The duration of exercise is recommended to be about 40 minutes per session with at least 3 to 4 sessions in a week (Eckel et al., 2013). Alternatively, the aerobic physical activity like daily walking, swimming or jogging for 30 minutes is reported to decrease the SBP by 4- 9 mmHg (Chobanian et al., 2003). Also, it is encouraged to combine the physical exercise and health nutrition in lifestyle in order to achieve optimum results (Eckel et al., 2013).

*Weight maintenance***.** As discussed earlier, as obesity is one of the risk factor of hypertension, weight loss of less than 10 lbs. (4.5 kg) is reported to be successful in reducing and preventing hypertension. The BMI more than 30 is regarded as obese and the BMI more than 25 is considered as overweight. Hence, it is recommended to maintain the normal body weight with BMI within the range of 18.5 to 24.9 which is assumed to reduce SBP by 5 to 200 mmHg/ 10 kg (Chobanian et al., 2003). A structured low calorie diet and regular programmed physical activity is recommended in order to lose weight successfully (Kaplan & Victor, 2010).

Situation of hypertension in Nepal. Nepal is regarded as one of the low and middle income countries where the number of patients with undiagnosed, untreated and uncontrolled hypertension is higher than in western developed countries (World Health Organization, 2013). The mean prevalence of hypertension of the countries

that belongs to the South Asian Association for regional Corporation (SAARC) region was reported as 27%. The SAARC is home to seven countries in the south Asia, including Nepal. It was highlighted in a study that according to the recent WHO data, hypertension is estimated to be higher in the SAARC region. The mean prevalence of hypertension calculated for each country from the studies conducted after 2000 revealed that, prevalence is second highest in Nepal (29.72 %) among seven countries after India (30.35%) (Neupane et al., 2014).

Vaidya et al. (2012) conducted a cross-sectional study to make a comparison of the prevalence of hypertension in the capital city of Nepal, Kathmandu in 1981 and 2006. In 1981, a study was conducted in order to determine the prevalence of hypertension in rural Kathmandu. A repeat survey conducted after 25 years in the same community showed a robust evidence of the increasing trend of hypertension in Nepal. The study revealed that within the time period of 25 years, hypertension in Nepalese population increased by threefold. The prevalence of hypertension in outskirts of Kathmandu valley was only 6% in 1981 which boomed up to 18% in 2006.

Hypertension prevalence studied in the year 2011 in the central region of Nepal reported overall prevalence to be 22.4% (32.7% in men and 15.3% in women) (Chataut, Adhikari, & Sinha, 2011). Also, the study by Dhital and Karki (2013) reviewed the trend of hypertension in Nepal which included nine studies from different regions of Nepal from 2003 to 2011. The prevalence of hypertension ranged from 18.8 % in 2003 to 33.9% in 2011 indicating an increasing trend.

Dhungana (2013) described the presence of several risk factors contributing to the development of high blood pressure in Nepal. Sedentary lifestyle and newly developed fast food culture in Nepalese population might be the reasons behind the

rising hypertension. Moreover, the prevalence of alcohol consumption and smoking was found to be high in Nepal. About 40 % of males and 17 % of females were indulgent to alcohol which was highest among the South Asian countries. Similarly, about one fifth of the Nepalese were daily smokers and interestingly, the prevalence of smoking among the women in Nepal was highest among South Asian countries (World Health Organization, 2011).

Health care system for patients with hypertension in Nepal. Nepal's current health care system is focused on the management of acute illnesses and communicable diseases. Although, the prevalence of cardiovascular diseases (CVD's), especially hypertension and its risk factors is reported to be higher in current context of Nepal, there is lack of systematic health policy to deal with the challenges surfaced from it. With increasing demand to address the risk of cardiovascular disease, a draft policy addressing non-communicable diseases (NCDs) has been prepared. Unfortunately, it has not been adopted by the government of Nepal (Dhital & Karki, 2013) and still in the process of review for implementation. The draft policy does not specify the treatment guidelines for hypertension specifically but includes the health policy and targets for minimizing risk of CVDs in overall. Hence, the health care providers follow the international guidelines for the management of patients with hypertension in Nepal.

The specific policy for the treatment of hypertension is not existent in Nepal. Patients are treated and covered as per the general health care system of Nepal. The health care delivery system of Nepal is run under the Ministry of Health, Department of Health Services (DoHS). DoHS delivers preventive, promotive, diagnostic and curative health services to overall population of Nepal. The Sub-Health Post (SHP) in

each Village Development Committee is the basic unit and first contact point for basic health services in rural areas. From the SHP there is referral hierarchy to tertiary level designed in a way that majority of patients receive the appropriate treatment in accessible places for patients. If the patients need further treatment, SHP refers those patients to Health Post or to Primary Health Care Centre which are also the basic units of health care delivery system and considered as the primary level. The next level of referral is District level which comprises District Hospital with in-patient facility and serves as secondary level of health delivery. Above this, there are zonal sub regional and regional hospitals. Finally, tertiary level of care is delivered at central hospitals for the patients in need (Department of Health Servies, 2015). In urban areas, tertiary and regional hospitals are the first contact point for health services.

The patients with hypertension seek for their treatment at any of these levels as per their convenience and stage of hypertension. When patients with hypertension seek for health check-up at any of these health centers, they are attended by the physician or medical officer in out-patient department. The confirmation for the diagnosis of hypertension is made as per the blood pressure measurement and laboratory investigations. The physician decides the further therapeutic treatment for patients. Patients are usually placed on antihypertensive drugs and counselled for lifestyle modifications and advised for follow- up visit after 1 to 3 months according to their condition. The nurses are responsible in counselling the patient about their medication and the ways for lifestyle modifications. The free essential healthcare services (EHCS) program of the Nepal Government only provides free basic care services (blood pressure measurement for hypertensive patients) and limited free essential medicines (atenolol for hypertensive patients at district level) (Adhikari,

2013). For all other services, such as, hypertensive medicines, doctor's visits, lab investigations or hospitalization, patients have to pay by themselves (Magar, 2013).

Overview of Nepalese Community

The culture of Nepal is largely influenced by ethnicity and religion. Nepal is known as country with ethnic diversity. The ethnicity prevailed from ancient times when all Nepalese were socially defined by the caste system. This caste system was categorized into five broad groups according to the occupation and social status as: the Brahmins (priests), the Kshetriyas (kings and warriors), the Vaisyas (traders and businessman), the Sudras (peasants and laborers) and the untouchables (defiling jobs) (Bennett, Dahal, & Govindasamy, 2008). Under these groups, there are 125 varieties of ethnicity spreading all over the country (Government of Nepal Central Bureau of Statistics, 2012). Nevertheless, the rigidity of the occupation and social status based on caste system in Nepal is gradually eroding. According to the Census 2011, the ethnic group that forms the majority of population are: the Kshatriyas, the Brahmins, the Magars, the Tharus, the Tamangs, the Newars and the Kamis (Government of Nepal Central Bureau of Statistics, 2012). As the ethnicity portrays the occupation and social status of people, it largely influences the lifestyle of people in Nepal.

Similarly, religion plays a profound role in Nepalese lifestyle. The higher proportion of Nepalese community follows Hindu religion followed by Buddhism. The minority of population follow other religions such as Islam, Kirant and Christian (Government of Nepal Central Bureau of Statistics, 2012). Hinduism predominantly influences the social structure and tradition of the country. However, harmony among all people in all religions is prevalent, particularly between Hindus and Buddhists (Kandel, 2011). The numerous traditions, festivals, food in daily life and life events

including practices related to illness, medicine and health care are prevalent in Nepal and are leveraged by religious beliefs (Culture of Nepal Forum, 2016). Hence, Nepalese were found to be inclined towards varieties of health practices such as animistic and shamanic traditions, ayurvedic medicine practice and allopathic or western medicine or combination of these categories (Wasti, Randall, Simkhada, & Teijlingen, 2011). Modern allopathic medicine was regarded as practiced by people of higher status only. Nevertheless, during the last fifty years, the modern medicine practices are dominating over other health practices, particularly, in the urban cities of Nepal (Shankar, Paudel, & Giri, n.d.).

Based on the ethnicity and religion, there are many festivals throughout the year. Despite the difference in nature of Hindu and Buddhist or animistic festivals, people from all the ethnicities and religions join and enjoy together. The festivals involve family or relatives feasts, parades and processions, animal sacrifices (Hindu festival), and cultural rituals (Reed & McConnachie, 2013). It is customary to organize grand feasts on life-cycle events such as marriage ceremony or birth processions by the host family and invite large number of guests for it. These feasts include serving of many varieties of food including alcohol. Spending money lavishly is common for Nepalese in these celebrations (Culture of Nepal Forum, 2016). The staple food in Nepal is rice, lentils, vegetables or spicy meat and pickle which is mainly eaten twice a day. Salt is mandatory for all kinds of curry and majority of the specialties of food are quite spicy (Reed & McConnachie, 2013).

Treatment Adherence Among Patients With Hypertension

Definition of treatment adherence. The classic definition of adherence given in many studies is the extent to which a patient takes medicines according to plan

developed by health care provider with mutual agreement from the patient (Oosterom-Calo et al., 2013; Osterberg & Blaschke, 2005). The term ‘adherence’ was coined by World Health Organization (2003) in order to introduce the active role of patients and to describe the need of patient’s agreement (Alikari & Zyga, 2014). Despite having different meanings, adherence has been used interchangeably with the terms compliance and concordance, and nurses also used them as synonyms. The controversy over the proper use of these terms still continues as these words are not exactly synonymous but partially fulfills each other’s definition (Alikari & Zyga, 2014; Cohen, 2009; Krousel-Wood, Thomas, Muntner & Morisky, 2004).

Compliance is defined as the extent to which the patient’s behavior coincides with medical recommendation from care provider with or without mutual understanding and negotiation from patients. It implies that the role of patients is passive in their health care. The word ‘compliance’ is taken as traditional as it is infamous in today’s literature (Cohen, 2009). In the concept analysis done by Alikari and Zyga (2014), it was concluded that the meaning of ‘compliance’ should be re-conceptualized in order for nurses to influence patients to improve treatment. Bissonnette (2008) noted that the WHO attempted to redefine compliance for its paternalism towards health care professionals by introducing the term adherence.

Adherence is defined as ‘persistence in practice and maintenance of desired health behaviors and is the result of active participation and agreement’ (Cohen, 2009, p. 33). The World Health Organization defines adherence as the agreement between an individual’s medication-related behaviors and following nutritional and lifestyle changes recommended by health care providers (Sabate, 2003). Bissonnette (2008) also stated that adherence is the agreement from the patient to follow the treatment recommendations provided by the health professional. However, he argued that it is

unclear from the definition of adherence how patient's agreement contributes to changes in adherence behavior, thereby resulting in introduction of the term concordance.

Concordance is an agreement reached after negotiation between a patient and a health care professional that respects the beliefs and wishes of the patient in determining whether, when and how medicines are to be taken. Among these 3 concepts, concordance practices the highest level of patient's involvement and involves the process of mutual decision making through negotiation between two parties (Alikari & Zyga, 2014). However, concordance focuses more on interaction between patient and care provider rather than the actual behavior. Thus, adherence was suggested as the appropriate term for describing patient's behavior of taking required medicines (Horne et al., 2005).

According to concept analysis by Bissonnette (2008), in nursing research, adherence is used for maximum times and concordance is rarely used. Adherence was also found to be used synonymously with compliance in nursing literatures. In most of the studies regarding adherence, the definition provided by Sabate (2003) and Cohen (2009) was followed to define adherence attributes. Combining these two concepts, treatment adherence can be defined as individual's behavior in actively participating with voluntary willingness, and persisting to the recommended health regimens which are provided by health care providers.

Dimensions of treatment adherence. The JNC-7 and ESH/ ESC Guidelines (2013) recommended that the treatment of hypertension should include both pharmacological and non-pharmacological or lifestyle modifications which are described in detail on page 19. Based on these latest evidence-based guidelines for hypertension the components of treatment adherence for the patients with

hypertension can be enlisted as: medication, weight maintenance, adopting DASH eating plan, dietary sodium reduction, physical activity, moderating alcohol consumption and smoking cessation.

In addition, from the definition of treatment adherence discussed above, all of these treatment recommendations for hypertension should be assessed along the three dimensions in order to execute the actual treatment adherence. The three dimensions of treatment adherence are: Active participation, Voluntary willingness and Persistence.

Active participation. Active participation can be defined as being responsible in maintenance of desired behavior of adhering to the treatment recommendations for hypertension. The patients are expected to be actively involved in maintaining the both pharmacological and lifestyle measures recommended to them as a treatment for hypertension in order to be considered as active participation (Cohen, 2009).

Voluntary willingness. Voluntary willingness refers to the patient's agreement or desire in taking anti-hypertensive medications and lifestyle measures as recommended by the health care providers. It includes the role of patients in agreeing to take the medications after knowing information about the medicine such as mechanism of action, side effects, dose, frequency, and time, and also agreeing to follow the five lifestyle modifications as required treatment for hypertension, and not only under the pressure of significant another (Cohen, 2009; Sabate, 2003).

Persistence. Persistence indicates following the treatment recommendations of taking medicines and lifestyle measures for hypertension in accordance with the correct type, correct dose, and correct frequency and at correct time from initiation to discontinuation of therapy. Persistence results as the active participation of the

patients in their treatment for the duration of time from the first time appointment to the end of therapy (Cramer, Benedict, Muszbek, Keskinaslan, & Khan, 2008).

Impact of treatment adherence. Alleviating the burden of hypertension requires treatment adherence for lifelong due to the chronic nature of the disease. However, one third or more patients in treatment for hypertension fail to adhere to their therapeutic regimens (Leventhal, Diefenbach, & Leventhal, 1992). Chow et al. (2013) claimed that treatment adherence was poor in the large majority of patients after the initiation of therapy. This notifies that the low treatment adherence is still the major problem after decades.

Uncontrolled hypertension is associated with life threatening complications such as stroke, kidney failure, congestive heart failure and ischemic heart disease, regardless of age, gender, race and ethnicity (Chobanian et al., 2003). Treatment adherence is regarded as an essential strategy to prevent these major negative consequences.

Firstly, treatment adherence is helpful in reducing the blood pressure. A slight difference in blood pressure was obtained in patients with high treatment adherence in comparison with those with medium and low treatment adherence (Chobanian, 2009). Similarly, in another study, highly adherent patients were 45% more likely to achieve blood pressure control than those with medium or low adherence (Bramley, Gerbino, Nightengale, & Frech-Tamas, 2006).

Secondly, patients who had higher treatment adherence had significantly lower risk of developing cardiovascular events than those with lower treatment adherence (Chobanian, 2009). Mazzaglia et al. (2009) also stated that higher treatment adherence

was associated with reduction of cardiovascular events, strokes and coronary heart diseases by 38%.

Thirdly, good treatment adherence had a significant association with the positive clinical outcomes in patients with hypertension. Treatment adherence minimized the risk of negative consequences in patients not only in terms of uncontrolled disease but also time and money. As a result, mortality rates decreased in patients with good treatment adherence (Cramer, Benedict, Muszbek, Keskinaslan, & Khan, 2008). In addition, better treatment adherence reduced the risk of frequent hospitalization in patients and reduced the overall health care expenditures (Sokol, McGuigan, Verbrugge, & Epstein, 2005).

From above, we can conclude that enhancing treatment adherence has a greater potential in decreasing the burden of hypertension.

Factors associated to treatment adherence. WHO multidimensional adherence model (MAM) classifies the factors associated to treatment adherence in five categories, namely, socioeconomic factors, patient related factors, condition related factors, therapy related factors and health care team and system related factors (Sabate, 2003). Majority of studies covered varieties of factors underpinning medication adherence only. The studies including treatment adherence as whole was rare or/and old. As medication adherence is also the part of treatment adherence, it can be assumed the factors might be related to treatment adherence as well. Hence, factors affecting medication adherence were also reviewed and included as factors affecting treatment adherence.

Numerous factors were associated with treatment adherence in patients with hypertension which can be placed under five of the categories provided by the WHO MAM.

Socioeconomic factors. These factors include the demographic characteristics of patients such as age, gender, marital status, monthly income, education and social support.

Age. Age was statistically associated with treatment adherence (Al-Ramahi, 2015; Karakurt & Kaşikçi, 2012) and was found to be the good predictor of treatment adherence (Quine, Steadman, Thompson, & Rutter, 2012; Kang et al., 2015). From the review, it was found that older age enhances treatment adherence. The study done by Wang et al (2014) concluded that patients who are older than 65 years can be predicted to have better adherence to antihypertensive medicines and provided explanation that as older people had presence of more comorbidities than younger people, they might increase perceived illness and susceptibility of disease among them contributing to higher treatment adherence. It was also argued that older people stay at home having free time and receive more support from family and friends reminding them of their daily treatment routine, thereby enhancing treatment adherence.

Ethnicity. Ethnicity or race of patients affected the treatment adherence in patients with hypertension. Hyre, Krousel-Wood, Muntner, Kawasaki, and DeSalvo (2007) reported that non-black patients were four times more adherent than black patients. In a study by Al-Ramahi (2015), treatment adherence was higher for the Malay or Chinese patients than that for Indian patients.

