2017

Hypertension and its Association with Socioeconimic Factors in Rural Nepal

MASTERTHESIS IN PUBLIC HEALTH

BIRGIT JANSEN TANDSTAD

Abstract

Background: Hypertension is a major risk factor for cardiovascular diseases in all regions of the world. There is an increasing prevalence of hypertension and cardiovascular diseases in developing countries and this is no different in Nepal. Studies from many developed nations have suggested an association between lower socioeconomic status and higher prevalence of hypertension; however, in many developing countries, an association between high socioeconomic status and hypertension has been observed. The increase of hypertension has also been observed in rural areas in Nepal.

Study design: This is a Cross-sectional Study conducted in a primary health facility in rural Nepal.

Purpose: The purpose of this study is to estimate the prevalence of hypertension in a rural village in Nepal, and to determine the association between socioeconomic indicators (income, education and occupation), with hypertension. This has not yet been studied in this area of Nepal and this study will contribute information of prevalence of hypertension and socioeconomic factors in a rural health setting.

Method: This study was conducted among 260 participants at Kirneter health Center located in Dolakha district of Nepal. The study was conducted between October and December 2016. Information on sociodemographic, lifestyle, dietary, and other clinical history of each of the participants was collected using a standardized questionnaire. We measured systolic and diastolic blood pressure 2 times and then calculating each patients' mean blood pressure as a measure for defining hypertension. Multiple logistic regression models was used to assess association of socioeconomic factors with hypertension.

Results: Prevalence of hypertension was 19.2% in this study. Participants who attained higher education, had higher income and those employed had higher odds of hypertension compared to those with lower education, low income or farmers. However, the result is not statistically significant.

Conclusion: We observed no clear evidence of positive association between higher socioeconomic status and hypertension among patients from Kirnetar health center. Future studies with larger sample size are needed to replicate our findings.

Keywords: Hypertension, income, education, occupation, sociodemographic factors, Nepal, South Asia, Low and middle income countries.

Acknowledgements

I owe my deepest gratitude to the guidance of my supervisor Abhijit Sen for all his input and discussion for moving the project forward. Special thanks to my co-supervisors Archana Shrestha and Biraj Karmacharya for sharing their knowledge and expertise about the topic, Nepal, and for the help in training the local research assistants. Undertaking primary data collection in Nepal would not have been possible without their help and support. I am also grateful for all the help we received from Dulikhel Hospital's community department, who helped me to understanding Nepalese context, and also for their positivity and support. A huge thanks to the research assistants Uz val and Saroj who conducted the interviews in the Nepalese language. They also gave a lot of information and local knowledge of Nepal and Nepalese culture. I would like to thank the employees at Kirnetar health center who gave us our own room for our data collection and also contributed with information about the village of data collection and Kirnertar health center. I would also like to thank Jacob for his constant support, positivity and guidance with my thesis work. Lastly I would like to thank Rikke, whom I collaborated with during the data collection, and Eva who gave me useful feedback in presenting the result.

Table of Contents

Abbreviations

SES	Socioeconomic factors
LMIC	Low and middle income countries
CVD	Cardiovascular diseases
SBP	Systolic blood pressure
DBP	Diastolic blood pressure
OR	Odds ratio
CI	Confidence interval
IQR	Inter quartile range
BMI	Body mass index
NPR	Nepalese Rupees
MET	Metabolic equivalent minutes
WHO	World Health Organization

List of Tables and Figures

1. Introduction

Hypertension

Blood pressure is measured in millimeters of mercury (mm Hg), and recorded as systolic blood pressure (SBP), the maximum blood pressure during one heartbeat, and diastolic blood pressure (DBP), the minimum blood pressure between 2 heart beats (1). A person is considered to have hypertension when their blood pressure is raised indefinitely from ≥ 140 mmHg SBP, and/or from ≥ 90 mmHg DBP (2).

Global Burden of Hypertension

In 2015, the global prevalence of people diagnosed with hypertension was estimated to be 900 million among those who are 25 years or older (3). Furthermore, in 2010, hypertension was considered the leading risk factor of the global disease burden, accounting for 7% of global disability adjusted life years (4, 5). Moreover, the World Health Organization has reported that a suboptimal blood pressure is responsible for 62% of cerebrovascular diseases, and 49% of ischemic heart diseases. It has been therefore stated that suboptimal blood pressure is the number one attributable risk factor for death worldwide (6). In 2013, there were 17.3 million people dying of cardiovascular diseases (CVDs) globally (7), and it is predicted that during the first 25 years of the 21st century, the burden of hypertension is expected to increase by 60% (8). This increasing trend of hypertension prevalence has also been seen in Nepal, where from the year 1980 to 2006 there has been an increase in prevalence of hypertension from 6% to 18% in one specific area (9). Furthermore, the national estimates in Nepal in 2013 found that the prevalence could be as high as 26% (10).

Since hypertension does not have any symptoms before disease onset, it is difficult to find recent estimates of the global cost of hypertension (1). In 2001 alone, the global cost of non-optimal blood pressure was US$370 billion, which equates to 10% of the global health care expenditure (11). In low and middle income countries (LMIC), the cost of CVDs was US$3.76 trillion (1). In Central Asia and Eastern Europe, the economic expenditure on blood pressure related health care was as much as 25% of the total health care expenditures (11, 12). In developing countries, if citizens had access to health care and paid for their own necessary medicines to treat chronic diseases (such as hypertension), 2-4 % of the population would be driven below the poverty line, which is less than 1.25 US dollars a day (13).

Consequences of Raised Blood Pressure

Hypertension usually occurs when the blood vessels have a persistently raised pressure. If the blood pressure is high, it will be more challenging for the heart to pump the blood around the body. This can lead to aneurysms and weak spots in the blood vessels. Furthermore, it can lead to blood clots, which can cause blood vessels to burst. If this happens in the brain, for example, it is likely to cause a stroke (14).

A normal blood pressure for humans is defined as 120 mmHg SBP, and 80 mmHg DBP. Pre-hypertensive is defined as high normal blood pressure in the range of 120–139 mmHg for SBP, and 80–89 mmHg for DBP (2). An SBP of 135mmHg, and/or a DBP of 85mmHg is also considered to be a risk factor for hypertension and other diseases (2). If hypertension remains untreated it will increase the danger of severe morbidity and mortality since it is the major risk factor for CVDs (1), and since hypertension usually has no symptoms, it is considered a 'silent killer' (1).

Socioeconomic Status

The relationship between the socioeconomic status (SES), and both mortality and health is well known (15). It is claimed that individuals with a lower SES are more prone to bad lifestyle factors, such as smoking, bad diet, and increased alcohol intake (16). Studies have shown that a higher SES is associated with a lower blood pressure in many developed countries (17, 18); however, in many low and middle income countries (LMIC), several studies have reported a high SES associated with high blood pressure (19-22). Despite this, the association might differ between geographical locations, and there has also been increasing prevalence of hypertension among people with lower SES in developing countries (15, 16, 20, 22).

2. Literature Review

2.1. Epidemiology of Hypertension; Global Overview

The prevalence of hypertension has increased in many developing countries in last decades (2). Today, hypertension is most prevalent in low-income countries in South Asia and Sub-Saharan Africa (23). In high mortality countries, including Nepal, high blood pressure is the third largest cause of mortality, after malnutrition and unsafe sex (24). In South Africa, the risk of death from high blood pressure has increased by 25% in less than a decade (25). In regions such as China, which has a lower-mortality rate, high blood pressure is the highest contributor to total mortality (24).

Studies have reported that hypertension has been decreasing globally from the year 1980 to the year 2008 in some parts of the world (25). This decrease has been highest in high income countries (23). A study from the US suggested that hypertension and CVD have been decreasing steadily in the country since 1988 due to interventions such as increased hypertension control and awareness among people in the society (26). Furthermore, in high income countries, people suffering from hypertension were usually more than 60 years of age, whereas in LMIC, a greater burden of people with hypertension were seen to be in the middle age group (40-59 years) (27).