Gender. Gender showed significant relationship with treatment adherence. Ramli et al. (2012) mentioned that female were one and a half times more likely to be adherent than male whereas Quine et al (2012) reported about gender association with

treatment adherence but did not mention that either male or female patients had better treatment adherence.

Marital status. Marital status influenced treatment adherence. Two studies (Al-Ramahi, 2015; Wang et al., 2014) showed a significant relationship of marital status to treatment adherence. In both of the studies, married people were reported to have higher treatment adherence than single patients.

Income. Monthly income of patients was associated with treatment adherence. Patients with higher monthly income had better treatment adherence in the study conducted by Al-Ramahi (2015). Lee et al. (2013) did not find significant relationship of monthly income to treatment adherence but reported that unemployed patients tend to have poor treatment adherence than employed patients.

Education. Education was significant predictor for treatment adherence. Patients with higher education had higher scores of treatment adherence (Ma et al., 2013). On the other hand, the study done by Wang et al. (2014) reported that patients with low level of education had better treatment adherence. They reasoned that patients with low level of education had unquestioning dedication to health care professionals resulting in higher adherence. The study done by Karakurt and Kasikci (2012) did not examine the direction of education with treatment adherence but mentioned the significant association between the two variables.

Social support. Social support is the widely studied factor and it is estimated that support from family and friends motivate the patient's persistence to treatment behaviors. Surprisingly, in a study by Warner et al. (2013) medication-specific social support was negatively associated with treatment adherence. In the same study, it was found that social conflict mediated the relationship between social support and treatment adherence. The negative relationship between social support and treatment

adherence might be due to the interference of presence of social conflict. The social support without social conflict might be beneficial for enhancing treatment adherence.

Patient related factors. The factors that affect patients' psychological status, attitudes, beliefs, perceptions and expectations can be included in patient related factors. The patient related factors affecting treatment adherence in patients with hypertension are: Illness perception and Knowledge.

Illness perception. Illness perceptions such as patient's beliefs and attitudes, subjective norms and conscientiousness influenced treatment adherence. Six studies reported the aspects of illness perception and treatment adherence in patients with hypertension. Quine et al. (2012) reported that the person who is conscientious, believes that he or she is able to deal with potential barriers and hence is predicted to show good treatment adherence. Health perceptions such as perceived susceptibility to disease, perceived benefits of Chinese herbs and western medication were assessed in another study (Li et al., 2012). Lower perceived susceptibility, severity and benefit to disease had negative relationship with medication adherence as shown by two studies (Kamran, Sadeghieh Ahari, Biria, Malepour, & Heydari, 2014; Li et al., 2012). Perceiving health status as good was the positive predictor for treatment adherence as reported by two studies (Kang et al., 2015; Lee et al., 2013).

Two Studies using CSM showed a positive relationship between overall illness perception and treatment adherence, particularly medication adherence (Kang et al., 2015; Rajpura & Nayak, 2014). Kang et al. (2015) further reported that illness perception significantly predicted positive treatment adherence among respondents. The review by Kucukarslan (2012) stated that illness perception significantly predicted treatment adherence. Similarly, in a study in Taiwan, all the dimensions of illness

perception except illness identity had significant association with treatment adherence (Chen et al., 2009).

Knowledge. Knowledge of patients or health awareness about the hypertension and its treatment was related with treatment adherence. Ramli et al. (2012) concluded that knowledge regarding hypertension was a positive predictor of treatment adherence. Imparting and improving knowledge to patients regarding hypertension enhanced treatment adherence as having relevant knowledge could motivate the patients to be concerned about the hypertension and empower them with the understanding about their condition. The positive association was found out between knowledge regarding complications of hypertension and treatment adherence (Karakurt & Kaşikçi, 2012). Furthermore, knowledge regarding the duration of medication use ($p=.075$), cause of hypertension ($p=.037$) & knowing target level of optimal BP ($P<.01$) resulted in increment of adherence rates significantly. Nevertheless, knowing the side effects of medicine ($p=.005$) had negative effect on adherence (Karearen, 2009).

Condition-related factors. Condition- related factors are illness-related aspects which affect treatment adherence, namely, presence of comorbidities and duration of hypertension. .

Presence of comorbidities. Comorbidities of hypertension include the concurrent diseases which are casually related to hypertension (obesity, diabetes, hyperthyroidism) or complications of hypertension (atherosclerosis, ischemic heart disease, myocardial infarction, heart failure, stroke) and conditions unrelated to hypertension (neurotic disorders, chronic obstructive pulmonary disease, asthma, peptic ulcer diseases) (Zygmuntowicz, Owczarek, Elibol, & Chudek, 2012). Wang et al. (2014) reported comorbidities as significant positive predictor of treatment

adherence and postulated that patients with comorbidities might experience more negative symptoms and perceive their condition to be sicker and thus tend to be more receptive towards treatment adherence. Also, the patients with comorbidities requires routine follow-ups to health center which could facilitate their treatment adherence (Kang et al., 2015). Similarly, patients with comorbidities had better treatment adherence in a study by Alsolami, Correa-Velez, and Hou (2015) and they discussed that to relieve the more symptoms experienced by hypertensive patients with comorbidities, they might need to be more adhered towards treatment.

*Duration of hypertension***.** Duration of hypertension or length of time since diagnosis of hypertension had an inverse relationship with treatment adherence. Patients with longer duration of hypertension diagnosis had poor treatment adherence (Dennis et al., 2011; Li et al., 2012). As hypertension is asymptomatic in nature, patients might not feel the immediate need for the treatment if they stop having symptoms for a long time and hence, might not adhere to the treatment, which reflect low levels of adherence among them (Li et al., 2012). Ma et al. (2013) also, stated that patients with longer duration of hypertension showed poor treatment adherence. The need for following the treatment on the daily basis and for prolonged period of time might become repetitive and mundane for patients and hence, discourage them from continuing the treatment.

Therapy-related factors. Another widely studied aspect of factors underpinning adherence is therapy-related factors such as the number of tablets, frequency of dosing and duration of medication use.

Dose and frequency of drugs. The number of drugs and frequency of dosing had a negative impact on medication adherence. Higher number of drug pills prescribed increased the complexity of the therapy making it hard for patients to

remember all prescribed doses and worsening the adherence (Dennis et al., 2011). The study done by Al-Ramahi (2015) and Ramli et al. (2012) reported a negative association between the number of drugs and the frequency of dosing and medication adherence. The simple medication prescription with less number of pills and less daily dose frequencies enhanced better medication adherence in patients with hypertension (Al-Ramahi, 2015).

Duration of medication use. The duration of antihypertensive medication positively influences adherence. Long term use of antihypertensive medication was significant positive predictors of medication adherence (Lee et al., 2013; Wang et al., 2014). The longer duration of medication allows patients to experience and gain more confidence regarding the effectiveness of medicine in maintaining their physical functioning and controlling their health condition (Lee et al., 2013). To the contrary, patients at the beginning of medication use might experience common side effects from the medicine. As hypertension is asymptomatic, the patients might perceive that their medication deteriorates their condition, leading to poor adherence.

Health care team and system-related factors. The factors such as patient-provider relationship and health care system were discussed as having effects on treatment adherence in patients with hypertension.

Patient-provider relationship. The relationship between health care providers and patients plays an essential role in enhancing treatment adherence (Sabate, 2003). Patients assumed the health care providers as experts in treating their condition and seldom challenge their advices. They implicitly follow the treatment guidelines provided by doctors and nurses to avoid the interpersonal conflict and disharmony. Hence, the better patient-provider relationship resulted in better treatment adherence (Wang et al., 2014; Alsolami et al., 2015). In contrast, poor patient-provider

relationship led to patient's unwillingness to ask questions to physicians or nurses and lack of trust, leading to poor adherence (Hyre et al., 2007).

Health care system. The health care system, such as, the types of services and resources provided, the place of health services, the operation of health systems and the ways of treatment delivery by health care providers influenced treatment adherence (Sabate, 2003). The health care system that supports frequent contacts with health care providers or adequate follow ups (Alsolami et al., 2015; Hyre et al., 2007), getting patients involved in their treatment and provision of appropriate counseling (Al-Ramahi, 2015) promoted treatment adherence.

Measurement of treatment adherence. Medication adherence, being one of the essential and chief components in enhancing prognosis of hypertensive patients is widely reviewed but tools for measuring treatment adherence is limited. There are varieties of methods and tools available for measuring adherence to medications. According to Osterberg and Blaschke (2005), there are two ways of assessing medication adherence, such as direct and indirect methods. Direct methods include direct observation of patients while taking medicines and laboratory measurement of level of medicine metabolites in circulation and determining biological marker in blood. These methods might be difficult to practically apply for the purpose of research studies and are not economically feasible (Osterberg & Blaschke, 2005). On the other hand, indirect methods of measurement are commonly used in numerous existing studies and can be further subdivided as subjective and objective tools. The most commonly observed methods of measuring treatment adherence are discussed below:

Morisky Medication Adherence Scale (MMAS). MMAS-8 is the subjective method of adherence assessment tool in patients with hypertension, which is modified by Krousel Wood et al.in 2009 from previously validated MMAS-4. MMAS-8 consists of 8 items assessing the behavior of medication taking rather than the factors affecting adherence. The seven items in the questionnaire use the dichotomial form of 'yes' or 'no' for replies and one of the items (how often do you have difficulty to remember to take medicines) is rated on 5-point Likert-type scale. The total score ranged from the lowest 1 to the highest 12. Higher score indicates better medication adherence. Further, the scores are categorized with 3 cut points into 3 levels of adherence such as low adherence (less than 6), medium adherence (6 to 8) and high adherence (more than 8). The Cronbach's alpha was .83 for the MMAS-8, which indicates a marked improvement from the original one (Krousel-Wood et al., 2009). The major advantages in using the tool are ease of use and time-efficiency. However, it only measures the presence of non-adherent behavior and does not measure frequency of medication.

Brief Adherence Rating Scale (BARS). The BARS is a newly introduced clinician administered adherence tool by Byerly, Nakonezny and Rush (2008). The scale is divided into two parts. The first part consists of 3 items addressing patient's knowledge of their medication therapy and episodes of not taking medicines according to prescription and taking less than prescription. The second part is a visual analog scale which is the final adherence determinant and measures a proportion of medicine doses the patient took in the past month (0% to 100%). In a study, the Cronbach's alpha was reported to be .92 and test-retest reliability was .46 to .86. The good point about the tool is it assesses patients' knowledge of their therapy which

reflects their voluntary willingness. It also measures the missing doses of medication but does not take into account the reasons behind the episode of failure to adherence.

Brief Medication Questionnaire (BMQ). The BMQ is a brief and sensitive tool developed by Svarstad et al. in 1999. The scale consists of altogether 9- items which are divided into 3 parts. The first part is known as regimen screen and consists of 5 items assessing episodes of missing doses. The second part designated as belief screen contains 2 items measuring beliefs about efficacy of drugs and side-effects. Finally the third parts, recall screen consists of 2 items and assess barriers in medication focusing on forgetting behaviors. The answers were in the dichotomial form such as yes = 1 and no = 0. The score ranged from 0 to 9. Higher score indicated potential non adherence. The merit of BMQ is that it assesses different dimensions of adherence and also imparts the name and type of medicines prescribed. However, it might be difficult and time consuming for the patient to list down all the drug names. Contrary to its name, BMQ contains numerous questions and is lengthy than other adherence scales.

Medication Event Monitoring System (MEMS). Adherence to medication can be measured objectively by the use of the device called, MEMS. It is an electronic device that monitors the drugs taken by patients via a computer chip present in the medicine bottle cap. It records the date and times of each opening of cap which can be transferred to a computer at the end of the period. The previous studies have indicated the MEMS as a valid indicator of measuring medication intake (Wu et al., 2008). The MEMS has been reported as the most accurate and sophisticated method available till date for measuring adherence and hence also referred technologically as ‘gold standard’ of adherence assessment (Byerly et al., 2008). The validity and reliability of many objective tools are determined with reference to MEMS. The major advantage

of using MEMS is that it reduces the overestimation of adherence behavior in patients and prevents a recall bias. Despite many advantages, the use of MEMS is limited because of its relatively high cost. Also, the tool records only the opening of medicine cap, which does not ensure that patients actually take the medicines.

From above, it can be concluded that the majority of studies used subjective methods for measuring medication adherence. In addition, Morisky Medication Adherence Scale (MMAS) was the most commonly used tool. The current study intends to measure overall treatment adherence as well as medication adherence. However, two tools were identified in literature that measured non-pharmacological aspects of hypertension treatment including medication. The Hill-Bone Compliance Scale and Treatment Adherence Questionnaire for Patients with Hypertension are discussed below:

***The Hill-Bone Compliance Scale*.** Kim et al. developed the Hill-Bone Compliance Scale in 2000. The scale assesses patient reported compliance level. The tool encompasses 14 items that can be divided into 3 subscales, one of them being medication adherence (8 items). The other two scales measure sodium intake (3 items) and appointment-keeping behavior of the patients (3 items). Every item of the tool is scored on four point Likert-type scale (1 = none of the time, 2 = some of the time, 3 = most of the time and 4 = all the time). The score ranges from the lowest 14 to the highest 56. The higher scores can be interpreted as poor adherence and vice versa. The reliability was tested as internal consistency and Cronbach's alpha was found to be .74 in the black population examined. The validity was measured by the extensive literature review and expert opinion which passed it for its cultural appropriateness. This tool is also applicable in patients with low literacy (Kim, Hill, Bone, & Levine, 2000). The tool is specially designed to use in hypertensive patients

and also can be used in a population with cultural diversity. Moreover, the questions are simple and consume a short time to complete. Nevertheless, the major drawback is that it is focused only on patient-related barriers and reflects adherence to only three dimensions of treatment adherence.

Treatment Adherence Questionnaire for Patients with Hypertension (TAQPH). The TAQPH was developed by Ma.et al. in 2012 in order to evaluate treatment adherence in terms of pharmacological and non- pharmacological aspects of hypertension treatment. The TAQPH consists of a total of six dimensions with 28 items measured in four point Likert-type scale as ‘all of the time’, ‘most of the time’, ‘some of the time’ and ‘never’. The six dimensions are: a) medication consisting of 9 items, b) diet consisting of 9 items, c) stimulation consisting of 3 items, d) weight control consisting of 2 items, e) exercise consisting of 2 items and f) relieving stress consisting of 3 items. The questionnaire includes both positive and negative statements. The total score is obtained by adding the score obtained from all the items and ranges from 28 to 112. The higher indicates higher treatment adherence. The Cronbach's alpha of the overall questionnaire was .86 and .82 for test-retest reliability.

The TAQPH comprehensively assesses a larger number of non-pharmacological aspects of treatment adherence including the medication adherence. The questionnaire marks a milestone in the area of hypertension as there is a lack of well accepted tool measuring both aspects. However, some of the dimensions of lifestyle modifications emphasized by JNC-8/ JNC-7 and AHA are not covered in detail by the questionnaire, such as ‘moderation of alcohol consumption’ is measured which is measured by only one question.

The objective of the current study is to assess the treatment adherence in terms of both pharmacological and non-pharmacological dimensions of treatment along

with the attributes such as active participation, voluntary willingness and persistence. From the review it can be concluded that the TAQPH serves as a suitable tool that measures treatment adherence comprehensively. However, the components of TAQPH need to be modified in accordance with the goal of the study. The questions representing the active participation, voluntary willingness and persistence should be added for each of the seven dimensions of treatment adherence for this study.

The Common Sense Model (CSM) of Illness Perception

Overview of CSM. The CSM developed by Leventhal and colleagues is a dynamic and organized theoretical model related to individual's response towards illness. It emphasizes on an individual's belief about an illness as a major component influencing their health behavior. The CSM described in Leventhal et al. (1980) is often cited in the studies regarding illness perception and adherence. Hale, Treharne, and Kitas (2007) stated that the CSM is synonymously mentioned with several other names such as, 'Illness Perceptions Model, the Illness Representation Model, the Self-Regulatory Model, the Parallel Process Model, the Common- Sense Model of Self-Regulation or simply as Leventhal's model.' However, in most of the literature, it is often referred to as CSM, which is followed by the current study.

CSM theory was developed as a result of motivation from their previous research on fear communication and distress control. Leventhal and colleagues aimed to study the way people defined their illness, how they select their coping behaviors and decision making process, central to which they proposed three main constructs: 1) Illness Representations, 2) Coping procedures and, 3) Appraisal, which is further described in details in upcoming sections.

According to the CSM, internal and external situational stimuli, such as pool lay of information, somatic and symptomatic information generate cognitive illness representations and emotional representations in parallel loop. Both of these illness representations exhibit the coping strategies to deal with the illness. Cognitive illness representation influences the type of coping strategies selected such as avoidance, cognitive reappraisal, problem-focused coping and leads to outcome appraisal. Finally, the evaluation of outcome appraisal, in return might require the revision of appraisal, selection of new coping style, revision of illness perceptions including a change in individual's illness stimuli (Hagger & Orbell, 2003; Leventhal et al., 1997).

***Illness representation*.** Illness representation or illness perception is the implicit belief system about an illness constructed by an individual in order to give meaning to their illness based on the assimilated and integrated information from different sources in order to select the appropriate coping strategies that manage the health threat (Leventhal, et al., 1980). Simply, illness perception is the conception of person about his disease. Leventhal presented three prime sources of stimuli that construct illness perception of an individual: 1) experience of bodily symptoms in the past and present occurrence of disease, 2) external social environment such as direct communication from health care providers, family, friends or media, and 3) previous knowledge about the illness that individuals learned from their societies and cultures. In addition, illness perception of individuals is influenced by many factors such as incidental factors, model of illness and most of all, largely influenced by environmental aspect around them. According to Hagger & Orbell (2003), illness perception refers to mental representation of an individual about disease created from symmetrical processing of concrete (schematic) and abstract (conceptual) memory

structures enabling an individual to make sense of their condition and their action plan to manage the problem.

Five attributes of illness perception were identified from the studies that largely influenced the coping procedures and set the criteria for appraisal of outcomes as follows (Broadbent et al., 2006; Leventhal et al., 2003; Leventhal et al., 1992):

Identity. Identity refers to belief of an individual regarding the label or diagnosis given to the conditions along with its associated symptoms.

Cause. Cause refers to the beliefs or ideas of an individual about the factors that are responsible for the occurrence of health threat. In case of hypertension, the cause dimension was assumed to be affected from two models. The models include the stress reduction model which claims that hypertension is caused due to stress and the biomedical/ lifestyle model which states that hypertension is primarily related to heredity, poor diet, medications or exercise. The endorsement of stress reduction model did not show association with blood pressure and medication adherence (Hekler et al., 2008).

Timeline. Timeline refers to the predictive belief about course and duration of illness and symptoms. Three types of timeline model are discussed: acute, cyclical and chronic. Acute timeline is belief of an individual that the symptoms are short termed. Cyclical timeline refers to the belief of an individual that the expected symptoms will diminish after a certain period of time and then they might reappear at certain time in future. Lastly, chronic timeline refers to the belief of an individual that the symptoms are long lasting and they would need continuous treatment.

Consequences. Consequences refers to the belief of an individual regarding the impact of an illness on all the aspects of physical and social well-being.

Cure/ control. Cure/ control refer to the belief of an individual regarding the efficacy of the treatment procedures or behaviors to cure or control an illness. control is further divided into two types which are personal control and treatment control. Personal control is the belief of an individual that their own behaviors or actions will be beneficial in the treatment of illness whereas treatment control is the belief of an individual that prescription from significant source such as health care providers will be beneficial in the treatment of illness.

Further, Leventhal et al. (1997) delineated the regulation of emotional reaction generated during an illness, along with cognitive processing which contributes in formation of another arm of the model. Emotional representations which are subjective in nature are related with the individual's fear about the illness and consist of its own coping procedures and appraisals to control the emotion. Two attributes of emotional illness representation, namely concern and emotion were reported by Broadbent et al. (2006). Emotional processing also influences illness perception and occurs parallel with the cognitive illness representation. Hence, illness perception is also defined as occurrence of two parallel processing regulation systems of cognitive representation about health threat and emotional reactions to the health threat of an individual.

Moss-Morris et al. (2002) reported illness coherence as another important attribute of illness perception which helps to explore patient's understanding of illness. Coherence was referred as meta-cognition of patients reflecting how patients monitor and evaluate their comprehension or understanding about the illness.

Coping procedures. Coping is defined as 'health behaviors that individuals adopt in response to their illnesses'. In literature, it is often referred to as 'coping behaviors', 'coping strategies' or 'coping procedures' (Hagger & Orbell, 2003).

Leventhal et al. (1997) emphasized on the use of the term ‘coping procedures’ in order to distinguish the meaning of the construct ‘coping’ they want to relay in CSM model from the general lay meaning of coping. The lay meaning of coping is limited to positive, goal-directed action to control emotional feelings. In the CSM, coping has multiple roles than those mentioned above. The selection of the coping procedures is based upon the current illness perception of the patient and they are selected in order to control or get rid of the current health threat as well as to prevent the potential health threat.

When individuals are faced with a health threat, they seek to go back to normal state. Their behaviors to bring the state back to normal are referred to as coping procedures by Leventhal et al. (2003). Some of the examples of coping strategies given are diet adjustments, self- prescription of drugs, following treatment regimen designed by health practitioners, traditional healers or following advice of a friend or significant other, which suggests that there is a wide range of scope for selecting coping procedures.

Coping procedures are hypothesized to be involved with the integration of current informational inputs with the memory of and about illness episodes. The most important feature of CSM model is to link coping procedures with illness perception, in a way that perceptions guide coping. The concrete and detailed structure of perception guides in developing detailed and specific plan for coping. The process of continuous selection, analysis and evaluation of the coping efforts takes place based on the state of illness cognitions. The meta-analytical review by Hagger and Orbell (2003) concluded that the association between illness perceptions, coping procedures and outcome appraisal is theoretically predictable from the literature. They also identified that strong illness identity resulted in adopting better coping procedures and

patients adopt coping strategies based on perceived cure/ control of illness. In order to deal with the burden of hypertension, patients use a variety of coping procedures which include the strategies such as avoidance/ denial, cognitive reappraisal, expressing emotion, problem-focused coping (generic and specific) and seeking social support. Furthermore, coping procedures can also be classified into five domains based on the five components of illness perception, which means that coping procedures also have their own identity, timeline, cause, consequences and cure or control (Leventhal et al., 2003). Eventually via coping procedures, individuals determine their own suitable action plan constructing the behaviors to respond to their current and potential health threats.

Appraisal. The third construct of the CSM is referred as appraisal and can be defined as the evaluation of coping strategies. The perception guides coping and provides a pathway for a set of immediate action plans along with the goal that the individual desires to fulfill after the implementation of action plan. Hence, the individual evaluates or appraises the outcomes obtained from the coping behavior. The action plans or coping strategies are continuously analyzed on the basis of their efficacy in preventing, controlling or eliminating the present or potential health threat. This ongoing evaluation leads to the refinements of the illness perception components which further influences the coping behaviors (Cameron & Moss-Morris, 2004; Leventhal el al., 1980; Leventhal et al., 1997). To conclude, appraisal does not end the process of self-regulatory system but instead leads to generate the updated new cycle in an individual.

Measurement of illness perception. Leventhal et al. (1992) identified the content of the illness perceptions using the multi-dimensional scaling and in-depth,

open-ended interviews. Over more than the past two decades, researchers innovated a variety of objectives tools to assess patient's illness perception. With the ongoing research for the past three decades, there had been growing acceptance of CSM model of illness for dealing with the chronic illness such as hypertension and quantitative tools were developed and modified with sound theoretical background and valid psychometric properties. The popular tools measuring illness perception, used frequently in the studies of hypertension are the Illness Perception Questionnaire (IPQ), the Revised Illness Perception Questionnaire (IPQ-R), and the Brief Illness Perception Questionnaire (BIPQ).

Illness Perception Questionnaire (IPQ). The IPQ tool was developed by Weinman, Petrie, Moss-Morris, and Horne (1996) in an attempt to assess five dimensions of patient's illness perception derived from Leventhal's CSM model. This tool is composed of five subscales encompassing 38 items altogether.

The first subscale, illness identity is assessed with a 12 item core symptom list that is answered on a 4 point Likert scale as 1 for never, 2 for occasionally, 3 for frequently and 4 for all of the time. The list of core symptoms consists of pain, nausea, breathlessness, weight loss, fatigue, stiff joints, sore eyes, headaches, upset stomach, sleep difficulties, dizziness and loss of strength with the scores ranging from 0 to 12. The next four subscales, namely cause, timeline, consequences and control/ cure are measured on a five point Likert scale as 1 for strongly disagree, 2 for disagree, 3 for neither agree or disagree, 4 for agree and 5 for strongly agree. The subscale, cause consists of 10 items assessing belief of patients regarding the cause of their illness. For this subscale, the authors recommended not to sum all of the items as each item represented specific causal belief. The timeline subscale consists of 3 items measuring patient's belief about the duration of their illness with a range of scores

from lowest 3 to highest 15. The subscale, consequence consists of 7 items explaining the patient's belief about the severity of their illness and the score ranging from 7 to 35. Finally, the subscale cure/ control have 6 items assessing patient's belief about the effectiveness of their treatment with the score ranging from 6 to 30.

In all of the subscales, higher scores indicate higher belief of patients regarding the components. The instrument does not take into account emotional response of the patient. Also, it is difficult to calculate the cumulative illness perception score from this instrument as the items in the subscale cause cannot be summed.

Revised Illness Perception Questionnaire (IPQ-R). The IPQ-R was designed by Moss-Morris et al. (2002) by modifying the subscales of IPQ in order to enhance the internal consistency and correct the limitations encountered during administration. The subscales timeline and cure/ control were reevaluated and the new subscales for measuring emotional representations and illness coherence were added in this tool. The IPQ-R consists of 70 items altogether incorporated into 12 subscales. These subscales are categorized into 3 groups. The first group measures the attribute 'identity' containing 14 items, 12 of which are derived from the original IPQ whereas 2 items, sore throat and wheezing are added. The second group measures the timeline (acute/ chronic and cyclical), consequences, control (personal and treatment), coherence and emotional response and consists of 38 items rated in five point Likert type scale as in the original IPQ. The final group measures causal dimension divided into 4 subscales (psychological cause, risk factors, immunity and accidental/ chance) and consists of 18 items rated in five point Likert-type scale. The higher score from the tool indicates that the patient has increased awareness about the illness or the degree of common sense about the disease is higher. The Cronbach's alpha for the

IPQ-R ranged from .67 to .87, which is higher than the original IPQ. However the scoring from the tools seems to be complicated and time-consuming because of its long list of items.

Brief Illness Perception Questionnaire (BIPQ). The BIPQ designed by Broadbent et al. (2006) is a short and simple form of measurement of both cognitive and emotional representation of illness. The BIPQ is composed of 9 items altogether. These items are derived from IPQ-R subscales in a way that each item in BIPQ represented one subscale of IPQ-R. From all the items in each subscale, one new question that best represented the subscale was formulated. Hence, the BIPQ comprises 9 items altogether. The first 8 items are new ones that are measured in a continuous linear scale ranging from 0 to 10 and the 9^{th} item is an unchanged item adapted from IPQ-R that consists of open-ended question without any scales.

The first item assesses the consequence of cognitive representation, where 0 indicates 'no affect at all' whereas 10 indicated consequence that severely affected life. The second item assess timeline, where 0 indicate 'a very short time' and 10 indicate 'forever'. As cure/ control has two types (personal control and treatment control), it was assessed using third and fourth items. The third item measures personal control which starts from 0 meaning 'absolutely no control' and ends at 10 meaning 'extreme amount of personal control'. The fourth item assess treatment control in a scale starting from 0 meaning 'not at all' to 10 meaning 'extremely helpful. The fifth item assesses identity in a scale starting from 0 meaning 'no symptoms at all' to 10 meaning 'many severe symptoms'. Similarly, the sixth and seventh items represent emotional representation of illness. Concern is the sixth item which is measured from the scale starting at 0 indicating 'not at all concerned' until 10 indicating 'extremely concerned'. Emotion is another item which is assessed from

the scale staring at 0 indicating ‘not at all affected emotionally’ and ends at 10 indicating ‘extremely affected emotionally’. The eighth item measures comprehensibility about the illness with a scale ranging from 0 indicating ‘don’t understand at all’ to 10 indicating ‘understand very clearly’. Finally, the ninth item measures cause about illness. This question asks patients to list three beliefs regarding the cause of illness.

The BIPQ was presented with good test-retest reliability. The correlation coefficient of all the items of BIPQ in test retest reliability was higher than .88 (Rakhshan, Hassani, Ashktorab, & Majd, 2011). The BIPQ enhances the speed of measuring illness perception of an individual by transforming complex IPQ-R into simpler form and eases the interpretation of score. However, the BIPQ is not detailed enough to capture patient’s illness perception in depth. Open-ended questions can be added in order to explore the details of each illness perception.

From the review, it is observed that most of the research studies regarding illness perception on hypertensive patients used IPQ-R to assess the illness perception of an individual (Chen et al., 2009; Chen et al., 2011; Hsiao et al., 2012; Ross et al., 2004). BIPQ is also popular in measuring illness perception in the latest studies (Ahmad et al., 2013; Rajpura & Nayak, 2014) because of its simplicity and ability to save time of measurement. In this study, the BIPQ will be extended with the open-ended questionnaires in order to capture the details of illness perception in patients with hypertension in Nepal.

Illness perception among patients with hypertension. The patients with hypertension had various degrees of perception about their illness for different aspects of hypertension (Nivedita, 2015). Based on the literature, the perceptions of

hypertension can be grouped under identity, cause, timeline, consequences, treatment and emotions.

Patients with hypertension perceived that the high blood pressure was characterized by the symptoms such as headache, palpitations and dizziness and they believed that hypertension was controlled when they did not have these symptoms or the severity of the symptoms subsided (Marshall, Wolfe, & McKevitt, 2012). Leelacharas (2005) reported that 80% of patients believed that they experienced the symptoms such as headache, fatigue, dizziness and difficulty in sleeping due to the high blood pressure. The study by Kolb, Zarate-Abbott, Gillespie, Deliganis, and Norgan (2011) also found the similar symptoms, such as headache and dizziness reported by the patients. From above, it can be concluded that hypertension is perceived as a symptomatic illness by the patients.

Stress was considered as the prime cause of hypertension by patients (Leelacharas, 2005; Marshall et al., 2012). Similarly, Kolb (2011) revealed that patients believed that daily stressors of life could increase their blood pressure. In a study by Rahman et al. (2015), patients believed that the causes of hypertension were high dietary sodium intake, alcohol consumption and excessive stress. Furthermore, bad blood circulation and a flow of wind were believed to be the cause of hypertension by hypertensive patients in Thailand (Udompittayason, Boonyasopun & Songawathana, 2015). High blood pressure was believed to be from the psychological stress, eating pork and evil spirits in a study conducted by Wilson et al. (2002).

The perceived timeframe for the hypertension varied among the studies. In a study by Leelacharas (2005), patients believed that the hypertension was permanent and stayed for a long time whereas Kolb et al. (2011) in a qualitative interview received different responses that hypertension lasted only for short time to

hypertension for lifetime. Nevertheless, hypertension was taken as permanent illness rather than temporary illness in the recent study (Leelacharas, Kerdonfag, Chontichachalalauk, & Sanongdej, 2015). Also, in a study conducted in different countries of Asia, the majority of patients believed the timeline of hypertension to be chronic in nature (Rahman et al., 2015).

All of the studies presented similar findings regarding the consequences of hypertension. Patients with hypertension, regardless of ethnicity, culture or geographical area believed that high blood pressure led to serious consequence (Marshall et al., 2012). Rahman et al. (2015) stated that patients believed that hypertension could lead to severe consequences such as stroke, paralysis and heart attack. Similarly, Kolb et al. (2011) reported that patients listed heart disease, kidney disease, diabetes mellitus and stroke as the consequences of hypertension.

Patients believed that hypertension could be controlled through various methods (Leelacharas, 2005) but they also felt that treatment of hypertension could be overwhelming and difficult as they had to keep up with various aspects of treatment such as medication, diet and exercise on a daily basis (Kolb et al., 2011). Patients explained that if they could control the symptoms or prevent the symptoms, they did not need to follow the treatment. They believed that treatment could effectively control blood pressure and consequences but they feared treatment because of its complexity and need to adopt it every day for life long (Marshall et al., 2012). Rahman et al. (2015) stated that patients with hypertension perceived that treatment would help them to recover but they had to face side effects of drugs and lifestyle modifications were tiring and difficult to follow.

The emotions of patients after the diagnosis of hypertension ranged from vague fear to no fear at all (Kolb et al., 2011). Rahman et al. (2015) reported that

patients described their emotions as “worried”, “anxious”, “confused”, “depressed” and “stressed”. A minority of patients explained these negative emotions could go away with time and they would feel confident and hopeful.

Relationship Between Illness Perception and Treatment Adherence Among Patients With Hypertension

The CSM of illness illuminates that the representation of a health threat serves as a guide for selection of coping strategies. Treatment adherence is considered as one of the coping action chosen by individuals when they are overwhelmed by their illness. The behavior of adherence for long periods of time demands coherence of the self-regulation system of an individual. To elaborate it, the components of illness perception should be consistent with the coping procedures set by an individual and treatment regimen recommended for him. The mismatch between the illness perception and treatment procedures generates the misconceptions which might alter the coherency of the system that regulates the behaviors performed. As each variation in the perception of illness affects the coherence in patient’s self- regulation system and further creates alterations in adherence behaviors of an individual, it is of utmost importance to validate the illness perception. Furthermore, CSM provides framework that illustrates how illness perception guides adherence behaviors of a patient and helps to integrate various factors affecting the treatment adherence behavior of an individual, thereby maximizes the understanding about the treatment adherence of patients (Leventhal et al., 1992).