For South Asians, the prevalence of hypertension is claimed to be approximately 12% among the young population, which includes 14.3% male youth, and 7% female youth (27). Moreover, a study in India has claimed that 20.6% of Indian men and almost 20.9% women have hypertension (28). Another study claimed that the prevalence of hypertension in individuals in India below 40 years of age, was almost 13% (29). A review from the World Health Organization (WHO) suggest that the prevalence of hypertension in India has increased from 5% in the year 1960 to above 30% in 2008 (30). The prevalence of hypertension is highest in urban areas where the increase has been 30-fold in the last 55 years, compared to the rural areas where the increase has been 10-fold in last 36 years (21, 27). In Vietnam, the prevalence of hypertension in adults aged between 25-34 was around 11% for men and around 4% for women (31).

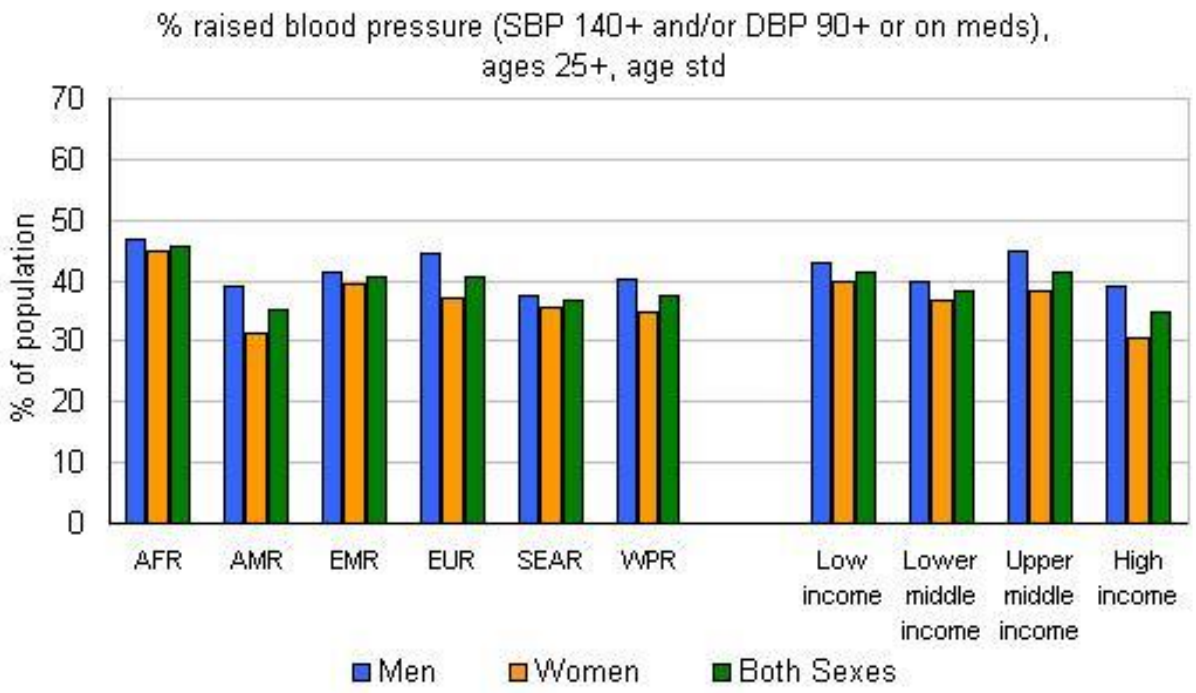


Figure 1.1. Percentage of People with Raised Blood Pressure. The percentage of people with raised blood pressure is shown as a function of gender, geographical location, and countries' wealth. http://www.who.int/gho/ncd/risk_factors/blood_pressure_prevalence_text/en/

2.2. Modifiable Risk Factors

Excessive alcohol consumption, tobacco, high salt intake, smoking, sedentary lifestyle, and increasing BMI are potential risk factors for hypertension (32, 33). With the increasing urbanization and globalization in LMICs, the risk for hypertension is increasing (34). In Asia, there are several studies that have reported hypertension prevalence in context of these risk factors (35, 36).

2.2.1. Alcohol Consumption

Alcohol is harmful for health and it is directly associated with higher blood pressure regardless of geographical location (24). Moreover, alcohol consumption has been reported to be increasing in developing countries (37). Earlier it was more common to drink homebrew beers and drinking at special occasion; however, more people in developing countries now have access to industrial alcoholic beverages, which leads to higher proportion of binge drinking and leaving some people with little money left (37).

In Nepal, alcohol consumption is associated with low SES and a higher prevalence of hypertension (38, 39). A study conducted in an eastern town in Nepal suggested alcohol

dependence was associated with low educational attainment. They suggested that 35.8% of those who were illiterate had an alcohol dependence, while 16.8% of the highest educated participants had an alcohol dependence (40). They also found that males had twice as high alcohol dependence as females (40).

2.2.2. Tobacco Products

In South Asia, there is increasing access to tobacco products among the poorer segments of the society, and an increasing hypertension prevalence (34). In a meta-analysis of tobacco use in this region they found 55.6% of males and 15.7% of females are using tobacco products. Furthermore, tobacco use was linked to higher education and better wealth (41). A study conducted in Nepal found association between age and smoking, where for every 10 years increase in age the prevalence of smoking increased nearly two-fold and more males than females were smokers (42). Moreover, a health survey from Nepal suggest that 51% of the population in Nepal use tobacco products. This is an increase from 30.3% in 2006 (42). In this study, smoking was significant associated with the poorest segment of the participants (OR 2.92) and those with lowest education (OR7.58) compared to those with highest income and education (42).

2.2.3. Salt Consumption

Excessive salt intake is associated directly with increased blood pressure (6). The main source for salt intake is salt added while cooking, and also processed food (5). The increasing availability of such salt sources in LMICs can have a bad effect on health (5). In South Asia, where the general salt consumption is high, it is thought to be a major cause of increased blood pressure (36). The WHO recommendations for salt intake is set to less than 5 g per day, and less than 2 g per day of salt to reduce blood pressure (5).

2.2.4. Fruits and vegetables

A study from Nepal assessed the association between hypertension and fruit/vegetable consumption found that the people who had high fruit and vegetable consumption had a 45% lower risk of developing hypertension compared to people who eat little or no fruits and/or vegetables (43). Fruits and vegetables are components of the diet that are associated with better health, and their consumption prevents major diseases such as cardiovascular diseases (6). Consumption of fruits and vegetables varies between different geographical locations due to different cultures, economies and agricultural traditions (6). Nevertheless, low intake of fruits

and vegetables is estimated to cause about 31% of ischemic heart disease, and 11% of strokes, globally (6).

2.3.Non-Modifiable Risk Factors

2.3.1. Age

It is well known that hypertension increases with age for both genders (28) (44), therefore, it is estimated that the lifetime risk for people developing hypertension between the ages of 55 and 65 years will increase to 90% (45). In 1950, people who were above 65 years of age accounted for around 5% of the global population, which increased to 8% by 2010. It is expected to further increase to approximately 15% by the year 2040, where LMICs will experience the highest increase in age (46).

2.3.1. Gender

The WHO reported that the global prevalence of hypertension is 40.8% in men and 36% in women (30). Furthermore, they reported that the prevalence in South East Asia is 37.6% for men and 35.4% for women (30). Nepal is an exception in this study, where the prevalence of hypertension was found slightly higher among women than men (38.4% for men and 38.7% for women (30). Furthermore, a study from Vietnam found significantly higher hypertension prevalence among males than females. They also found that the awareness of hypertension differed between males and females where females were more aware of their hypertension status (20). Moreover, observations from a meta-analysis suggest that the estimate of the prevalence of hypertension will increase, especially among women, by 2025, and in countries such as India, hypertension will be higher in women than in men (28).