The review by Kucukarslan (2012) on illness perception and medication adherence included 11 published studies from 2001 to 2011. The relationship between the components of illness perception and medication adherence was analyzed in

patient populations with different illness including hypertension, asthma, diabetes, heart failure, glaucoma and tuberculosis. The findings of the study indicated that in all those studies, medication adherence regressed significantly with more than two components of illness perception. For instance, in the study on hypertensive population included in the review, a significant association was found between adherence and the components, emotional representation (*OR* = 0.65, 95% *CI* = 0.47 – 0.90, *p* = .008) and personal control (*OR* = 0.59, 95% *CI* = 0.40 – 0.89, *p* = .012) of illness perception (Ross et al., 2004). Similarly, another reviewed study on hypertensive adolescents in Slovenia reported that treatment adherence positively regressed with the component, treatment control and illness concern whereas the relationship was opposite with emotional representation (Žugelj et al., 2010).

In the study that examined the relationship between medication adherence and illness perception, treatment beliefs and illness burden in elderly hypertensive population, they reported that the association between overall illness perception and medication adherence was positive and significant ($r = .33$, $p < .001$) indicating that higher threatening view regarding the components of illness perception resulted in higher adherence (Rajpura and Nayak 2014).

The study by Hsiao et al. (2012) also analyzed the association between illness perception and medication adherence. In their study, participants were categorized into three clusters based on their scoring on the components of illness perception. The findings revealed that the relationship between illness perception and medication adherence was positive, suggesting that the more positive perception the patient had about hypertension, the better their medication adherence was and vice versa. Cluster 1 had positive perception along the components of illness perception and had highest medication adherence than cluster 2 and cluster 3 ($\chi^2 = 7.67$, $p < .05$).

The two studies conducted in Taiwan addressed treatment adherence including both medication and lifestyle management. Chen et al. (2011) established the structural equation model to construct paths from illness identity, cause, control and adherence to medication and self-management. They reported that the structural relationship of medication adherence with illness identity *(t* = 2.09, β = .23), control (*t* = 4.06, β = .41) and cause *(t* = -2.49, β = -.25) were statistically significant. Furthermore, illness identity was associated with illness control and illness causes, which in turn had negative association with adherence. A similar study by Chen et al. (2009) measured the impact of illness perception on treatment adherence. In their study, medication adherence and adherence to self-management behaviors were measured using separate questionnaires. The inter-correlations between the measures revealed that all the dimensions of illness perception excluding illness identity and emotion had a significant association with treatment adherence. For instance, illness control had a significant positive association with scores of treatment adherence whereas timeline and consequences had a negative association with medication adherence. Interestingly, personal control had a stronger association with self-management behaviors *(r* = .30, *p* < .001) than behavior of medication taking *(r* = .14, *p* < .05).

Conversely, a study by Saarti et al. (2015) studied the association between the illness perception and treatment adherence among hypertensive patients in Beirut and concluded that the association between these two measures was not statistically significant. However, it should be noted that there was a difference between illness perception scores between adherent and non-adherent patients.

From above, it is seen that most of studies identified the valid relationship between illness perception and treatment adherence. However, most of the studies

included only medication adherence as the component of treatment adherence and did not focus on other lifestyle measures or did not include all the components of treatment adherence. No studies addressing the relationship between illness perception and treatment adherence in population of Nepal could be identified in the literature.

Summary of Literature Review

To conclude, this chapter of the study assesses the current available information regarding overview of hypertension, treatment adherence, CSM of illness perception and relationship between illness perception and treatment adherence in patients with hypertension.

Apparently, the prevalence of hypertension is widely varied around the world and it is complicated to derive an accurate figure to represent prevalence of hypertension in world as most of the prevalence rates provided were not age standardized. Nevertheless, it is clear that hypertension is prevalent and the number of hypertensive patients is on the rise in both developing and developed countries. Most of the studies in Nepal confirm that hypertension poses a health challenge for the Nepalese community as the prevalence of hypertension had increased dramatically within the short period of time.

Treatment adherence is essential for decreasing the burden of the magnitude of uncontrolled hypertension and life threatening complication associated with it. However, an examination of the relevant literature reveals that the overall treatment adherence is fairly low. Patients with hypertension are required to be adherent to medication as well as non-pharmacological or lifestyle modification behaviors which

encompass adopting DASH eating plan, dietary sodium reduction, moderating alcohol consumption, performing exercise and weight maintenance.

Factors that contribute to treatment adherence in patients with hypertension include socioeconomic factors, patient-related factors, condition-related factors, therapy-related factors and health care team and system-related factors, including illness perception. The CSM is a theoretical model that illuminates that treatment adherence can be considered as the coping strategy chosen by an individual based on the illness perception along the components of cognitive and emotional illness representation. From the review, it has been found that individual's perception of illness guides treatment adherence and helps to bridge various factors affecting treatment adherence. Illness perception was positively associated with treatment adherence in most of the studies. Also, illness perception significantly predicted positive treatment adherence in a few studies. However, in the studies on treatment adherence, medication adherence was considered as the utmost importance, disregarding a potential impact of the lifestyle management for hypertension. To add, the role of illness perception was never investigated in Nepal. The diverse ethnicity and religion of Nepal largely influence the culture and lifestyle of Nepalese, which might have different effects on illness perception from other countries where most hypertension studies have been conducted. Hence, it is vital to conduct a study to examine the association between illness perception and treatment adherence in the patients with hypertension in Nepal.

Chapter 3

Research Methodology

This chapter comprises population and sample, setting, instrumentation, validity and reliability of the instruments, data collection procedures, ethical considerations, and data analysis of the study.

Population and Sample

This descriptive correlational study was conducted among the patients attending the out-patient department of the Shahid Gangalal National Heart Centre, Kathmandu, Nepal in order to identify the relationship between illness perception and treatment adherence. The sample for this study was drawn from the adult population with a diagnosis of hypertension and registered at the out-patient department of the hospital. Purposive sampling was used to recruit subjects for the study.

Eligibility criteria of study participants. Participants for this study included adult patients (above 18 years based on JNC-7 & JNC-8 inclusion of adults) with the diagnosis of hypertension and placed on anti-hypertensive medication prescribed for at least three months prior to collection of data. Patients who had complications of hypertension, had diabetes mellitus, congestive heart failure, coronary heart disease, renal impairment, or had secondary hypertension were excluded to prevent potential confounders as their treatment regimen might be more complex (Alhalaiqa, Deane, Nawafleh, Clark, & Gray, 2012).

Sample size. The sample size was calculated by using power analysis. The previous study by Rajpura and Nayak (2014) assessed the role of illness perception and medications beliefs and medication compliance of elderly adults and stated that there was a significant positive correlation between illness perception and medication adherence (r = .332, p = .001). According to Polit and Beck, 2012 (Table 17.7 on p. 425), when estimated population coefficient correlation, r = .30 to achieve the power of .80 at .05 level of significance, the required sample size is 85.

Setting. The study was conducted in Shahid Gangalal National Heart Centre, which is the national referral center of cardiology, located in Kathmandu, Nepal. A wide spectrum of cardiac cases visit in the hospital and is one of the busiest cardiac center in Nepal. The patients with hypertension visiting the hospital first undergo the diagnostic evaluation such as physical examination and laboratory tests in order to confirm the diagnosis of hypertension, detect the causes and risk factors of hypertension, and evaluate cardiovascular risk, organ damage and other comorbidities. The treatment regimen are decided by health care providers on the basis of standard evidence based treatment algorithm and international guidelines for the management of patients with hypertension. The doctors prescribe the medication and nurses counsel the patients regarding the medication and lifestyle modifications.

Instrumentation

The data collection instruments used in this study were: the Demographic and Health Related Data Questionnaire (DHRDQ), the Extended Brief Illness perception questionnaire (EBIPQ), and the Modified Treatment Adherence Questionnaire for Patients with Hypertension (MTAQPH).

The Extended Brief Illness Perception Questionnaire (EBIPQ). In this study, the BIPQ designed by Broadbent et al. (2006) was modified to measure illness perception in patients with hypertension. The questionnaire was extended and divided into two parts, Part I (the BIPQ) and Part II (the OEQ). The Part I encompasses the original BIPQ which is comprised of 9 items altogether, namely, item 1 (consequences), item 2 (timeline), item 3 (personal control), item 4 (treatment control), item 5 (identity), item 6 (concern), item 7 (coherence), item 8 (emotion) and item 9 (cause). The first eight items (item 1 to item 8) were measured in a continuous linear scale ranging from 0 to 10 and the item 9 (cause) was assessed by open ended question as in original questionnaire.

For the items consequences, timeline, identity, concern and emotion, higher scores indicated more threatening illness view of illness, for instance, chronic timeline or severe consequences. For the items personal control, treatment control and coherence, higher score represents less threatening view of illness, for instance, more treatment control or personal control. Hence, these three items (3, 4 and 7) were reversed as in the original instruction by Broadbent et al (2006) before summing up for obtaining the total illness perception score. However, the scores were not reversed while illustrating the level of these items separately. Also, the original score without reverse was used while assessing the relationship between these three dimensions and treatment adherence.

The possible scores obtained from the EBIPQ ranges from 0 to 80. Higher scores indicated more threatening view of illness perception. The raw scores were grouped into three categories in order to interpret the level of illness perception by simple mathematics of dividing the total score by the number of categories. Of the total score, the score of 0 to 27 indicated ‘high threatening illness perception’, the

score of 28 to 54 indicated ‘moderate threatening illness perception’ and 55 to 80 indicated ‘low threatening illness perception’. For the interpretation of individual items, the score 0 to 3.33 indicated ‘high threatening illness perception’, the score of 3.34 to 6.66 indicated ‘moderate threatening illness perception’ and the score 6.67 to 10 indicated ‘low threatening illness perception’. The answers obtained from the 8th item were grouped into categories and was analyzed with simple content analysis method.

The Part II consists of open ended questions and was called as the Open Ended Questionnaire (OEQ). The OEQ, developed by Rasani (2015) was modified based on the dimensions of the CSM specifically for the patients with hypertension. The purpose of designing the OEQ was to capture the patient’s perception of illness in depth and aid to the information obtained from the BIPQ. The OEQ consists of total 10 items, namely identity (item 1), cause (item 2), timeline (item 3), consequences (item 4) and cure/ control (item 5-7), concern (item 8), coherence (item 9) and emotion (item 10). Content analysis method was used in order to analyze the qualitative data obtained from the questionnaire (Polit & Beck, 2012).

The Modified Treatment Adherence Questionnaire for Patients with Hypertension (TAQPH). The TAQPH, developed by Ma et al. (2012) was modified and used in this study to measure treatment adherence among patients with hypertension. The original TAQPH consists 28 items altogether measured as per four point Likert scale as 1 = all of the time, 2 = most of the time, 3 = some of the time and 4 = never. From these 28 items, four items (item 19, item 26, item 27 and item 28) were excluded as they did not represent the dimension of treatment adherence that was intended to measure in this study. In the MTAQPH, the items were categorized into seven subscales as per the components of treatment of hypertension, which were,

medication, adopting DASH eating plan, dietary sodium reduction, moderating alcohol consumption, smoking cessation, performing exercise, and weight maintenance. For each subscale, more items were added in order to capture the three dimensions of treatment adherence, specifically, active participation, voluntary willingness and persistence. Hence, the MTAQPH encompassed of 41 items altogether.

The total score ranged from 41 to 164 and was obtained by adding the score obtained from all the items. The negative statements were reversed before summing them. Higher the score, higher the treatment adherence. The raw scores were grouped into three categories in order to determine the level of treatment adherence. The cut-off points were obtained using simple mathematics of dividing the total score by the number of levels. Of the total score, the score of 41 to 81.99 indicated 'low treatment adherence', the score of 82 to 122.99 indicated 'moderate treatment adherence' and 123 to 164 indicated 'high treatment adherence'.

Validity and Reliability of the Instruments

In this study, the original instruments were modified in order to fit the conceptual framework of the study for both of the instruments and the test for validity and reliability was done.

Validity of the instruments. The content validity for the EBPIQ and the MTAQPH was analyzed by a panel of three experts. The first expert was a professor from Faculty of Nursing, Prince of Songkla University, Thailand. The second expert was an advanced practiced nurse (APN) specialized in cardiovascular area from the Songklanagarind Hospital, Thailand. Finally, the third expert was lecturer from Faculty of Nursing, Nepal Institute of Health Sciences, Nepal. The necessary changes

were made based on experts' suggestions. For instance, the term 'illness' was changed into 'hypertension' for all the items in the EBIPQ and the OEQ.

Reliability of the instruments. After assuring the validity of the instruments, a pre-testing was conducted among 20 hypertensive patients who met the inclusion criteria to calculate the reliability of the instruments (Radhakrishna, 2007). The patients were recruited from the Bir Hospital, Nepal. The internal consistency was tested by calculating Cronbach's alpha. The Cronbach's alpha for the MTAQPH was .89 and for the EBIPQ was .72 which can be regarded as acceptable values (Gliem & Gliem, 2003).

Translation of the Instruments

The EBPIQ and the MTAQPH were initially developed in English version and were translated into Nepalese version. To ensure that these instruments are equivalent to Nepalese language, the back translation technique using three bilingual translators expert in English and Nepalese language was adopted (Hilton & Skrutskowski, 2002).

Firstly, the original English version of both instruments was translated into Nepalese language by bilingual translator. Secondly, the Nepalese version was translated into English by second bilingual translator who has not seen the original version. Lastly, the original English version and the translated versions of questionnaire were analyzed by the third expert to identify discrepancies. Minor discrepancies were identified in the process which were corrected before administration of questionnaire

Data Collection Procedures

Data collection was conducted between the months January and March, 2016 and was accomplished in the following steps:

Preparation phase. The preparation of the study was conducted in the following ways: 1) Obtaining the official approval from the Institutional Review Board of the Faculty of Nursing, Prince of Songkla University and National Health Research council, Nepal, 2) Obtaining official permission from the hospital (SGNHC) under study, 3) Informing the head nurse, doctor and staff in the cardiac outpatient department of the hospital about the purpose, procedure and time of study, 4) Preparing all the instruments required such as the questionnaires and informed consent, and 5) Testing the validity and reliability of the both tools.

Permission from the researchers to use the questionnaire and to translate to the Nepalese language was obtained for both of the tools.

Implementation phase. After receiving the necessary approval, the researcher went to the hospital and introduced herself to the incharge nurse of the OPD and executed the informed consent process for data collection.

Firstly, study participants based on eligibility criteria were contacted by the nurse from the OPD to encourage the patients to participate in the study. After the permission from the participants, individuals interested in the study were asked for the time for their participation on the day of their follow-up visit and were recruited.

Before collecting data, the researcher introduced herself and explained the objectives of the study. The informed consent form was read and explained until they understood all and was signed by both researcher and participants. The copy of the form was provided to every participant. All the components of ethical consideration

were strictly followed. After the participants signed the informed consent form and were comfortable and ready, the required information was obtained.

In the beginning, the DHRDQ was administered to the patients. After 5 to 10 minutes of giving the DHRDQ, the EBPIQ was provided to the patient and asked to answer the questions. The time duration for completion of these two questionnaires was approximately 15 minutes. The Part II of the EBPIQ (the OEQ) was administered to 30 participants only which was selected conveniently on the basis of presence of either high threatening view of illness or low threatening view of illness because these features might be beneficial for understanding the illness perception of patients with hypertension. Finally, the MTAQPH was administered for another 15 minutes. The researcher checked the completion of the questionnaire in the end. This process was continued until the sample size was reached.

Ethical Considerations

The researcher obtained permission from the Institutional Research Board of the Faculty of Nursing, Prince of Songkla University, Thailand and National Health Research council, Nepal in order to protect the human right of individual. The participants who agreed to participate were included in the study and provided with informed consent (Appendix B). Moreover, they were also explained that they have right to withdraw at any time during the study. The researcher started the procedure after well explaining the purpose, procedure, risk, comfort and benefit of study. All of the information from the subjects and the identity of them were kept confidential. They were assured that even if they reject or withdraw from the study, they will receive all the routinely offered treatment in the hospital. The coding system was used in order to protect anonymity of the participants.

Data Analysis

To compute and analyze the data to answer research questions, both descriptive and inferential statistics were used and in following ways:

1. Descriptive statistics was used to analyze and describe the demographic characteristics, illness perception and treatment adherence of the patients and frequencies, percentage, mean, standard deviation, median and interquartile range were calculated wherever possible.

2. Researcher planned to use Pearson product-moment correlation to analyze the relationship between illness perception and treatment adherence. Before using the Pearson product-moment correlation, the test of assumption for correlation was examined between the independent variable, illness perception and dependent variable, treatment adherence with the help of test of normality, linearity and homoscedasticity. The assumption for normality was tested by using standardized skewness and kurtosis and Kormogorov Smirnov test. The Kormogorov Smirnov test were less than .05 and the standardized Z value for kurtosis was greater than 3 (only standardized Z value for skewness was between + 3 to – 3) for the treatment adherence and majority of its components. This indicated that the data set for treatment adherence was not normally distributed. The assumption for linearity and homoscedasticity was tested by the scatter plot from original and residual form of variable respectively. The variables met the test for both linearity and homoscedasticity.

3. Spearman's rank correlation was used to determine the association between the study variables since the data violated the test of assumption for normality.

4. Lastly, the simple content analysis method was used to analyze qualitative data from the OEQ to describe the phenomena of illness perception. The content

analysis was performed as per following steps: breaking down whole data into smaller coherent parts, organizing the parts according to the content they represent and finally categorizing them based on shared concepts (Polit & Beck, 2012).

Chapter 4

Results and Discussion

This chapter comprises of results of the study and discussion. The result and discussions are based according to the objectives of the study.

Results

The results of the study are presented in three sections as shown below:

1. Description of demographic data and health related characteristics

2. Description of the level of illness perception and treatment adherence

3. Relationship between illness perception and treatment adherence among the patients with hypertension in Nepal.

Demographic characteristics among patients with hypertension. The demographic and health related characteristics of the 85 patients with hypertension who participated in this study are illustrated in Table 1. The mean age of the patients was 51.81 (*S.D* = 11.38). The highest percentage of the patients (32.9%) belonged to the age group of 41 to 50. About 34.1% of the patients were Brahmins (ethnicity of Nepal) and more than half of the patients (62.4%) were male. The majority of the patients' religion (87.1%) was Hindu and most of the patients (90.6%) were married. The highest percentage of the patients (24.7 %) had studied until secondary level of education. Only 2.4% of the patients were not employed. The patients with nuclear family was about half (51.8%) and more than half of the patients (54.1%) had family income of 10,000 to 30,000 Nepalese Rupees (approx. 100 to 300 US dollar).

Table 1

Frequency, Percentage, Mean and Standard Deviation of Patients' Demographic Characteristics (N = 85)

Characteristics	*n*	%
Age (years old)		
19 – 30	1	1.2
31 - 40	12	14.1
41 – 50	28	32.9
51 – 60	27	31.8
> 60	17	20
M = 51.81 *SD* = 11.38 Min - Max = 30 - 76		
Ethnicity		
Brahmins	29	34.1
Kshatriyas	21	24.7
Newars	19	22.4
Janajatis	7	8.2
Others	9	10.6
Gender		
Male	53	62.4
Female	32	37.6
Religion		
Hindu	74	87.1
Muslim	4	4.7
Buddhist	2	2.4
Christian	3	3.5
Other	2	2.4
Marital status		
Married	77	90.6
Widow/widower	8	9.4
Educational status		
No formal education	14	16.5
Primary level	10	11.8
Secondary level	21	24.7
Higher secondary level	11	12.9
University level	14	16.5
Masters level	6	7.1
Illiterate	9	10.6
Occupational		
House worker	17	20
Agriculture	11	12.9
Government Employee	10	11.8

Table 1 (continued)

Characteristics	*n*	%
Private employee	12	14.1
Business	15	17.6
General labor	13	15.3
Unemployed	2	2.4
Retired	2	2.4
Others (priest, migrant worker)	3	3.5
Family type		
Extended/ Joint	41	48.2
Nuclear	44	51.8
Monthly family income		
< NPR 10000	17	20
NPR 10000 - NPR 30000	46	54.1
NPR 30001 - NPR 50000	16	18.8
>NPR 50001	6	7.1
M = 28347.06 *SD* = 27903.74 Min - Max = 3000 – 200000		

*NPR = Nepalese Rupees

Health-related characteristics among patients with hypertension. The health related characteristics are illustrated in Table 2. The majority of the patients (76.5%) were diagnosed as hypertension for more than 2 years. More than half of the patients (64.7%) had their BP under control (under Stage I hypertension). Approximately half of the patients (45.9%) did not have any co-morbidities whereas 40% of the patients had other comorbidities, particularly gastritis. In terms of current use of medicines, almost half of the patients (47.1%) were using combination drugs such as Calcium Channel Blockers plus Beta Blockers or Angiotensin II Blockers. The majority of the patients were taking drugs only one time per day (78.8%). The number of pills per time was only one for most of the patients (85.9%) and about half of them (47.1%) took medicine in the morning.

Table 2

Frequency and Percentage of Patients' Health Related Characteristics (N = 85)

Characteristics	*n*	%
Duration of hypertension (in months)		
< 6	7	8.2
6 to 12	6	7.1
12 to 24	7	8.2
> 24	65	76.5
Blood pressure (Systolic)		
Less than 140 mmHg	55	64.7
140 – 159 mmHg	28	32.9
160 – 179 mm Hg	2	2.4
Blood pressure (Diastolic)		
Less than 90 mmHg	55	64.7
90 – 99 mmHg	28	32.9
100 – 109 mm Hg	2	2.4
Comorbidities		
No	39	45.9
Dyslipidemia	12	14.1
Others (gastritis, hyperuricemia, fatty liver)	34	40
Hypertensive drugs		
Combination drugs (Single pill combination)	40	47.1
Calcium Channel Blockers	24	28.2
ARB	15	17.6
Beta Blockers	3	3.5
ACE inhibitors	3	3.5
Number of drugs per day		
Only one	70	82.4
More than one	15	17.6
Number of pills per time		
One	73	85.9
More than one	12	14.1
Time of medication		
Morning	40	47.1
Evening	26	30.6
Morning and evening	19	22.4

Illness perception among patients with hypertension. The illness perception was assessed with the Extended Brief Illness perception Questionnaire (EBIPQ) consisting two parts. The scores obtained from the first part of the EBIPQ (8 items of the BIPQ) are summarized in Table 3. The total illness perception mean score among

the patients with hypertension was 40.35 and median score was 42 indicating moderate threatening view about the illness. As dimensions were not normally distributed, median and interquartile ranges were used as measure of central tendency. The dimensions treatment control, timeline and consequences had the highest median score. The results indicated that patients with hypertension had high level of perceived treatment control and perceived timeline of the illness, and they perceived that their illness severely affected their lives. The remaining dimensions, personal control, identity, concern, coherence and emotion were reported at a moderate level, indicating of moderate level of perceived personal control, perceived symptoms, perceived concern about the illness and perceived affected emotions including moderate understanding about the hypertension. Furthermore, Table 4 depicts that two-thirds of patients (61.2 %) had moderate threatening illness perception and just below one-quarter perceived hypertension as low threatening illness.

Table 3

Median, Interquartile Range (IQR) and Level of Illness Perception (N = 85)

Dimensions	Min-Max	Median	*IQR*	Level
Total illness perception	7-63	42	20	Moderate
Consequences	0-10	7	5	High
Timeline	1-10	10	4	High
Personal control	0-10	6	7	Moderate
Treatment control	3-10	10	2	High
Identity	0-10	6	3	Moderate
Concern	0-10	6	5	Moderate
Coherence	0-10	6	4	Moderate
Emotion	0-10	6	5	Moderate

Table 4

Frequency and Percentage of Level of Illness Perception (N = 85)

Level of illness perception	n	%
Low	18	21.2
Moderate	52	61.2
High	15	17.6

The causal dimension (9th item) assessed the patient's belief regarding the three most important causes of hypertension. The causes of hypertension as perceived by the patients could be categorized as modifiable and non-modifiable causes as shown in Table 5. Three most perceived causes of hypertension were unmanaged diet, excessive stress and heredity respectively whereas three least perceived causes of hypertension were obesity, alcohol consumption and blood related causes.

Table 5

Frequency and Percentage of Statements of Causal Items (N = 85)

Cause (n* = 176)	n*	%
Non modifiable cause	35	19.89
Heredity	22	62.85
Age	13	37.14
Modifiable cause	141	80.11
Unmanaged diet (consuming salty diet, fatty diet, spicy diet, unhealthy diet, unhygienic or adulterated food, overeating)	59	41.84
Stress (Mental tension, Fear , Family related stress, Environmental stress (job, noisy environment, too many festivals, culture)	52	36.87

Table 5 (continued)

Cause (n* = 176)	n*	%
Obesity	7	4.96
Alcohol consumption	7	4.96
Physical impairments (fever, weakness, organ damage/ failure, side effects of medicine	9	6.38
Blood related (high cholesterol in blood, thick blood, increased blood)	7	4.96

*n = Total content items

Furthermore the second part of EBIPQ, the OEQ explored the illness perception among 30 patients in depth. The results obtained are summarized below:

Consequences. Hypertension was perceived as being life threatening or bringing devastating consequences to their life. Most of the patients perceived that hypertension had more than one consequence. Majority of the patients answered that hypertension led to paralysis of body, heart attack, brain hemorrhage, death, renal failure or blindness. Minority mentioned being handicapped, diabetes mellitus and bleeding as the consequences of hypertension. A patient stated:

"It can make our life difficult. I have seen people around rushed to hospital due to brain hemorrhage or heart attack caused from hypertension. We can have renal damage, blindness or diabetes mellitus due to hypertension. I think high blood pressure causes bleeding of blood vessels and we might die."

However, a patient was unaware about the complications of hypertension and did not think it might have threatening complications to life as stated:

"I don't know. I have never thought if it would ever bring dangerous complications. I have not experienced anything like that or heard about it."

Timeline. The perceived timeline of hypertension varied from long term to short term course. Half of the patients described that hypertension was lifelong and it had long term course. The patient's perception about long term course was assimilated from the information from healthcare providers that they have to take their medicine for lifelong as stated:

"Doctor said it can be controlled but not treated which means my illness lasts lifelong. It will not leave me until I die."

Eight patients believed that hypertension was short term, such as from one to three years. A patient perceived that hypertension was acute lasting less than a month. She believed that hypertension would be cured after taking the medicine as stated:

"I will be normal after taking medicines. Doctors can cure my disease and that's why I came to hospitals. It will not last longer than a month."

Cure/ control. Regarding the dimension cure/ control, three open ended questions were asked. For the personal control, the majority of the patients believed that they had control over their hypertension. One patient stated:

"My blood pressure is under good control now because I have modified my diet and performing exercise daily."

Five out of thirty answered of having no control over the illness and two patients didn't know anything about it. One patient commented:

"*I don't have any control over my blood pressure. It keeps on increasing despite of whatever I do and sometimes it comes to normal when I do nothing."*

For the treatment control, patients were asked about the use of drug and lifestyle modifications to control hypertension. More than half of the patients were positive about the medication and lifestyle modification. Patients regarded medication as a way to feel safe because it helped to control BP. One patient specified:

"Medicines are definitely very good. I have been taking it for 10 years as doctor advised and I am healthy. I feel safe after taking medicine."

However, twelve patients had negative responses for medication such as they had to take it daily and lifelong which was tiring and they were having medication by compulsion and just because doctor had advised them to take it. Four patients did not like taking medication concerning about side effects but they didn't stop taking it.

"*I am worried that eating lots of medicines will make me weak and had other effects. I am scared it might decrease my BP more than normal someday. Though, I take it regularly because doctors prescribe me every time I come here. I couldn't deny when they give me medicine."*

Lifestyle modifications were regarded as helpful and important in controlling BP by most of the patients. Diet and exercise were the major components of lifestyle modification. Two of them also quoted it to be better than eating medicines. For example one patient stated:

"Changing lifestyle is advantageous as it controlled my BP. We have to stop eating lots of salt, meat and fats. We need to jog around every day. It makes me feel good."

Ten of the patients complained that it is difficult to adopt all the required lifestyle modifications due to time constraints, culture, festivals and their food habits. One patient commented:

"*We cannot follow all the rules of lifestyle modifications because of our culture and tradition like our eating habits and types of food. So sometimes we fail and it might affect our blood pressure."*

Three patients did not comment anything regarding lifestyle modifications to control hypertension.

Identity. The patients with hypertension reported headache and dizziness as the common identity of hypertension. The other symptoms experienced by patients were warm body, weakness, pain (neck, chest, back, eye, and ear), anger, weakness, tingling sensation, and palpitation. They reported, when they experienced these symptoms, they got worried and went for health check-up and preferred to follow instructions from doctors or nurses. Only one out of thirty patients had never experienced any symptoms related to hypertension whereas one patient described of facing lots of symptoms as:

"*When I have headache, backache, neck pain, feel dizzy and weak, then I know that my BP has risen. I go to hospital to check it. I listen to what nurses ask me to do. It makes me feel safe and less worried."*

Concern. For the dimension concern about hypertension, patients were largely concerned about the negative consequences brought upon by hypertension. Nine patients reported they were worried about the consequences of hypertension, such as sudden rise of BP, death or stroke. Six patients stated family as one of their concern. They were worried about being burden to their family if something happened to them due to high BP whereas some of them were worried that there would be nobody to take care of their family if they could not work. Four patients were worried about their

treatment, such as the possibility of being cured and lifelong medications. A patient commented:

"I am worried a lot. If something happens to me, my family will be devastated."

Eleven patients, on the other hand, mentioned they had no worries regarding hypertension at the moment. As a patient said below:

"*Worrying doesn't improve my illness. So I don't take any stress related to it and I am fine.'*

Coherence. Regarding the dimension coherence, more than half of the patients believed that they understood everything that they need to know about hypertension. Their understandings were based on the information they received from health care providers, friends, media and their present and past experience of hypertension. A patient informed:

"*I think I know all about hypertension. I had read about it in newspaper and received the information booklets. I learnt many things from it."*

Six patients perceived that their knowledge about hypertension is superficial. They stated that their information about hypertension was limited to the things they need to adopt to control BP. They need more information regarding the cause and treatment of hypertension. As a patient said below:

"*I have some idea about the things to follow after we have high BP but I don't understand about what causes high BP."*

Emotion. The answers for the dimension emotion varied from nothing to feelings of fear, anger and sadness. Seventeen patients did not felt anything about

having hypertension. Fear and anger were reported by ten patients and two patients stated they felt sad about their high BP. Patients emotion fluctuated with time when they had hypertension. As a patient stated below:

"*At times I feel angry to have this illness. Sometimes I have this sad feeling that god cursed me to have this disease and at times I had this fear what if I cannot live long because of high BP."*

Cause. Majority of patients perceived that hypertension came from the food they ate. They described it was customary to attend festivals and feasts where they had to eat food that could increase blood pressure. Almost half of them thought hypertension could be the result of taking lots of tension or stress. Other causes mentioned by patients were age, heredity, lack of sleep, obesity, getting angry frequently and fear of earthquake. Patients predominantly assumed that their food habit adapted from their culture and stress were the cause of their hypertension as reflected in the following statements:

"We, Nepalese have festivals or feasts or rituals every month, sometimes twice a month. It is difficult to avoid them as they (friends and relatives) might be disappointed if I don't attend. Even though I know that it is harmful for my health, I end up eating salty and fatty foods. I am worried about it."

Another patient quoted:

"I have mental stress when these festivals arrive. I know this increases my blood pressure. Preparing for feasts means buying lots of food and alcohol for guests. We spend lots of money for it but it is hard to earn but we have to do it anyways. "

Treatment adherence among patients with hypertension. Treatment adherence of the patients with hypertension was measured by using the MTAQPH. The summary of the results for overall treatment adherence and for each dimensions are illustrated in Table 6. The overall treatment adherence among the patients with hypertension was moderate. Regarding each dimensions of treatment adherence, all the dimensions; medication, dietary sodium reduction, adopting DASH eating plan, moderating alcohol consumption, smoking cessation, performing exercise were at high level except weight maintenance which was performed at moderate level.

Similarly, the level of treatment adherence was further analyzed as shown in Table 7. The majority of patients (84.7 %) had high level of treatment adherence and only 15.3 % had moderate level of treatment adherence.

Table 6

Median, Interquartile Range (IQR) and Level of Treatment Adherence (N = 85)

Dimensions	Possible scores	Min-Max	Median	IQR	Level
Total treatment adherence	41-164	99-158	140	17	Moderate
Medication	13-24	13-24	24	2	High
Dietary sodium reduction	5-20	5-20	19	5	High
DASH eating plan	10-40	23-40	34	6	High
Moderating alcohol consumption	5-20	11-20	20	2	High
Smoking cessation	4-16	7-16	16	0	High
Performing exercise	6-24	8-24	21	9	High
Weight maintenance	5-20	7-20	11	5	Moderate

Table 7

Frequency and Percentage of Level of Treatment Adherence (N = 85)

Level of treatment adherence	n	%
Moderate	13	15.3
High	72	84.7

Relationship between illness perception and treatment adherence among patients with hypertension. The relationship between illness perception and treatment adherence was analyzed by using Spearman's correlation (Table 8) as the test of assumption for normal distribution was not met. The results showed that there was a significant positive correlation between illness perception and treatment adherence (r_s = .26, p < .05) indicating that the higher threatening perception of the illness, the higher was the treatment adherence.