2.4.Relation between Socioeconomic Status and Hypertension: Global Overview

Socioeconomic status is defined as a person's position in the society on the basis of their prestige, lifestyle, values, and attitudes (47). Important determinants of SES are income, education, and occupation, or a composite of these (19, 20, 48). Education and type of occupation is found to be strongly correlated since many types of jobs need certain skills, whereas education and income is less correlated (48).

In developed countries, higher SES is associated with better health and lower blood pressure (16). These findings are supported by a study in USA where they reported significant association between lowest income (OR 1.17) compared to highest income and lowest educational attainment (OR 1.23) compared to participants with highest education level (49). In the same study they suggested an association between black, non-Hispanic and hypertension

(OR 1.58), compared Hispanic participants (49). Conversely, in LMICs, people who have raised blood pressure and hypertension are more likely to have a higher SES (19, 50). This trend is inconsistent and can also differ between genders. For example, a study from South Africa found a decrease of SBP of 0.15mmHg in females, when doubling the monthly income. This was found opposite in males, where an increase in DBP of 0.12 mmHg per year when doubling the income (51). Similar result was suggest in education level; Females with higher education experienced lower blood pressure, whereas males, blood pressure increased among those with higher education (51)

2.4.1. Education

The educational attainment has been steadily increasing worldwide in last decades (52). From 1950 to 2010, the proportion of those without no formal schooling has decreased from almost 50% to 14.8%, respectively. In South Asia, those who have completed primary school has increased from 5.4% to 18.8% (52).

Lack of education is found to increase the risk for cardiovascular diseases and hypertension (18, 19, 48). This trend is linked to people with higher education having better knowledge about health, facing lower psychological stressors, and are more concerned about healthy behavior (15). Moreover, research in East Asia suggested a higher prevalence of hypertension among the less educated group of individuals (53). These findings are further supported by a study in rural China, where prevalence and awareness of hypertension were linked to individuals with little or no education (54). Despite this, a study from India found a higher prevalence of hypertension among the higher educated participants, compared to the low education group (55); however, the participants with low education were more frequent smokers, which is also a risk factor for hypertension (55). Similar results have been obtained from a South Indian rural population, where they found that the odds for hypertension among males increases 1.79 times for those who attained higher education compared to those who did not attended school (56). Among the female participants, an inverse association between the education status and hypertension was found (56). Another study from Vietnam found an inverse relationship, where a higher hypertension prevalence was found among the less educated group. The males with less than secondary school had a prevalence around 40%, whereas the prevalence was approximately 17% among high educated (20).

2.4.2. Income

High income is linked to better health and lower blood pressure in many high income countries (17). A study from USA found that for each $50.000 increase in income, there was a decrease in SBP of about 0.61mmHg (18). Similar findings were found in a study conducted in Saudi Arabia, where they suggested a link between income and hypertension (57). The study documented that the group defined as the lower income group had higher blood pressure than the group defined as the high income group. Therefore, it was concluded that the lower income group was more likely to develop diseases, such as cardiovascular disease (57). This trend was also found among poor people living in a slum area in Brazil, where the prevalence of hypertension was suggested to be quite high in the low income group (38.5% in females and 18.4% in males) (58). Another study from Brazil found the prevalence of hypertension in the lowest income group to be almost 30% compared to the highest income group, where they estimated around 17% had hypertension (59). Despite this, a meta-analysis from middle income countries found a positive link between income and blood pressure that revealed the prevalence of hypertension to be 38% in the second highest income group (fourth quantile), compared to the lowest income group, where they found the prevalence to be at 33% (60). Similar results were found from a WHO national survey from India in 2007, where they found significant association between income and hypertension. Among males, they found the OR to be 1.95 and among females the OR was 1.40 compared to the poorest (61). Moreover, in this study they suggested a trend of increased odds for hypertension among participants residing in urban area (OR 1.70), compared to rural participants.

2.4.3. Occupation

Type of work and working conditions are important due to personal development, social relations, financial security, and social status. Workplaces where individuals experience stress are associated with 50% increased risk of coronary heart disease (62).

A study from India found prevalence of hypertension to be 30% among males working as private employee had almost 30%, compared to manual labor, where the prevalence was 17% (56). In the study, they found among females, highest prevalence of those reporting homemakers at and the lowest prevalence was found among those doing manual labor work, 17.3% and 14.3%, respectively (56). Similar results were observed in several studies from India, where farmers and manual laborers have a lower prevalence of hypertension compared to those working in government/non-government jobs, or those self-employed (63, 64). Furthermore, a study from Vietnam found an association between occupation and hypertension,

where male farmers were found to have the lowest hypertensive prevalence of 13.1%, compared to those having government jobs with a prevalence of 21.2% (20).

2.5.Relation between Socioeconomic Status and Hypertension: Overview in Nepal

2.5.1. Profile of Nepal

Nepal is a country with approximately 29 million inhabitants, and is placed in South Asia with India and China as neighbours. Around 80% of the inhabitants in Nepal live in rural areas (65), Nepal is considered a low income country with around 25% of the inhabitants living below the poverty line (less than US$1.25 per day) (66). As with many other low income countries, direct payment (also called out-of-pocket expenditure), is the major source of health funding, where the second biggest source is the government spending, followed by donors and organizations (67). According to the government of Nepal the nominal per capita income in 2011 was around 42000 Nepalese Rupees (US$400), whereas the richest 10% earn 40% of the total income (68).

Enrollment rate in primary school in 2011 was 78% and seondary school 28% (68). Moreover, males have higher literacy rate than females, 72% and 45% respectively. Proportion of currently employed (including farmers with income) has increased from 67 percent in 1995/96 to 78 percent in 2010/11 and Around two-third of female population and half of the male population has farming as their occupation. (68)

Nepal is divided into three different belts; Northern range – the Mountains, Mid-range - the Hills and Southern range – the Terai (flat land). Access to facilities, such as health centers and schools, depends where people live. Around 43% of the rural population live within 30 minutes walking distance to a health clinic or private hospital (68). Those living in hilly areas or mountains have a lack of car roads and can walk for several hours and up to days to reach a health clinic or other services (68).

2.5.2. Ethnicity/caste system in Nepal

Ethnicity in Nepal has been an important determinant of which socioeconomic position individuals belong to. The caste system is divided into three main groups, where one of the highest caste groups includes the caste Brahmin. Historically, Brahmins have been receiving special treatment, such as tax relief and exemptions from labor work to undertake government projects instead. Low caste groups, have experienced more difficulties in receiving higher positions in the workplace (69). A study in Nepal has found a link between low caste ethnicity groups including Tamangs had higher prevalence of hypertension than higher caste Brahmins and Chhetris (70). Moreover, this study showed there low caste were heavier smokers and

consumed more alcohol compared to the high caste (70). A study published in 2017 found links between ethnic groups and the awareness of hypertension in Dulikhel, Nepal (71). The ethnic groups that had a higher income, and a higher education were more aware of their blood pressure (71).

2.5.3. Hypertension and its association with income, education and occupation in Nepal

Over the last decades there has been a huge increase in hypertension in Nepal (9). A study comparing prevalence of hypertension from Bhadrabas in Kathmandu found an increase in hypertension (defined as a blood pressure of 160/95mmHg), from 6% in the year 1980 to 18% in the year 2006 (9). From the WHO Step Survey conducted in the year 2013, the prevalence of hypertension was found to be almost 26% for both genders, including those on medication, among the 4200 participants. Furthermore, approximately 88% of hypertensive individuals did not use any anti-hypertensive medication (10). Similar results were found from a study conducted in a semi-urban area of Nepal, where 29% of the population had hypertension (72), and the percentage was 11.1% for people below 30 years of age (72). Approximately 70% of the participants with hypertension were unaware of their condition, and only 18% were taking medicine (72).