Furthermore, the relationship between dimensions of illness perception and dimensions of treatment adherence were also examined which is presented in Table 8. The directions of all the significant relationships were positive. The dimensions, consequences, timeline, treatment control, identity, concern and emotion had a significant positive relationship with total treatment adherence. The higher the perceived consequences (r_s = .36, p < .01), the higher the treatment adherence was. The higher the patient's perceived hypertension as chronic disease (r_s = .40, p < .01), the better treatment adherence they had. The higher the perceived treatment control (r_s = .33, p < .05), more they were adhered to treatment. The higher the perceived identity (r_s = .26, p < .05), the higher of treatment adherence. The higher perceived threatening concern (r_s = .28, p < .01), the higher of the treatment adherence and the higher affected emotion (r_s = .24, p < .05), the better treatment adherence they had.

Table 8

Spearman's Rank Correlation Coefficient of Relationship Between Illness Perception and Treatment Adherence

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Medication	1.00																
2. Dietary sodium reduction	.10	1.00															
3. DASH eating plan	.30**	.44**	1.00														
4. Moderating alcohol consumption	.23	.30**	.32**	1.00													
5. Smoking cessation	.12	.17	.23*	.43**	1.00												
6. Performing exercise	.16	.24*	.33**	.03	-.12	1.00											
7. Weight maintenance	.20	.22*	.29**	.24*	.12	.22*	1.00										
8. Consequences	.09	.18	.22*	.14	.01	.22*	.29**	1.00									
9. Timeline	.23*	.42**	.39**	.22*	.19	.09	.22*	.32**	1.00								
10. Personal control	.11	-.03	.04	.05	.02	-.12	-.03	-.38**	-.10	1.00							
11. Treatment control	.51*	.04	.37**	.11	.28*	.24*	.02	.03	.15	.10	1.00						
12. Identity	.00	.32**	.21	-.06	.12	.17	.08	.38**	.40**	-.47**	.04	1.00					
13. Concern	.11	.13	.17	.06	-.03	.16	.25	.55**	.34**	-.60**	-.06	.47**	1.00				
14. Coherence	.22*	.10	.19	-.03	.24*	.12	.02	-.20*	-.03	.23*	.30**	.06	-.38**	1.00			
15. Emotion	-.00	.18	.15	.04	.08	.20	.21	.57**	.29**	-.51	.03	.39**	.62**	-.18	1.00		
16. Total treatment adherence	.40**	.60**	.75**	.45**	.32**	.61**	.59**	.36**	.40**	-.07	.33*	.26*	.28**	.20	.24*	1.00	
17. Total BIPQ	-.00	.23*	.17	.09	.00	.13	.22*	.71**	.45**	-.74**	-.15	.59**	.86**	-.42**	.77**	.26*	1.00

**p< .05, **p< .01*

Discussion

The discussion of the study covers demographic data and health related characteristics of the patients, the level of illness perception and treatment adherence, and the relationship between illness perception and treatment adherence among patients with hypertension in Nepal.

Demographic characteristics among patients with hypertension. Eighty–five hypertensive patients under antihypertensive medication participated in the study at the Sahid Gangalal National Heart Centre. The mean age of the patients was 51.81 years (range, 30-76). Age over 35 years was regarded as a significant risk factor for hypertension (Kaur et al., 2012). The result was comparable with a study conducted in Nepal by Acharya and Chalise (2011) that reported a mean age of 51.26 years (range, 31-76) among patients with hypertension and a study in Malaysia by Ramli et al. (2012) reported that the mean age of patients with hypertension was 57.84 years (range, 32-84)..

More than half of the patients (62.4%) with hypertension were male. This finding was consistent with earlier studies on hypertension that reported 57% male patients in Nepal (Acharya & Chalise, 2011) and 60.3% male patients in Taiwan (Chen et al., 2011). The majority of patients in this study (90.6%) were married which is same as other studies (Acharya & Chalise, 2011; Chen et al., 2009; Chen et al., 2011; Saarti et al., 2015).

Regarding education, the majority of the patients (89.4%) were literate and the level of education was higher than secondary level. The current study enrolled patients who came to the hospital for their follow-up visits. Educated patients might be more aware of the importance of health check-ups and possibly were more likely

to come for follow-up visits than illiterate patients. Also, the study by Acharya and Chalise (2011) found 79% of the patients were literate and another study by Chen et al. (2011) found 87.3% of the patients were literate. The highest proportion of patients (87.1%) with hypertension belonged to the Hindu religion. The high percentage of Hindu patients in this study was possibly due to the high number of people in the general population of Nepal who follow Hinduism. The result was the same as the study by Acharya and Chalise (2011) where 80% of the participants were also from the Hindu religion.

Other socio-demographic characteristics (employment, family type and ethnicity) were comparable with previous studies done in Nepal. They reported that more than half of the patients had a nuclear family and one-third of the patients belonged to the Brahmin ethnicity which was the same as this study. Regarding the employment status, the highest percentage (20%) indicated that they were house workers, which is also similar with the previous studies (Acharya & Chalise, 2011; Khan et al., 2013).

From the above discussion, it can be concluded that all of the demographic characteristics of the patients in this study were consistent with hypertensive patients in previous studies conducted in Nepal and other Asian countries (Malaysia and Taiwan). It indicated that the sample acquired in this study was a good representative of Nepalese patients with hypertension.

Health-related characteristics among patients with hypertension. In the current study, almost three-quarters of the patients had hypertension for more than two years. Many previous studies reported longer duration of hypertension. The mean length of time since the diagnosis of hypertension was 8.59 years and 8.25 years in

studies by Li et al. (2012) and Ramli et al. (2012), respectively. The duration of hypertension was more than two years for about half of the patients (52.3%) in another study (Dennis et al., 2011).

Two-thirds of the patients had their blood pressure under control (below 140/90 mmHg) in the current study. Hypertension control status was significantly associated with medication adherence (Dennis et al., 2011). The majority of the patients in this study had a high level of medication adherence. Earlier studies had contradicting results regarding this issue. The mean BP was around 149/87 mmHg in a study by Ross et al. (2004). A study by Dennis et al. (2011) reported a higher proportion of patients (91.12%) had uncontrolled BP and Hekler et al. (2008) stated that the BP of almost three-quarters of the patients was not under control.

Chen et al. (2011) reported that more than half of the patients with hypertension were afflicted with comorbidities which was consistent with this study. Moreover, dyslipedemia was reported as a concomitant condition in patients with hypertension in two studies (Hsiao et al., 2012; Shah, Steiner, Vermeulen, Fleming, & Cory, 2007) which was also found in this study.

In this study, almost half of the patients (47.15 %) were under combination therapy of antihypertensive drugs. Although the patients mentioned the use of combination drugs, most of the patients used only one pill or one drug of antihypertensive medication in this study. The reason might be because of the use of ‘single pill combination drugs’ which was encouraged as it reduced the pill burden among the patients, simplified the treatment regimen and had fewer side effects, thereby increasing the treatment adherence (Gradman, Basile, Carter, & Bakris; Lewanczuk & Tobe, 2007). This was consistent with the study by Saarti et al. (2015) which mentioned that more than half of the patients used one pill per time for the

medication. Khan et al. (2013) reported about 21% of patients were under combination therapy whereas Pandaya, Reyald-ul-ferdous, Panthi, Pandey, and Maharjan (2014) and Ramli et al. (2012) reported about 68% and 69% of patients under combination therapy, respectively.

Consequently, the health related characteristics of the sample in this study also ensured a good representation of Nepalese hypertensive patients.

Illness perception among patients with hypertension. The first objective of the study was to find the level of illness perception. The total illness perception score was 40.35 ± 14.53 which represented a moderate threatening view of hypertension. In Nepal, patients perceived that cultural practice might influence their hypertension. Nepal has a large number of festivals and rituals accompanied by the intake of high calorie foods (Oli et al., 2014). The findings of the OEQ confirmed that patients perceived that their blood pressure level worsened by these cultural and religious rituals due to the consumption of salty and spicy foods or alcohol and the economic or mental burden to afford all the costs of the food, alcohol and preparation for the ceremonies. Hence, there might be a predisposition to the moderate threatening view of hypertension. Former studies on illness perception among patients with hypertension showed similar results (Ahmad et al., 2013; Saarti et al., 2015). However, the mean scores in the current study were slightly higher than the earlier studies which might suggest that the patients in Nepal perceived hypertension as a more threatening disease. Kucukarslan (2012) reported that discrepancies in cultural norms between the studies could play a role in the perception of a patient's illness.

The scores for illness perception dimensions showed that treatment control and timeline had the highest score followed by dimension consequences. It indicated

that hypertension was perceived as a chronic illness but could be controlled with treatment. Based on the OEQ, the majority of patients recalled that doctors and nurses in the hospital instructed them to follow the treatment (medicine and lifestyle modifications) for lifelong. This possibly led to the perception of hypertension as a permanent condition that they can control with treatment. This finding was supported in a study by Ross et al. (2004) which reported that hypertension was regarded as a long term condition, but it can be controlled. Ahmad et al. (2013) also reported the highest score for treatment control, followed by coherence and timeline. Belief in treatment was higher in patients with chronic conditions (Horne & Weinman, 1999). The patient's belief that hypertension has a long term course might have influenced their strong belief about the treatment control.

The dimension consequences had second highest score which indicated most of the patients perceived that hypertension has devastating consequences. The OEQ also revealed that patients believed hypertension might lead to serious complications such as paralysis of the body, a heart attack, stroke, or death which was consistent with previous studies (Kolb et al., 2011; Marshall et al., 2012; Rahman et al., 2015).The value for consequences of hypertension was also high for patients in Thailand (Nivedita, 2015).

The values for the remaining dimensions of illness perception were at mid-point which indicated medium threatening perception of patients regarding these dimensions. The moderate score in the dimension illness identity indicated that hypertension was regarded as a symptomatic illness which was supported by answers obtained from the OEQ. The major symptoms described by patients in the OEQ were headache and dizziness which supported the earlier studies (Kolb et al., 2011; Marshall et al., 2012). However, a plausible explanation for these findings seems

difficult because from a biomedical perspective hypertension is regarded as asymptomatic (Kaplan & Victor, 2010). Patients in Nepal tend to go for a health check-up and measure the BP only when they have symptoms or health problems. This might have led to the patient perception of hypertension as symptomatic as they discovered their hypertension only after experiencing symptoms. Leelacharas (2005) stated that the presence of these symptoms might also indicate other pathologies which the health care providers need to pay attention to.

The score was at the moderate level for personal control but lower than the treatment control score. As mentioned above, the patients might believe in the necessity of medicine prescribed by health care providers to control BP. Patients with a chronic disease believed that treatment can control BP and its consequences (Marshall et al., 2012). Patients in this study possibly had low self-confidence to adapt to the required lifestyle modifications which was also reflected in the answers obtained from the OEQ. Lifestyle modifications were stated as tiring and difficult to follow (Rahman et al., 2015). This finding was consistent with previous studies where the patients preferred treatment control over personal control (Ahmad et al., 2013; Nivedita, 2015; Ross et al., 2004).

All of the items that reflected the emotional representation arm scored average in this study. The OEQ in this study suggested that the concerns of the patients were related to the perceived consequences of hypertension. From the researcher's experience in the Nepalese community, the family and society play an important role in shaping emotions. The perceived consequences of hypertension, in particular paralysis of the body caused by stroke, might have instilled the fear of being neglected by the family and society in patients with hypertension. Kucukarslan (2012) reported that patients will have greater concerns about treatment if they have a greater

perception of illness consequences. A study by Morgan, Villiers-Tuthill, Barker, and McGee (2014) reported that perceived consequences could generate negative emotions in patients that affected emotional adjustment in patients with chronic illness.

The patients had various opinions about the factors that possibly caused their illness. Even though the cause of hypertension is unknown according to biomedical perspectives of hypertension (Dewit & Kumagai, 2013), the most common cause of hypertension as perceived by patients was a salty, fatty and unhealthy diet followed by stress, heredity and age. However, the risk factors that may attribute to hypertension can be classified as modifiable and non-modifiable risk factors. The perceived causes of hypertension in this study could be comparable to these risk factors since two-thirds of the patients endorsed the causes of hypertension as modifiable, specifically diet and stress. Nepal is rich in cultural festivals, feasts and religious rituals which influence the way people live. Patients stated that in the majority of these occasions, it is customary to follow the food customs and spend money lavishly adding to the economic burden. Moreover, the staple foods of Nepal include salty, spicy and oily foods. Hence, patients might have perceived diet and stress to be the overriding cause of their hypertension. Rahman et al. (2015) and Wilson et al. (2002) also reported diet and stress as the risk factors of hypertension.

Treatment adherence among patients with hypertension. This was the first study in Nepal to explore treatment adherence including all the components of treatment stated by the guidelines. The results revealed that the overall treatment adherence score was at the moderate level and the majority had a high treatment adherence level. The greatest proportion of patients in this study belonged to the

Hindu religion. Hindus in Nepal might respect and believe in health care professionals wholeheartedly. They tend to present good images of themselves with doctors and nurses. They are obliged to follow the instructions provided by doctors and nurses which possibly influenced the scores obtained for treatment adherence. A better patient-provider relationship had an influence in the achievement of better treatment adherence (Alsolami et al., 2014; Wang et al., 2015).

Similarly, another reason was possibly due to the place of the data collection which was the tertiary heart center where there was the provision of an appropriate patient counseling system by cardiovascular physicians and nurses. The researcher speculated that the physicians and nurses imparted knowledge on hypertension to each patient. Knowledge regarding hypertension contributed in the enhancement of treatment adherence (Karakurt & Kaşikçi, 2012; Ramli et al., 2012). Farmer (2012) reported that patients who attended the hospital and were willing to participate tended to be adherent which possibly left out many of the non-adherent patients from the study who did not attend the follow-ups at the hospital. This also possibly caused an overestimation in the adherence rates. Previous studies stated low treatment adherence of the patients (Banning, 2009; Ma et al., 2013; Shaw & Bosworth, 2012; Uzun et al., 2009).

In this study, treatment adherence included both modalities of treatment adherence: medication adherence and adherence to lifestyle modifications. The results revealed a high level of adherence for medication behavior which was contrary to the results described in earlier studies. Behnood-Rod et al. (2016) commented that medication adherence in Iranian patients was not satisfactory. Two previous studies reported that medication adherence was only around fifty percent (Kang et al., 2015; Li et al., 2012), including a study in Nepal where only 56.5% adhered to medications.

Since the dimensions of treatment adherence and the questionnaires used to measure treatment adherence were different in this study, the results might not be comparable with previous studies. Rao, Kamath, Shetty, and Kamath (2014) stated that the assessment tools and health care delivery system could result in discrepancies in the obtained rates. For medication adherence, the majority of research studies used the MMAS, whereas this study used self-reported questions to measure the adherence in the previous one week, ultimately resulting in higher adherence.

Along with medication adherence, patients had high levels of adherence for all the dimensions of lifestyle modifications except for weight maintenance. From the researcher's experience, while counselling the patients for treatment of hypertension, the nurses put less emphasis on weight maintenance compared to other components. They were not instructed to regularly measure their weight. Moreover, fat belly and overweight were regarded as signs of good health and prosperity in the Nepalese culture (Simkhada, Poobalan, Simkhada, Amalraj, & Aucott, 2011). These might have resulted in low scores on adherence to weight maintenance. Regarding the higher level of adherence to other lifestyle modification, previous studies had different findings. Hamer (2010) stated that the adherence to a healthy lifestyle was low. In a study by Uzun et al. (2009), adherence was high for the dimensions of smoking cessation, around fifty percent for DASH and lower for performing exercise. Ma et al. (2013) found that the scores for dietary, physical activity and weight control among patients were low. Similarly, another study measured the adherence in two lifestyle modalities, namely dietary control and performing exercise, and reported that both of them were low (Hareri, Abebe, & Asefaw, 2013).

Relationship between illness perception and treatment adherence among patients with hypertension. The result of this study suggested a significantly positive relationship between illness perception and treatment adherence. It supported the predictions of the common sense model (Leventhal et al., 2003; Leventhal et al., 1992; Leventhal, Leventhal, & Contrada, 1998). Based on the OEQ analysis, it could be suggested that the patients in this study assimilated and integrated the information on hypertension from different sources, particularly from communication with the health care providers and their previous knowledge inherent in the culture which influenced the regulation of their treatment adherence behaviors. Chen et al. (2009) also discussed the significant association between illness perception and treatment adherence. The results were also consistent with the findings of earlier studies (Hsiao et al., 2012; Rajpura & Nayak, 2014; Ross et al., 2004). On the other hand, two other studies reported they did not find a significant association between the study variables being discussed here (Chen et al., 2011; Saarti et al., 2015). These studies used different methods to assess illness perception and treatment adherence. Farmer (2012) explained that differences in the types of tools used might make a direct comparison between illness perception and treatment adherence complicated and might result in discrepancies in the results.

Furthermore, the interrelationships between the dimensions were also identified in this study. The dimensions of illness perception, particularly treatment control, timeline, and consequences were associated with treatment adherence. The associations of illness identity, concern and emotion with treatment adherence was also significant, but low.

Patient’s perception about cure/ control was noted as an important factor that affected treatment adherence in previous studies (Chen et al., 2009; Ross et al., 2004).

Two types of control, namely personal control and treatment control, were associated with patient treatment adherence. In the current study, there was a positive association between treatment adherence and treatment control. Also, in the dimension of treatment adherence, taking medication had a strong positive relationship with treatment control. Personal control did not show a significant relationship with any of the dimensions of treatment adherence. The cultural and religious norms in Nepal place the doctors and nurses in a highly valued and respectable profession. Patients tend to honor the advice from the health care professionals and believe that following their instructions is the only way to achieve better health. As a result, patients might be more inclined towards treatment control. In a previous study, treatment control was positively associated and personal control was negatively associated with treatment adherence (Ross et al., 2004).

Regarding the dimension timeline, there was a significantly positive relationship with overall treatment adherence which indicated that if the patient believes hypertension is long-lasting, they are more likely to continue their treatment. The patients in this study who participated in the OEQ stated that since hypertension stays with them forever, it could bring numerous consequences if they didn't adhere to the treatment and, therefore, they felt obliged to take the medicine and modify their lifestyle. This belief about the consequences might have mediated the positive association between the timeline and treatment adherence. However, Hsiao et al. (2012) reported that patients who believed in an acute timeline were more adherent than patients who believed that hypertension was a chronic disease. They reasoned that self-efficacy of patients was lower when the patient's perception of hypertension was chronic which led to a fall in adherence which was not applicable in the current study.

The perception of consequences was positively related to overall treatment adherence. The majority of patients had a high level of treatment adherence and had a high threatening perception related to consequences. Patients with a high perception of developing hypertension related consequences anticipated any life threatening situation ahead of them which might enhance their motivation to be adherent to their treatment (Li et al., 2012). It was logical to state this might be the reason for the association between consequences and treatment adherence among the patients in this study. However, it was inconsistent with the study by Ross et al. (2004) who reported an inverse relationship of consequence with treatment adherence and mentioned it as counter-intuitive. There were no newly diagnosed patients in a study by Ross et al. (2004), whereas the current study included all patients who were on treatment for at least 3 months. Horne and Weinman (2002) stated that the relationship between consequence and adherence is affected by duration of illness.

The illness identity was positively associated with overall treatment adherence in this study. Leventhal et al. (1998) explained that symptom experience might imply ineffectiveness of treatment and might cause a fall in adherence. However, patients in this study stated that it was necessary to follow instructions from the health care providers (doctors and nurses) to relieve their symptoms and restore their health. This cultural consideration of the patients regarding their belief in the effectiveness of treatment from the health care providers possibly influenced treatment adherence and resulted in a positive association between identity and treatment adherence. Earlier studies reported that a high score in illness identity led to a decrease in treatment adherence due to a discrepancy related to symptom experience between patients and health care providers (Chen et al., 2009; Chen et al., 2011; Hsiao et al., 2012).

The emotional aspects of illness perception, concern and emotion showed a negligible positive association with overall treatment adherence. The age of the patients in this study ranged from 30 to 76 years and they had no serious complications of hypertension or other comorbidities which might result in medium emotional perceptions which in turn would be less likely to influence the treatment adherence. Kucukarslan (2012) mentioned that the age and health condition of the patients might impact the role of emotions on treatment adherence. Previous studies (Hsiao et al., 2012; Ross et al., 2004; Žugelj et al., 2010) reported that a strong emotional perception influenced treatment adherence.

In conclusion, the moderate level of illness perception in patients suggested that hypertension was perceived as a moderately threatening illness. Patients believed that hypertension was a permanent illness lasting lifelong but could be controlled with appropriate treatment. The majority of patients perceived it might have serious consequences if not controlled. As a result, the patient's emotional aspects were moderately impacted from hypertension. Patients thought the major causes of hypertension were an unhealthy diet and stress. The patients labeled the occurrence of moderate symptoms such as headache and dizziness as indicator of hypertension.

Treatment adherence in patients attending SGNHC was at the moderate level. Moreover, patients were strongly adhered to taking the medication and other dimensions of treatment adherence except weight maintenance. Various factors might have contributed to these results such as religion, patient-provider relationship, knowledge of patients including the differences in tools used and current place of the study.

Treatment adherence was positively associated with illness perception of patients regarding hypertension. The patients' perceptions of treatment control,

consequences and timeline played major roles in enhancing their treatment adherence behavior. The CSM was useful in understanding the relationship between illness perception and treatment adherence among patients with hypertension in Nepal. As the original author of the CSM reported, it might be beneficial to identify the patient's own beliefs about hypertension before providing information in order to prevent gaps, misconceptions and confused patients. The researcher observed that due to the religious and cultural norms, the trust of the patients towards health care professionals was profound. The instructions from doctors and nurses largely contributed in influencing the illness perceptions of the patients in Nepal. Hence, the findings of this study suggested that nurses and health care providers could facilitate patients in changing their views to useful illness perceptions to assist in enhancing treatment adherence.

Chapter 5

Conclusion and Recommendation

This chapter comprises the conclusion, implications, limitations and recommendations of this study.

Conclusion of the Study

This descriptive correlational study was conducted to assess the level of illness perception and treatment adherence and also to assess the relationship of illness perception and treatment adherence among patients with hypertension. The study was conducted at the out-patient department of SGNHC, Bansbari, Kathmandu, Nepal. Eighty-five patients diagnosed as hypertension and registered in the hospital were recruited by purposive sampling method. Data were collected using the Demographic Data Questionnaire (DDQ), the Extended Brief Illness Perception Questionnaire (EBIPQ) with the Open Ended Questionnaire (OEQ), and the Modified Treatment Adherence Questionnaire for Patients with Hypertension (MTAQPH). Ethical considerations were strictly maintained throughout the data collection process. Validity and reliability of the instruments were examined before data collection. The reliability coefficients (Chronbach's alpha) were .72 for the EBIPQ and .89 for the MTAQPH. The data were analyzed using descriptive and inferential statistics that included a simple content analysis method for open ended questions. The assumption of normality, linearity and homogeneity were tested. The data set for treatment adherence did not meet the normality test. Thus, Spearman's rank correlation was used to examine the correlation between the study variables. The

findings revealed that illness perception and treatment adherence in patients was at the moderate level. The illness perception scores were high for the dimensions of personal control, timeline and consequences, whereas the scores for all dimensions of treatment adherence were high except for adherence to weight maintenance. The current study found a significantly positive relationship between illness perception and treatment adherence among patients with hypertension in Nepal. The dimensions of illness perception, particularly in treatment control, consequences and timeline, were significantly positively correlated with treatment adherence.

Strengths of the Study

Primarily, this is the first study that explores illness perception and treatment adherence among patients with hypertension in Nepal. The findings of the study can be useful to understand and generalize the perception of hypertension in the context of the Nepalese community as illness perception comes from information inherent in culture. This benefits the nurses in dealing with patients with hypertension in Nepal. Moreover, the open ended questionnaire was used in order to capture perceptions of a patient's illness in depth which aids the information obtained from the BIPQ and facilitates in the attainment of a clearer picture regarding illness perception of the Nepalese patients with hypertension. In addition, treatment adherence in this study covered not only medication adherence but all of the dimensions of lifestyle modifications of hypertension in accordance with the latest guidelines.

Limitations of the Study

This study also has some limitations. First, generalization of the study findings might be impacted as the patients were recruited based on purposive sampling from

only one large tertiary hospital in the central region. However, since this tertiary hospital is the national referral center for cardiology, a wide variety of patients from different areas of Nepal visited the hospital. Second, the study was a cross-sectional study that measured illness perception and treatment adherence among patients at one point of time. Therefore, any changing trend of these variables over time could not be assessed. Lastly, this study used only self-reported questionnaires to measure treatment adherence. The addition of objective questionnaires or observation of patient behaviors from family members might strengthen the measurements. Nevertheless, the objective measures to assess treatment adherence and observation might be complicated, time consuming and expensive.

Recommendations

The findings of the study provide several recommendations for nursing practice, nursing education and future nursing research studies.

Nursing practice. The findings of the study are relevant for implications in nursing practices which are described below:

1. This study provides baseline information regarding how patients perceive hypertension and provides direction for the relationship between illness perception and treatment adherence. Hence, the nurses can design illness perception based interventions to enhance treatment adherence among patients with hypertension in Nepal.

2. The nurses should address patient difficulties in maintaining lifestyle modifications to control hypertension due to the overwhelming number of festivals and feasts prevalent in the Nepalese community. They can find ways to help the patients by reducing the complexity of lifestyle modifications.

3. Regarding the adherence to lifestyle modifications, weight maintenance was found to be ignored which showed lower adherence than the other dimensions. As obesity is also one of the risk factors, nurses should focus on ways to enhance adherence to weight maintenance as well.

Nursing education.

1. Nurse educators should teach the students to emphasize each and every dimensions of treatment adherence while giving information to patients with hypertension.

2. The factors influencing treatment adherence, particularly illness perception can be incorporated as one of the teaching topics under caring for patients with hypertension.

3. It was noted that not all of the findings in the study were consistent with previous studies, indicating that culture and environment might influence the illness perception of patients with hypertension. Hence, it is suggested that the students assess the cultural background and perception of patients before applying the findings from different countries.

Nursing research.

1. Further studies to assess the effectiveness of illness perception based interventions to enhance treatment adherence in Nepalese cultural context should be conducted.

2. A longitudinal study design should be applied to assess and compare illness perceptions and treatment adherence over time.

3. Future studies to assess treatment adherence should emphasize both medication adherence and adherence to lifestyle modifications in order to fill the gaps in the literature regarding actual treatment adherence.

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Appendix A

Test of Assumptions

Table 9

Cronbach's Alpha Showing the Test Reliability of Illness Perception and Treatment Adherence (N = 20)

Measurement variable		Items	Cronbach's Alfa (α)
Principle scale	Sub Scale		
Illness Perception		8	.72
	Consequences	1	
	Timeline	1	
	Personal control	1	
	Treatment control	1	
	Identity	1	
	Coherence	1	
	Coherence	1	
	Emotional	1	
Treatment Adherence		41	.89
	Medication	6	
	Dietary sodium reduction	5	
	Adopting DASH eating plan	10	
	Moderating alcohol consumption	5	
	Smoking cessation	4	
	Performing exercise	6	
	Weight maintenance	5	

Table 10

Assumption of Normality by Kolmogorov-Smirnov Test

Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Treatment adherence	.08	85	.02	.98	85	.33
BIPQ domain	.09	85	.07	.96	85	.00
Consequences	.16	85	.00	.89	85	.00
Timeline	.31	85	.00	.76	85	.00
Personal control	.17	85	.00	.88	85	.00
Treatment control	.37	85	.00	.66	85	.00
Identity	.15	85	.00	.90	85	.00
Concern	.12	85	.00	.92	85	.00
Coherence	.18	85	.00	.91	85	.00
Medication	.28	85	.00	.67	85	.00
Weight maintenance	.23	85	.00	.80	85	.00
DASH eating plan	.10	85	.04	.96	85	.01
Dietary sodium reduction	.42	85	.00	.60	85	.00
Alcohol consumption	.45	85	.00	.53	85	.00
Smoking cessation	.22	85	.00	.85	85	.00
Performing exercise	.18	85	.00	.92	85	.00

Kolmogorov- Smirnov test: if $p > .05$ = not significant (assumption is met)

Table 11

Assumption of Normality by Skewness and Kurtosis of Variables

Variable	Skewness	Std.Error of Skewness	Kurtosis	Std.Error of Kurtosis	Z Skweness	Z kurtosis
Illness perception	-.51	.26	-.53	.52	-1.94	-1.03
Consequences	-.57	-.89	-.89	.52	-2.18	-1.7
Timeline	-1.08	.26	.013	.52	-4.1	-.02
Personal control	.02	.26	-1.46	.52	-.08	-2.82
Treatment control	-1.46	.52	2.16	.52	-6.60	4.17
Identity	-.80	.26	.138	.52	-3.06	.26
Concern	-.39	.26	-.92	.52	-1.47	-1.78
Comprehensibility	.05	.26	-.63	.52	-.17	-1.21
Emotion	-.47	.26	-.88	.52	-1.31	-1.73
Treatment adherence	-.94	.26	-.38	.52	-3.72	-0.81
Medication	-2.18	.26	5.01	.52	8.34	9.69
Weight maintenance	.89	.26	.43	.52	3.42	.82
DASH eating plan	-.47	.26	-.41	.52	-1.78	-.79
Dietary sodium reduction	-1.43	.26	2.26	.52	-5.46	4.35
Alcohol consumption	-.1.71	.26	-1.64	.52	-6.57	-3.17
Smoking cessation	-1.84	.26	-1.80	.52	-7.07	-3.48
Performing exercise	-.67	.26	-.85	.52	-2.59	-1.65

Figure 2

Assumption of Homoscedasticity

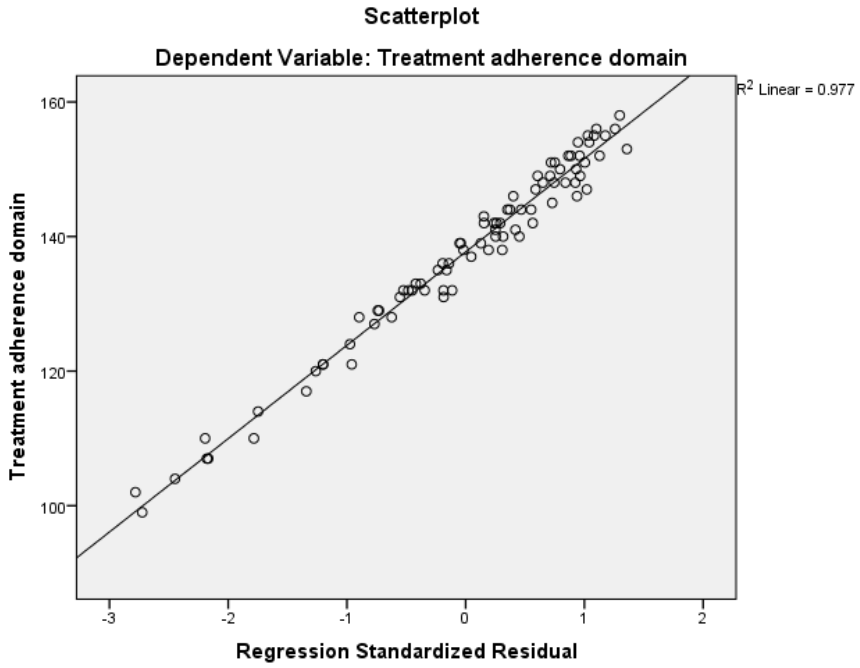
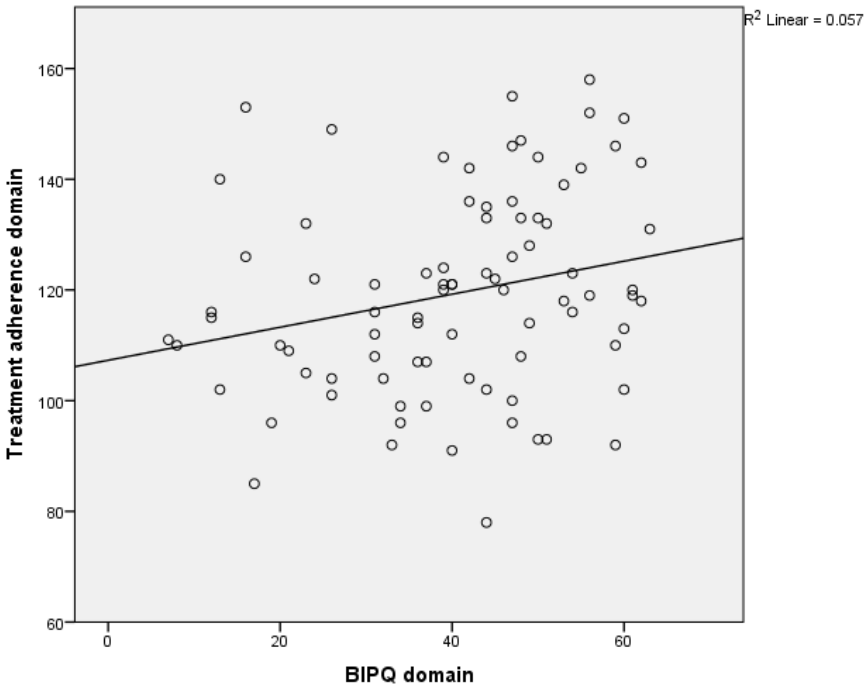


Figure 3

Assumption of Linearity



Appendix B

Informed Consent

Part I: Information Sheet

Dear participant,

I am Safala Maharjan, student of Masters in Nursing Science at Prince of Songkla University, Thailand. I am going to conduct a research study entitled 'Illness Perception and Treatment Adherence in Patients with Hypertension.' This is to fulfill the requirement of my Masters degree. I am going to give you required information and invite you to be part of this research. You do not have to decide today whether or not you will participate in the research. Before you decide, you can talk to anyone you feel comfortable with about the research. If you get confused, please ask me to stop at any time during the process and I will be happy to explain.

The reason I am doing this study is to learn more about how to help people who have hypertension. This study will help us learn more about the way people perceive hypertension and follow treatment and its effect on blood pressure control. We are asking people like you who will visit this clinic for treatment.