A study from the central development region in Nepal found the prevalence of hypertension to be 22.4% (73). Moreover, they found increased odds for hypertension among literate participants and lower odds among those who cannot not read or write (73). Furthermore, lifestyle factors such as smoking, alcohol consumption, and sedentary lifestyle were also strongly associated with hypertension (73). A study on cardiovascular disease from a remote rural community in Sindhuli district of Nepal found the prevalence of hypertension to be at 12.3% (74). Moreover, those with no formal education the prevalence was 14.9%, 8.3% among those with completed primary education, and the prevalence slightly increased to 9.1% among those with secondary or higher education (74).

Another study from rural Nepal estimated the prevalence of hypertension among a group of rural Nepalese women The total prevalence was found to be 3.3% of the women enrolled in the study (38). In this study, women who were unemployed had 4.3% prevalence of hypertension compared to those reported as employed (3.1%) (38). In this study, low SES (which was measured as household quality, household assets and farming/food storage) was associated with hypertension. For example, participants with low farming and food had 1.40 odds for developing hypertension compared to the highest group in the same category (38).

A cross-sectional study conducted in the Dharan municipality in Eastern Nepal in which one thousand males aged 35 years and above were included (2004-2005), found the prevalence of hypertension to be 22.7% (75). They found those with administrative work had double the prevalence of hypertension compared to those doing labor work, 34.9% and 16.8% respectively (75). Furthermore, in this study they measured SES with hypertension. They found those considered middle SES had highest prevalence of hypertension (26.4%, compared to those with low SES had 19.6% and high SES 18.3%) (75).

3. Rationale of This Study

3.1.Rationale of the Study

This research contributes exclusive data from Kirnetar, a remote area in Nepal. The association between Hypertension and socioeconomic factors has not yet been studied in this region, and therefore no data is yet available. This study will help to get an understanding of the prevalence of hypertension in a rural health setting in Nepal, and provide important insight between SES and hypertension. By understanding the magnitude of hypertension, future interventions can be undertaken before potential diseases occur.

3.2.Objectives and Research Questions

3.2.1. Aim

The overall aim of this study is to assess the relationship between demographic factors, socio-economic factors, and the prevalence of hypertension among patients visiting Kirnetar health center located in remote area of Dolakha district in Nepal.

3.2.2. Objectives

1. To estimate the prevalence of hypertension among adult patients visiting a primary-level health facility in rural Nepal.
2. To examine the association of hypertension with the socioeconomic factors (education, income and occupation) among adult patients visiting a primary-level health facility in rural Nepal.

3.2.3. Research hypothesis

We hypothesize that individuals with high SES are more likely to be hypertensive

3.2.4. Specific research hypothesis

1. We hypothesize that those who had attained high education are more likely to be hypertensive than those who had no formal education.
2. We hypothesize that those who had high level of income are more likely to be hypertensive than those with low income.
3. We hypothesize that those who are employed or have jobs are more likely to be hypertensive than those unemployed.

4. Methods

This is a hospital based, cross-sectional study to estimate the prevalence of hypertension and socioeconomic factors among adult patients visiting a primary-level health facility in the rural village of Kirnetar in Nepal. This study was launched in October, and ended the last week in November 2016.

4.1.Study Region

Kirnertar in Dolakha district is in the Hill area, 100km east from Kathmandu, the capital city, and has a population between 1000 – 2000 people. The health center is one of the 21 rural health centers of Dhulikhel Hospital. The center was opened in 2012, delivering various primary-level health services to rural people of this area in the Dolakha district. There is a total of 8 health staff working at this center. Around 600-800 people are visiting the health clinic each month and a normal health check costs an average of 200-300 Nepalese Rupees (US$ 1.90-2.90 USD).

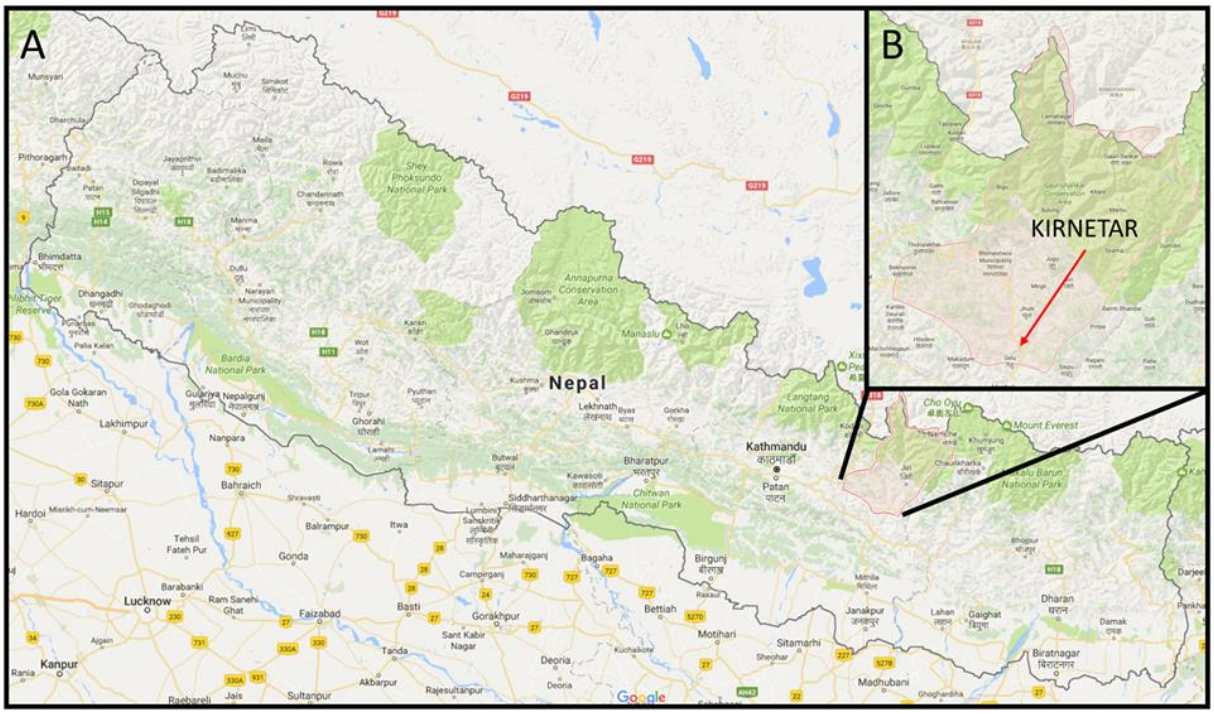


Figure 2.2. Study Location Map. This map shows Nepal and surrounding countries (A), with a magnification showing the Dolakha district, and the relative location of Kirnetar (B). Figure adapted from Google Maps

4.2.Study Population and Recruitment

The total sample size comprised of 260 participants. We recruited patients who were 18 years or older, who visited the center for clinical examination or purchasing medicine at the Kirnetar Health Center. The data was collected from 27. October, 17 to 01.December, 17. The total days of data collection was 26 days.

4.3.Data Collection

The research leader and local research assistants conducted face-to-face interviews with the eligible consenting participants in a private room at Kirnetar Health Center. All eligible participants were given oral information about the study objectives and were enrolled after giving informed consent. A standardized questionnaire was used to collect data on sociodemographic characteristics, lifestyle factors, diet, and medical history. The questionnaire was adopted from the standardized and validated Non-Communicable Disease Risk Factors: STEPS survey Nepal 2013 (10). Clinical instruments included a blood pressure monitor (GT - 702 Fully Automatic Arm Style Digital Blood Pressure Monitor), to measure blood pressure two times at least 15 minutes apart, before and after interview. The mean value of the first and second measurement was used for the analysis. The total time of the interviews, including clinical measurements varied from 15 minutes to 30 minutes.

4.3.1. Sample size calculation

Sample size was estimated using raosoft power calculaton. Out of the calculation with 5% critical limit (95% confidence interval) the approximate sample size of the study was around 260 participants. With this sample size, the margin of error would lay around 200 (6.48%) and 300 (5.10%). (Estimated from http://www.raosoft.com/samplesize.html)

Measures

The questionnaire included information on sociodemographic characteristics such as age, gender, marital status, ethnicity, education, income, land ownership, and occupation. Additionally, we collected anthropometric data such as height and weight, and lifestyle factors including alcohol intake, diet, physical activity, and smoking.

4.3.2. Outcome Variable

Research leader measured the blood pressure two times in a sitting posture over loose clothing using the GT-702 blood pressure machine. We ensured the participants had been sitting in a resting position for at least 15 minutes before the second measurement. Hypertension was defined as a systolic blood pressure of 140 mmHg, or higher and/or diastolic blood pressure of 90 mmHg or higher, or under hypertensive medication within the last two weeks of the interview

4.3.3. Socioeconomic Status

Participant's SES was defined by the following factors:

Income: We asked the combined income of all household members (in Nepali Rupees) in the past year. We divided the total reported income with the number of people in the household to estimate the household annual income per capita. We divided it further into tertiles as low income, middle income, and high income.

Education: The participants reported both (i) years in school, and (ii) the highest level of education completed. For our analysis, we used the level of education completed. Education was categorized into 'no formal schooling' for those who has not attended school, 'less than high school level' for those having at least one year of formal schooling, including those who have started, but not completed high school and 'completed high school and above` for those who have completed high school or have higher education.

Work status: The work status was categorized as farming for those doing agriculture. Government jobs, non-government jobs, or self-employment was categorized as employed. For those who reported that they were retired, students, unpaid, unable to work, unemployed, or homemaker were categorized unemployed.

4.3.4. Lifestyle Factors

Tobacco intake: Information on smoking and smokeless tobacco use was collected to identify those who were never, current, and former smokers. To identify those who were current users, the quantity of either smoking or smokeless tobacco products used in the past 30 days was asked. For those using tobacco products in the past, meaning before the last 30 days were asked which age they stopped using tobacco products. Those who said they never have used tobacco products were considered never smokers or smokeless users. For the analysis, smoking tobacco and smokeless tobacco was categorized into tobacco intake.

Alcohol consumption: Pictorial cards showing different kinds of glasses and bowls most commonly used in Nepal were used to help the participants recall the amount of alcohol consumed. The amount, as identified by the respondent, was then used to calculate the number of standard drinks of alcohol consumed (one standard drink contains 10 grams of ethanol). The amount in milliliters, as identified by the respondent, was then used to calculate the number of standard drinks of alcohol consumed. Low drinkers were those having less than one standard drink per week. Moderate drinkers were identified by those having one to three drinks per week and heavy drinkers were those having five standard drinks or more, per week.

Physical activity: The participants were asked for how many minutes/hours a week they are either moderately active, or heavily active trough work, travel to and from places and leisure. The total minutes/hours of each participants were calculated. *By* using the Global Physical. Activity Questionnaire, the activity level of at least 600 metabolic equivalent minutes (MET) per week was categorized as having adequate physical activity as per the WHO recommendations (76).

Salt intake: Salt intake: The questions regarding participants perception of their salt consumption was asked. Questions included in the analysis were asked as "How often do you eat processed food high in salt", and "How much salt or salty sauce do you think you consume" were included. For the analysis, it was categorized into little, just the right amount, or too much.

Fruit and vegetable consumption: This was measured using servings of fruits less than 2, 2-4, or more than 4 servings of fruits and vegetables per day. The WHO recommendation is more than 5 servings fruit/vegetable per day (77); however, almost all the participants reported eating less than 5 servings per day, therefore we divided the consumption into smaller groups as defined and categorized above.

4.3.5. Pre-testing questionnaire

The questionnaire was tested by the research leader, the research assistants, and a locally trained employee from Dulihel Hospital to make sure the questions were asked in suitable way and followed the ethical procedures. Six random patients from the main hospital in Dulikhel approved to participante. The data and identifiers were not kept.

4.3.6. Hypertension awareness and treatment

Self reported questions were asked to identfy the participants blood pressure hitory. Questions were asked as "Have you ever had your blood pressure measured by a doctor or other health worker?" and "have you ever been told by a doctor or health worker of raised blood pressure". Fo those who answered positive to the last questions were considered aware.

4.3.7. Anthropometric measure

Body mass index (BMI): The body mass index of the participants measured using "BOSCH Electronic scale PPW4201" was calculated as weight in kilograms divided by height in meters squared. The participants were then categorized as either underweight (< 18.5 kg/m^2), normal ($18.5 – 24.9$ kg/m^2), overweight ($25.0 – 25.9$ kg/m^2), or obese (≥ 30.0 kg/m^2) (5).

4.4. Statististical analysis

Normal distribution of the quantitative variables was assessed using histogram and Q-Q plots. Descriptive statistics of sociodemographic, lifestyle, and dietary factors was summarized. The means and standard deviations were calculated for continuous variables, while numbers and percentages were calculated for categorical variables. To assess whether sociodemographic, socioeconomic factors, lifestyle and dietary factors differ between normotensive and hypertensive groups, chi-square tests was performed, and t-test was used for continuous variables.

A multivariable logistic regression model was used to calculate odds ratio and the corresponding 95% confidence interval to assess association between hypertension and socio-economic factors. Three models with different sets of covariates were used. Model 1 was unadjusted. In Model 2, sociodemographic factors (age, sex, marital status, and ethnicity) and socioeconomic factors were adjusted. Finally, in Model 3, all variables from model 2 plus the lifestyle factors including alcohol consumption, tobacco status, physical activity, fruit and vegetable consumption, and salty sauce consumption were additionally adjusted. A two-tailed p-value of less than or equal to 0.05 was statistically significant.

Statistical analysis was performed using SPSS version 24 (IBM, Ehningen, Germany).

4.5.Ethical approval

The project was approved by the Norwegian Ethical Committee and Dulikhel Hospital Institutional Review Committee, Nepal.

Informed consent: Patients of the Kirnetar health center took part in the study voluntarily. Research assistants explained the study's goals, purpose, and aims, as well as how the data will be used and kept anonymous, in the Nepalese language. We ensured both literate and illiterate patients understood the goal of the study, and their role in the consent form before signing the consent. For those who were illiterate we used fingerprints, along with a signature of a witness who was either family member or one of the health staff. All participants received a copy of the consent form.

The identifiers (name, address, and telephone number), were collected on a separate page with a unique identification code. The data was entered with a code and only de-identified data was taken back to Norway for analysis. The identifiers stayed in Nepal in a safe locker in Dhulikhel hospital, where only an authorized hospital personnel have access to the files.

5. Results

5.1.Descriptive Statistics

A total of 260 participants were recruited at the Kirnetar Health center in Dolakha district of Nepal. All quantitative variables (except income) were normally distributed.

Table 1 presents the demographic characters, socioeconomic variables, and lifestyle characteristics by gender. There were 51.5% males and 48.5% females in this study, with a mean age of 43 and 48, respectively. Majority of the participants were between 18 to 49 years old. Additionally, majority of the participants were married and belonged to the Brahmin/Chhetri castes In comparison to female population, more males were hypertensive.

Higher proportion of males reported higher income, were highly educated, and reported employed as work category compared to females. Moreover, farming is the most frequent occupation among females. Furthermore, more males consume tobacco and alcoholic beverage. Additionally more males have had their blood pressure measured, whereas slightly more females are considered overweight or obese.