Your participation in this study is very important for me but it is your choice whether to participate or not. If you choose not to participate also, all the services routinely offered in this clinic will continue and will not affect your treatment at this clinic in any way. If you decide to participate in this study, I will ask you questions from set of questionnaires which will take about 40-60 minutes of your time. You may also stop and discontinue the interview at any time you choose. It is your choice and all of your rights will still be respected.

Your information will be kept confidential and I confirm that your name will not be appeared in any of the reports and information. The only people

allowed to see your answers will be the people who work on the study and people who make sure study is conducted in the right way.

All the procedures of this study have been approved by the ethical committee which makes sure that it does not involve any risk of harm to you. This study will contribute to increase nurses' knowledge regarding care of hypertensive patients. Hence being in this study may not help you now but may help people with hypertension in the future. You will not be paid money for participating in the study.

Lastly, if you have any questions you may ask at any time. If you wish to find more about this study, you can contact me by phone or e-mail provided in this paper without any hesitation. I will also provide you the copy of this paper. Thank you.

Part II: Certificate of Consent

I have read or have had read out all statements in the consent form and do hereby agree to voluntarily participate as subject in the study 'Illness Perception and Treatment Adherence in Patients with Hypertension.' I have understood that all information will be kept confidential.

I understood that I have the right to leave or cancel my consent and withdraw myself from this study at any time for any reason without penalty. I have had opportunity to ask questions about it and all my questions have been answered to me properly.

……. …….....

Signature of Participant Signature of Researcher

Date: Date:

Part III: Interviewer's Statement

I, the undersigned, have explained the respondent, to the best of my ability about the procedures of the interview and the risks and benefits involved in the study in a language that she understands. I confirm that all the questions asked by the participant have been answered correctly and I also gave her the contact address, in case she has any further questions.

A copy of the informed consent has been provided to the participant

Signature of the interviewer: _____ Date: _____

Name of the interviewer: _____ Contact no.: 9849373308

Code: ……
Date: …….

Appendix C

Demographic and Health Related Data Questionnaire (DHRDQ)

Date of Assessment: ……

This questionnaire consists of 2 parts: demographic data and health related data.

Please answer all the questions.

Part I: Demographic Data

1. Age : ……. Years
2. Ethnicity : ……
3. Gender : ( ) Male ( ) Female
4. Religion : ( ) Hindu ( ) Muslim
   ( ) Buddhist ( ) Christian
   ( ) Others ……....
5. Marital Status : ( ) Single ( ) Married
   ( ) Widow/ widower ( ) Divorcee
6. Educational status : ( ) No formal education ( ) Primary level
   ( ) Secondary level ( ) University
   ( ) Higher Secondary
7. Occupation : ( ) Housewife ( ) Agriculture
   ( ) Government ( ) Business
   ( ) Unemployed ( ) Others …….
8. Monthly family income : ……. Rupees
9. Family type : ( ) Extended/ Joint ( ) Nuclear
10. Who takes care of you in home?

    ……..

Part II: Clinical Data

11. Month(s) diagnosed with hypertension: ( ) < 6 months ( ) 6 to 12 months
    ( ) 12 to 24 months ( ) > 24 month
12. Hypertension stage : ( ) Stage I
    ( ) Stage II
    ( ) Stage III
13. Comorbidities : ( ) No ( ) Diabetes Mellitus
    ( ) Heart disease ( ) Dyslipidemia
    ( ) Renal disease ( ) Stroke
    ( ) Others
14. History of depression: …….
15. Medication:

Name of medicine	Dose	Frequency	Time	Total number of pills per time

Appendix D

The Extended Brief Illness Perception Questionnaire (EBIPQ)

Part I: Brief Illness Perception Questionnaire

For the following questions, please circle the number that best corresponds to your views:

1.How much does hypertension affect your life? 0 1 2 3 4 5 6 7 8 9 10 no affect at all — severely affects my life
2.How long do you think hypertension will continue? 0 1 2 3 4 5 6 7 8 9 10 a very short time — forever
3. How much control do you feel you have over hypertension? 0 1 2 3 4 5 6 7 8 9 10 absolutely no control — extreme amount of control
4. How much do you think your treatment can help hypertension? 0 1 2 3 4 5 6 7 8 9 10 not at all — extremely helpful
5. How much do you experience symptoms from hypertension? 0 1 2 3 4 5 6 7 8 9 10 no symptoms at all — many severe symptoms
6. How concerned are you about hypertension? 0 1 2 3 4 5 6 7 8 9 10 no at all concerned — extremely concerned
7. How well do you feel you understand hypertension? 0 1 2 3 4 5 6 7 8 9 10 Don't understand at all — Understand very clearly
8. How much does your hypertension affect you emotionally? (e.g. does it make you angry, scared, upset or depressed?) 0 1 2 3 4 5 6 7 8 9 10 not at all affected emotionally — extremely affected emotionally
Please list in rank-order the three most important factors that you believe caused your hypertension. The most important causes for me:- 1)……. 2)……. 3)…….

Part II: The Open-Ended Questionnaire (OEQ)

Please answer all of the questions:

1) What are the sign or symptoms that you have and think that it is related to your hypertension? (Identity)

……..……

……..……

2) What is/are the cause(s) of hypertension? (Causal)

……..……

……..……

3) How long do you think your hypertension will last? (Timeline)

……..……

……..……

4) What kind of consequences of hypertension do you think will affect your life? (Consequences)

……..……

……..……

5) Do you think that you have the control over your hypertension? (Cure/ Control)

……..……

6) What do you think about taking medications to control your hypertension? (Cure/ Control)

……..……

……..……

7) What do you think about lifestyle modifications to control your hypertension? (Cure/ Control)

……..……

……..……

8) What are you worrying about your hypertension? (Concern)

……..……

……..……

9) What do you understand/ don't understand about your hypertension? (Understanding)

……..……

……..……

10) How does hypertension make you feel? (Emotion)

……..……

……..……

Appendix E

The Modified Treatment Adherence Questionnaire of Patients with Hypertension (MTAQPH)

Instructions

Please indicate your behavior in the past week with the following statements by ticking the corresponding columns for all of the time, most of the time, some of the time, never**.**

None of the time : not performed
Some of the time : 1-3 days
Most of the time : 4-6 days
All of the time : everyday

Behaviors/ Frequency	All of the time (4)	Most of the time (3)	Some of the time (2)	None of the time (1)
Medication 1. I took the correct dose of prescribed medicines at correct time and correct frequency. 2. I missed my medicines that I should take. 3. I was willing to take medicines. 4. I took prescribed medications, whether in hypertension symptoms or not. 5. I did not increase or decrease tablets by myself. 6. I prepare and eat my medicine by myself.				

Behaviors/ Frequency	All of the time (4)	Most of the time (3)	Some of the time (2)	None of the time (1)
Dietary Sodium Reduction				
7. I ate low salt diet as recommended.				
8. I missed restricting salty diet.				
9. I was willing to eat low salt diet.				
10. I took low salt diet, whether in hypertension symptoms or not.				
11. I knew the foods that contain low salt and I choose my food by myself.				
Adopting DASH Eating Plan				
12. I ate low fat and low cholesterol diet				
13. I reduced intake of sugar and sweets.				
14. I ate food with more roughage.				
15. I increased intake of fresh vegetables and fresh fruits.				
16. I ate more bean products.				
17. I increased intake of low fat dairy products.				
18. I missed adopting above dietary modifications.				
19. I was willing to adopt dietary modifications.				
20. I modified my diet after others forced me.				
21. I prepare my food by myself.				
Moderating Alcohol Consumption				
22. I decreased the frequency and amount of drinking/ I did not drink alcohol.				
23. I couldn't restrict alcohol.				
24. I was willing to restrict/ not drink alcohol.				

Behaviors/ Frequency	All of the time (4)	Most of the time (3)	Some of the time (2)	None of the time (1)
25. I restricted drinking/ did not drink alcohol after others force me. 26. I restricted/ did not drink alcohol, whether in hypertension symptoms or not.				
Smoking Cessation 27. I did not smoke. 28. I was willing to not smoke. 29. I did not smoke because others forced me. 30. I did not smoke, whether in hypertension symptoms or not.				
Performing exercise 31. I do correct type of exercise as recommended. 32. I exercised more than 30 minutes per time. 33. I missed doing exercise. 34. I was willing to perform exercise. 35. I did exercise after others forced me. 36. I performed exercise, whether in hypertension symptoms or not.				
Weight Maintenance 37. I limited the total diet. 38. I took my weight daily. 39. I missed taking my weight. 40. I was willing to control my weight. 41. I measured my weight, whether in hypertension symptoms or not.				

Appendix F

Letters for Data Collection

FACULTY OF NURSING

PRINCE OF SONGKLA UNIVERSITY

P.O. BOX 9, KHOR HONG, HATYAI
SONGKHLA, THAILAND, 90112
FAX NO. 66-74-286421
TEL. NO. 66-74-286456,
66-74-286459

MOE 0521.1.05/ 5401

December 8, 2015

To: Director of Bir Hospital

This letter is to inform you that Ms.Safala Maharjan ID. 5710420035, a master student of the Faculty of Nursing, Prince of Songkla University, Thailand, is taking a thesis in this semester. As part of the requirement of the course, she has to conduct a research study in Indonesia. Her thesis is entitled: "Illness Perception and Treatment Adherence among Patients with Hypertension in Nepal". The thesis proposal has been approved on 11 November 2015. Therefore, She will try-out of research instrument from 20 patients in your hospital during December 2015.

I will be greatly appreciated if Ms.Safala Maharjan is permitted to try-out research instruments in your hospital, as it will provide valuable information for nursing profession in the future.

If you need any further information regarding het study, please do not hesitate to contact us at the above address or e-mail us at: tippamas.c@psu.ac.th.

Sincerely Yours,

Assistant Professor Umaporn Boonyasopun, PhD., RN
Associate Dean Research and Graduate Study
Faculty of Nursing,
Prince of Songkla University
THAILAND

FACULTY OF NURSING

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MOE 0521.1.05/ 5402

December 8, 2015

To Director of Shahid Gangalal National Heart Centre,
Kathmandu, Nepal

This letter is to inform you that Ms. Safala Maharjan ID. 5710420035, a master student of the Faculty of Nursing, Prince of Songkla University, Thailand, is taking a thesis in this semester. As part of the requirement of the course, she has to conduct a research study in some government hospitals in West Sumatera, Indonesia. Her thesis is entitled: Illness Perception and Treatment Adherence among Patients with Hypertension in Nepal. The thesis proposal has been approved on October 11, 2015. Therefore, she will collect the data from Nurses and Miswives in Shalid Gangalal Nation Heart Centre during December 2015 to February 2016.

I will be greatly appreciated if Ms. Safala Maharjan is permitted to collect her data in your hospital as it will provide valuable information for nursing and midwifery profession in the future.

If you need any further information regarding her study, please do not hesitate to contact us at the above address or e-mail us at: tippamas.c@psu.ac.th

Sincerely Yours,

Assistant Professor Umaporn Boonyasopun, PhD., RN
Associate Dean Research and Graduate Study
Faculty of Nursing,
Prince of Songkla University
THAILAND

FACULTY OF NURSING

PRINCE OF SONGKLA UNIVERSITY

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MOE 0521.1.05/8369

Ethics Committee Approval

December 9, 2015

To whom it may concern:

This letter is to confirm that the Nursing Faculty Ethics Committee approved the research study of Ms.Safala Maharjan ID. 5710420035 entitled "Illness Perception and Treatment Adherence among Patients with Hypertension in Nepal" on November 11, 2015. The study is a major part of Ms.Safala Maharjan' s Master Degree at the Faculty of Nursing, Prince of Songkla University, Thailand. The study ensures the rights, safety, confidentiality, and welfare of research participants and it was determined that the study would not be harmful to the participants in the future.

Sincerely,

Assistant Professor Umaporn Boonyasopun, PhD., RN
Associate Dean Research and Graduate Study
Faculty of Nursing,
Prince of Songkla University
THAILAND

Appendix G

Letters of Acceptance for Collecting Data

Government of Nepal

Nepal Health Research Council (NHRC)

Estd. 1991

Ref. No.: 1300

18 February 2016

Ms. Safala Maharjan
Principal Investigator
Prince of Songkla University
Thailand

Ref: **Approval of Research Proposal** entitled, **Illness Perception and Treatment Adherence among Patients with hypertension in Nepal**

Dear Ms. Maharjan,

It is my pleasure to inform you that the above-mentioned proposal submitted on 25 January 2016 (**Reg.no. 18/2016** please use this Reg. No. during further correspondence) has been approved by NHRC Ethical Review Board on 17 February 2016.

As per NHRC rules and regulations, the investigator has to strictly follow the protocol stipulated in the proposal. Any change in objective(s), problem statement, research question or hypothesis, methodology, implementation procedure, data management and budget that may be necessary in course of the implementation of the research proposal can only be made so and implemented after prior approval from this council. Thus, it is compulsory to submit the detail of such changes intended or desired with justification prior to actual change in the protocol.

If the researcher requires transfer of the bio samples to other countries, the investigator should apply to the NHRC for the permission.

Further, the researchers are directed to strictly abide by the National Ethical Guidelines published by NHRC during the implementation of their research proposal and submit progress report and full or summary report upon completion.

As per your research proposal, the total research amount is **Self-Funded** and accordingly the processing fee amount to **NRs. 10,850.00.** It is acknowledged that the above-mentioned processing fee has been received at NHRC.

If you have any questions, please contact the Ethical Review M & E section of NHRC.

Thanking you,

.....
Dr. Khem Bahadur Karki
Member-Secretary

SHAHID GANGALAL NATIONAL HEART CENTRE
(Established Under Shahid Gangalal National Heart Centre Act 2057)
Bansbari, Kathmandu, Nepal

P.O.Box: 11360, Kathmandu, Nepal
Phone: 4371322, 4371374, 4370622
Fax No : 977-1-4371123
E-mail: sgnhc@sgnhc.org.np

Ref. No.: 072/073
Dispatch No.: 1239

Ref No: SGNHC/IRC No: 2-2016

19 February, 2016

Safala Maharjan
Principle Investigator
Shahid Gangalal National Heart Centre
Bansbari, Kathmandu, Nepal

Subject: **Approval of Research Proposal** entitled Illness Perception and Treatment Adherence among Patients with Hypertension in Nepal

Dear Safala,

It is my pleasure to inform you that the above proposal submitted on 24 December 2015 (Reg. No. 2 – 2016) has been approved by Institution Review committee of Shahid Gangalal Nation Heart Centre on 8 February 2016. Please use this Reg. No. during further correspondence.

As per IRC SGNHC rules and regulations, the researcher has to follow the protocol as mentioned in the proposal. If the researcher wants to make any changes in his research she needs to get a fresh approval.

We hope that she carries out her research sincerely and diligently. She should co operate and maintain cordial and friendly relationship with the patients of SGNHC.

Sujeeb

Dr. Sujeeb Rajbhandari

Consultant Cardiologist and Associate Professor of Cardiology

Member Secretary (Institutional Review Committee of SGNCH)

Appendix H

Letter for Completion of Data Collection

SHAHID GANGALAL NATIONAL HEART CENTRE

Bansbari, Kathmandu Phone No.4371322, 4371374

10. March.2016

To Whom it May Concern

This is to certify that Ms, Safala Maharjan who is doing Masters in Nursing, in Prince of Songkla University, Thailand is has successfully completed her data collection in the research titled "Illness Perception and Treatment Adherence among Patient with Hypertension in Nepal". She complied with the rules and regulations as mentioned in the protocol.

We wish her all the best for her completed research.

Dr. Sujeeb Rajbhandari

Consultant Cardiologist & Member Secretary of Institutional Review Board

Appendix I

List of Experts

Three experts who validated the content of the instruments were:

1. Assist. Prof. Dr. Wipa Sae-sea, RN. PhD.

   Faculty of Nursing, Prince of Songkla University, Thailand

2. Ms. Sununta Sakude, RN.

   APN at Songklanagarind Hospital, Thailand

3. Dr. Binita Poudel, RN. PhD (Research Methodology)

   Faculty of Nursing, Nepal Institute of Health Sciences

VITAE

Name Safala Maharjan

Student ID 5710420035

Educational Attainment

Degree	Name of Institution	Year of Graduation
Bachelor of Science in Nursing	Nepal Institute of Health Sciences	2009

Scholarship Awards during Enrolment

Thailand's Educations Hub for Southern Region of ASEAN Countries (TEH-AC) Scholarship, Graduate School, Prince of Songkla University, Thailand.

Work-Position and Address

Instructor, Faculty of Nursing, Nepal Institute of Health Sciences, Kathmandu, Nepal

List of Publications, Poster and Proceeding

Maharjan, S., & Kritpracha, C. (2015, 6-8 November). *Predictors of Medication Adherence in Patients with Hypertension: A Literature Review.* Paper presented at the The 1st Udayana International Nursing Conference Global Health: Nursing Perspective, Bali, Indonesia.