Table 1A. Distribution of Sociodemographic Characteristics of Study Participants

	Male (n=134)	**Female (n=126)**	**Total (n=260)**
	n (%)	**n (%)**	**n (%)**
Hypertensive	32 (23.9)	18 (14.3)	50 (19.2)
Demographic factors			
Age groups in years			
18-34	34 (25.4)	43 (34.1)	77 (29.6)
35-49	44 (32.8)	44 (34.9)	88 (33.8)
50-65	23 (18.1)	32 (23.9)	55 (21.2)
66 and over	16 (12.7)	24 (17.9)	40 (15.4)
Age in years, Mean (SD)	43 (15.9)	48 (16.7)	45 (16.4)
Marital status			
Unmarried	15 (11.2)	23 (18.3)	38 (14.6)
Married	119 (88.8)	103 (81.7)	222 (85.4)
Ethnicity, n (%)			
Brahmin/Cethhri	92 (68.7)	81 (64.3)	173 (66.5)
Dalits	17 (12.7)	18 (14.3)	35 (13.5)
Others	25 (18.7)	27 (21.4)	52 (20)
Socioeconomic status			
Education, n (%)			
No formal education	36 (26.9)	77 (61.1)	113 (43.5)
Less than high school	71 (53)	35 (27.8)	106 (40.8)
High school or more	27 (20.1)	14 (11.2)	41 (15.8)
Income grade			

Low income	34 (25.4)	47 (37.3)	81 (31.2)
Middle income	48 (35.8)	45 (35.7)	93 (35.8)
High	52 (38.8)	34 (27)	86 (33.1)
Annual Income median (IQR) In NPRs In USD	 24500 (45500) 236 (438)	 13095 (30890) 126 (298)	 16733 (36074) 161 (348)
Occupation			
Unemployed	37 (29.4)	22 (16.4)	59 (22.7)
Employed	61 (45.5)	12 (9.5)	74 (28.1)
Farming	51 (38.1)	77 (61.1)	128 (49.2)

Abbreviation *:* IQR, Inner quartile range
Hypertension: Proportion of hypertensive among male and female with SBP from >140mmHg or/and DBP from >90mmHg or on hypertensive medicine
For categorical variable, Pearson's chi-square test was used
For continuous variable, t-test was performed

Table 1B. Distribution of Lifestyle Characteristics of Study Participants

	Males	**Females**	**Total**
	n (%)	**n (%)**	**n (%)**
Lifestyle factors			
Tobacco intake			
Never	29 (21.6)	79 (62.7)	108 (41.5)
Current	51 (38.1)	9 (7.1)	60 (23.1)
Former	54 (40.3)	38 (30.2)	92 (35.4)
Alcohol/weekly			
Never	82 (61.2)	113 (89.7)	195 (75)
Low (<1glass/week)	6 (4.5)	4 (3.2)	10 (3.8)
Moderate (1-3 glass/week)	13 (9.7)	1 (0.8)	14 (5.4)
High (>3 glass/week)	33 (24.6)	8 (6.3)	41 (15.8)
Physical activity			
MET total min/week			
MET <600	11 (8.2)	17 (11.9)	26 (10)
MET >600	123 (91.8)	111 (88.1)	234 (90)
Dietary Factors			
Fruits and vegetables			
<2 servings/day	22 (16.4)	13 (10.3)	35 (13.5)
2-4 servings/day	100 (74.6)	104 (82.5)	204 (78.5)
>4 servings/day	12 (9)	9 (7.1)	21 (8.1)
Salt			
Consumption of processed food			
Little	119 (88.8)	96 (76.2)	215 (82.7)
Just the right amount	14 (10.4)	26 (20.6)	40 (15.4)
Too much	1 (0.7)	4 (3.2)	5 (1.9)
Salty sauce consumption			
Little	28 (20.9)	24 (19)	52 (20)
Just the right amount	70 (52.2)	63 (50)	133 (51.2)

Too much	36 (26.9)	39 (31)	75 (28.8)
Clinical history			
Measured blood pressure			
Never	21 (15.7)	25 (19.8)	46 (17.7)
Yes	113 (84.3)	101 (80.2)	214 (82.3)
Been told of raised blood pressure			
Never	86 (85.1)	77 (68.1)	163 (76.2)
Yes	15 (14.9)	36 (31.9)	51 (23.8)
Anthropometric measures			
BMI			
Underweight	14 (10.4)	22 (17.5)	36 (13.8)
Normal weight	89 (66.4)	71 (56.3)	160 (61.5)
Overweight	25 (18.7)	27 (21.4)	52 (20)
Obesity	6 (4.5)	6 (4.8)	12 (4,6)
BMI kg/m^2 , Mean (SD)	22.7 (3.7)	22.4 (4.1)	22.5 (3.9)

Abbreviation *:* BMI, body mass index; MET, metabolic equivalent
Tobacco intake (smokeless + smoking tobacco)
For categorical variable, Pearson's chi-square test was used
For continuous variable, t-test was performed

Table 2 presents the socio-demographic and lifestyle characteristics of the normotensive and hypertensive participants. Among 260 participants, a total of 50 (19.2%) participants were hypertensive. The mean age of hypertensive participants was 51 years, whereas normotensive participants were 44 years (p 0.01).

The median annual household per capita income was higher among hypertensive compared to normotensives. Additionally, a higher proportion of hypertensive belong to the high income earners (p <0.05). Higher proportion of participants with higher education were also found among the hypertensive, whereas a higher proportion of the normotensive reported no formal schooling. Majority of hypertensive were employed whereas the major work category among normotensive participants was farming. Moreover, about 84% of the hypertensive participants meet the WHO recommendation (METmin/week of 600 or more) of being physical active. Lower intake of fruits and vegetables, and higher intake of processed food were also more common among the hypertensive compared to normotensive. Higher proportions of hypertensive compared to normotensive are former smokers and moderate drinkers. In addition, hypertensives were more likely to be overweight and obese than normotensive participants (p=<0.01). Moreover, 28.6% of the hypertensive have not been told they have raised blood pressure and was therefor unaware of their condtition.

Table 2 Distribution of Sociodemographic Factors of Normotensive/Hypertensive

	Normotensive n = 210	**Hypertensive n = 50**	**P-value**
	n (%)	**n (%)**	
Demographics factors			
Age group (in years)			
18-34	67 (31.9)	10 (20)	**0.05**
35-49	70 (33.3)	18 (36)	
50-65	45 (21.4)	10 (20)	
66 and over	28 (13.3)	12 (24)	
Age in years, mean (SD)	44.1 (16.1)	50.8 (16.7)	**0.01**
Gender			
Male	102 (48.6)	32 (64)	**0.05**
Female	108 (51.4)	18 (36)	
Marital status			
Unmarried	31 (14.8)	7 (14)	0.89
Married	179 (85.2)	43 (86)	
Ethnicity, n (%)			
Brahmin/Chhetris	141 (67.1)	32 (64)	0.57
Dalits	26 (12.4)	9 (18)	
Others	43 (20.5)	9 (18)	
Socioeconomic factors			
Education, n (%)			
No formal education	94 (44.8)	19 (38)	0.28
Less than high school	85 (40.5)	21 (42)	
High school or more	31 (14.8)	10 (20)	
Income grade			
Low income	66 (31.4)	15 (30)	**0.03**
Middle income	78 (37.1)	15 (30)	
High	66 (31.4)	20 (40)	
Annual Income NPRs, median (IQR)	16333 (323)	26286 (91817)	
Annual income USD, median (IQR)	160	255 (888)	
Occupation			
Unemployed	47 (22.4)	12 (24)	**0.02**
Employed	52 (24.8)	21 (42)	
Farming	111 (52.9)	17 (34)	

Abbreviation *:* IQR, Inner quartile range
For categorical variable, Pearson's chi-square test was used
For continuous variable, t-test was performed
***P≤0.05* is statistically significant**

Table 2b Distribution of Lifestyle Factors of Normotensive/Hypertensive

	Normotensive n = 210	**Hypertensive n = 50**	**P-value**
	n (%)	**n (%)**	
Lifestyle variables			
Tobacco status			
Never	88 (41.9)	20 (40)	0.72
Current	50 (23.8)	10 (20)	
Former	72 (34.3)	20 (40)	
Alcohol status			
Never	158 (75.2)	37 (74)	0.82
Low (<1glass/week)	8 (3.8)	2 (4)	
Moderate (1-3 glass/week)	10 (4.8)	4 (8)	
High (>3 glass/week)	34 (16.7)	7 (14)	
Physical activity			
MET total min/week			
MET <600	18 (8.6)	8 (16)	0.12
MET >600	192 (91.4)	42 (84)	
Fruits and vegetables			
<2 servings/day	27 (12.9)	8 (16)	0.45
2-4 servings/day	164 (78.1)	40 (80)	
>4 servings/day	19 (9)	2 (4)	
Salt			
Processed food consumption			
Little	170 (81)	45 (90)	**0.011**
Just the right amount	37 (17.6)	3 (6)	
too much	3 (1.4)	2 (4)	
Salty sauce consumption			
Too little	32 (15.2)	20 (40)	**<0.001**
Just the right amount	110 (52.4)	23 (46)	
Too much	68 (32.4)	7 (14)	
Clinical history			
Measured blood pressure			
Never	38 (18.1)	8 (16)	0.73
Yes	172 (81.9)	42 (84)	
Been told of raised blood pressure			
Never	151 (87.8)	12 (28.6)	**<0.001**
Yes	21 (12.2)	30 (71.4)	
Anthropometric measures			
BMI groups			
Underweight	32 (15.2)	4 (8)	**<0.001**
Normal weight	138 (65.7)	22 (44)	
Overweight	33 (15.7)	19 (38)	
Obese	7 (3.3)	5 (10)	
BMI Kg/m^2, mean (SD)	21.9 (3.54)	24.9 (4.37)	

Abbreviation *:* BMI, body mass index; MET, metabolic equivalent
Tobacco intake (smokeless + smoking tobacco)
For categorical variable, Pearson's chi-square test was used
For continuous variable, t-test was performed
***P≤0.05* is statistically significant**

5.2.Multivariable regression

Table 3 describes then crude and adjusted association of socio-economic status (income, educational attainment, and occupation) with hypertension.

In comparison with the lowest category of individual income, individuals within the highest group were found to be positively associated with hypertension (OR model 1, 1.33, 95% CI; 0.63-2.83); however, the association was not statistically significant. After adjustment of education, occupatiom, age, marital status and ethnicity, the odds ratio increased slightly (OR model 2, 1.45, 95% CI, 0.49-3.12), but remained statistically non-significant.

Indiviuals with higher educational attainment had also higher odds of having hypertension, compared with those with no formal education (OR model 1, 1.60, 95% CI, 0.67-3.80); After adjustments for income, occupation, age, sex, marital status, ethnicity, tobacco intake, alcohol consumption, diet, physical activity, and salt consumption, the OR increased (OR model 3, 3.31, 95% CI, 0.84-13.06). We observed a linear trend of increased hypertension with each higher category of education ($P_{\text{for linear trend}}$=0.04, after adjusting for model 2.

In comparison with unemployed individuals, those who were employed had higher odds of being hypertensive (OR model 1, 1.58, 95% CI, and 0.70-3.56); however, the association was not statistically significant. After further adjusting for income, education, age, sex, marital status, ethnicity, tobacco intake, alcohol consumption, diet, physical activity and salt consumption, the odds ratio was slightly stronger Moreover, those working as famers had lower odds for hypertension when compared to those who are unemployed (OR model 3, 0.95, 95% CI, 0.34 – 2.70).

Table 3. Multivariable Logistic Regression Analysis

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
Income			
Low income	1.00 (ref)	1.00 (ref)	1.00 (ref)
Lower middle income			
Middle income	0.85 (0.39-1.86)	0.94 (0.41-2.16)	0.92 (0.39-2.17)
High income	1.33 (0.63-2.83)	1.45 (0.60-3.55)	1.24 (0.49-3.12)
P for linear trend	*0.42*	*0.42*	*0.65*
Education			
No formal education	1.00 (ref)	1.00 (ref)	1.00 (ref)
Less than high school	1.22 (0.62-2.43)	2.20 (0.86-5.62)	2.11 (0.78-5.68)
High school or more	1.60 (0.67-3.80)	3.75 (1.02-13.75)	3.31 (0.84-13.06)
P for linear trend	*0.29*	***0.043***	*0.08*
Occupation			
Unemployed	1.00 (ref)	1.00 (ref)	1.00 (ref)
Employed	1.58 (0.70-3.56)	2.65 (0.87-8.09)	2.84 (0.87-9.32)
Farmers	0.60 (0.27-1.35)	0.95 (0.36-2.47)	0.95 (0.34-2.70)

Abbreviations: OR=Odds Ratio, CI=Confidence Interval
Model 1: Unadjusted
Model 2: Rest of socioeconomic status + age, Sex, Marital Status and Ethnicity
Model 3: Model 2 + physical activity, tobacco intake, alcohol consumption, vegetable consumption (continuous variable), salty-sauce consumption

6. Discussion

6.1.Main Findings of the Study

This thesis studied the possible association of SES with hypertension in Kirnetar region of Nepal. The result suggested a higher prevalence of hypertension among those with higher education, higher income and employed occupation. Despite this, we observed no clear evidence of positive association between higher SES and hypertension among participants in our study. Of the study participants, the total number classified as hypertensive is 19.2%, where males were observed to have a higher rate of hypertension than females. Majority of the hypertensive participants were employed workers compared to the normotensive participants, where the majority were farmers.

6.2. Comparison to previous studies

6.2.1. Prevalence of hypertension

The hypertension prevalence in this study was lower than the national survey conducted in 2013, where they found prevalence of hypertension to be 26% (10); however, the lowest and highest prevalence from other studies that we found from rural Nepal is 3.3% and 22.4%, respectively (38, 73). This disparity in findings may be due to the difference in the study population, whereas rural Nepal often has a lower burden of hypertension than the urban areas (78); however, hypertension is increasing in both rural and urban areas. This is shown in meta-analysis by Mills (2016) that found decrease in high income countries and increase in LMIC (27). In Nepal, hypertension prevalence was found to increase three-fold between 1980 to 2006 in one specific area (9).

6.2.2. Education and hypertension

In this study, education was an important SES indicator. Reasons for this are related to all participants in our study answered which level of education they have completed. Education is also the SES measure that is most found in similar studies in South Asia, including Nepal, and further linked to which type of occupation people have.

Majority other cross-sectional studies found from South Asia, find somewhat similar trend in education level and hypertension to our study (50, 55, 63) . For example, the study by Gupta (2010), conducted in the city Jaipur in India, found the prevalence of hypertension among the participants with high education status was almost three times as high compared to those with low education status (55). This might be the result of increasing educational attainment in South Asia; however, the awareness, research, intervention, and knowledge are still in many regions

in their infancy. This is also seen in a global scale, where high income countries experience a decrease in hypertension prevalence due to focus and awareness of blood pressure, whereas LMICs experience increase due to the globalization and urbanization, but lack awareness (71, 79).

Conversely to our research, other studies in Nepal have linked low education with hypertension prevalence (38, 73-75, 78, 80, 81). These findings are interesting because they differ from other studies in nearby countries, such as India. An example of this can be seen in a cardiovascular risk factor study conducted in a rural town in Eastern Nepal in 2014, where an inverse association between education and hypertension prevalence was observed (74). An explanation for these converse findings might be related to lifestyle differences between high and low education. For example are tobacco habits and alcohol consumption associated with low education, which is also suggested by Chandrashekhar *et al* (2011) who reported an association between low education and smoking habits (42).

6.2.3. Income and hypertension

Our present study suggests that those with the highest income tertile are more hypertensive than low income earners. The research by Dutta (2012), which was conducted in health camps in 18 rural villages in India, shows a similar trend. This study enrolled 1186 women above 18 year of age and found high odds for pre-hypertension among the richest participants (50). Similar results were found in a large analysis of national survey data in India where significant odds among the richest males and females compared to the poorest participants were found (61).

At this time, community based researches measuring income and direct association with hypertension in Nepal has not yet been found. Income or wealth was rather measured such as household quality, household assets, land ownership or a composition of different SES measures. Additionally, ethnicity is another social feature linked to hypertension (38, 69). The study by Dhungana et. al., (2014), conducted in a rural area in Nepal, found that those belonging to the high caste Brahmin/Chhetri had higher prevalence of hypertension (74). This is interesting since the study of CVD awareness found the Brahmin/Chhetri caste seem to have lower awareness than other ethnicities (71).

6.2.4. Occupation and hypertension

Occupation and hypertension prevalence seem to show similar trends in LMICs, and this is no different in Nepal. As mentioned above, a larger proportion among the hypertensive group are employed (which include government jobs, non-government jobs and self-employed), whereas for those who are normotensive, the majority are farmers. Similar findings are found in Vietnam, where the prevalence of hypertension is related to the type of occupation (20) . This cross sectional study was also conducted in a rural setting in a low income country, where it was found that 13.1% of farmers had hypertension, whereas those employed by the government had a hypertension prevalence of 21.2% (20). Furthermore, a study conducted in a suburban area in Nepal (2016) showed a similar trend, where those doing agriculture as their main form of income had 17.9% prevalence of hypertension as opposed to those working as business employees, where the prevalence was 23.5% (39). Another study from a remote community in Nepal claimed that the participants who had agriculture as their occupation, had a lower prevalence of hypertension compared to those doing administrative work; however, contradictory to other findings, the participants who were working as professionals were the ones with lowest hypertension prevalence.

These trends between occupation and hypertension can be explained by the fact that larger lifestyle differences may be created between the ones who live off their own land (often in villages in the mountains), who grow their own food, and therefore live healthier lifestyle. Additionally, it is a lot more likely that the air is a lot fresher in hill and mountain villages compared to flat land where cars and industries are placed. Most paid jobs, are placed on flat land near the towns and cities, which might contribute to an increased access to processed food, sedentary lifestyle, and therefore hypertension prevalence. In the area the data collection for this thesis, it is most likely those working as “employed”, were placed in the flat lands, whereas farming was common in hill villages. This might create larger lifestyle differences between the different occupations.

6.3. Strengths and Limitations of This Study

This is the first study to estimate the prevalence of hypertension and its association with SES (income, education, occupation) in Kirnetar, Nepal. Secondly, we had high response rate from all participants on question based on their socio-demographic and lifestyle characteristics. Thirdly, we had extensive information on wide range of covariates as potential confounders in

our study. Lastly, we used structured and validated questionnaire to assess information on demographic, lifestyle and diet from our study participants.

Our study is not without limitations. First, the study had a relatively small sample size, and this might lead to imprecise estimates, and wide confidence intervals. Because the individuals recruited were mostly patients who were visiting health clinic, the sample may not represent the entire population living in that rural area of Nepal. Some of these participants might have sought clinical attention to receive hypertensive medication, or for hypertension control, both of which can result in a higher observation of hypertension compared to the general population.

The data from this study is also highly dependent on the participant's answers. Memory, truthfulness, and their own perception of their level of undertaking in certain questions (e.g., income,salt usage on food, diet, minutes/hours of physical activity), can cause large errors in the results, reducing their accuracy. Getting information on alcohol consumption is one such challenge in this community, as many people might find it difficul to talk about their consumption, and therefore a lower frequency of drinks may be reported.

Although, we additionally collected ethnicity as a proxy for determining their SES, majority of the participants belonged to the high caste Brahmin/Chhetri caste, therefore not providing a large enough distribution of ethnicity to use as an adequate determination of SES. Further determinants of SES could have been used to get a more accurate measure of participants SES.

The nature of a cross-sectional study has its limitations on causal inference between categories income and occupation and prevalence of hypertension, further cohort studies with follow-up data are necessary to strengthen the evidence. For example, indiviuals might be hypertensive before they were employed or started earning high wages. We are not sure which came first.

6.1.Conclusion

This cross-sectional study has provided insight on SES and hypertension among patients visiting Kirnetar health center in rural Nepal. We observed no clear evidence of a positive association between SES and hypertension; however, future studies are required in order to reproduce our findings with a larger sample. Nevertheless, this study has provided results that may be used for cost-effective interventions, such as raising awareness and implement blood pressure control of all patients visiting the health clinic. This is cost-effective and can detect potential hypertension conditions. By detecting hypertension, more people will be able to undergo lifestyle changes or use medicines to decrease blood pressure before potential diseases occur, such as hearth diseases and stroke.

7. References

1. Organization Wh. A Global Brief on Hypertension. WHO; 2013. Contract No.: WHO/DCO/WHD/2013.2.
2. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo Jr JL, et al. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. Jama. 2003;289(19):2560-71.
3. Huffman MD, Lloyd-Jones DM. Global Burden of Raised Blood Pressure: Coming Into Focus. JAMA. 2017;317(2):142-3.
4. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. The lancet. 2013;380(9859):2224-60.
5. World Health O. Global status report on noncommunicable diseases 2014: World Health Organization; 2014.
6. Organization WH. Reducing Risks, Promoting Healthy Life. who.int; 2002.
7. Roth GA, Forouzanfar MH, Moran AE, Barber R, Nguyen G, Feigin VL, et al. Demographic and epidemiologic drivers of global cardiovascular mortality. New England Journal of Medicine. 2015;372(14):1333-41.
8. Lackland DT, Weber MA. Global burden of cardiovascular disease and stroke: hypertension at the core. Canadian Journal of Cardiology. 2015;31(5):569-71.
9. Vaidya A, Pathak RP, Pandey MR. Prevalence of hypertension in Nepalese community triples in 25 years: a repeat cross-sectional study in rural Kathmandu. Indian heart journal. 2012;64(2):128-31.
10. World Health Organization GoN. Non-Communicable Diseases Risk factors: STEPS Survey Nepal 2013. Kathmandu, Nepal; 2014 20.04.
11. Gaziano TA, Bitton A, Anand S, Weinstein MC. The global cost of nonoptimal blood pressure. Journal of hypertension. 2009;27(7):1472-7.
12. Campbell NRC, Lackland DT, Niebylski ML. High blood pressure: why prevention and control are urgent and important—a 2014 fact sheet from the World Hypertension League and the International Society of Hypertension. The Journal of Clinical Hypertension. 2014;16(8):551-3.
13. World Health O. Impact of out-of-pocket payments for treatment of non-communicable diseases in developing countries: a review of literature. 2011.
14. Poulter NR, Prabhakaran D, Caulfield M. Hypertension. The Lancet.386(9995):801-12.
15. Blakely T, Hales S, Woodward A, Prüss-Üstün A, Campbell-Lendrum D, Corvalán C. Assessing the distribution of health risks by socioeconomic position at national and local levels. World Health Organization,(10). 2004:1-40.
16. Lam CSP. The Socioeconomics of Hypertension. Hypertension. 2011;58(2):140.
17. Loucks EB, Abrahamowicz M, Xiao Y, Lynch JW. Associations of education with 30 year life course blood pressure trajectories: Framingham Offspring Study. BMC Public Health. 2011;11(1):139.
18. Brummett BH, Babyak MA, Siegler IC, Shanahan M, Harris KM, Elder GH, et al. Systolic blood pressure, socioeconomic status, and biobehavioral risk factors in a nationally representative US young adult sample. Hypertension. 2011;58(2):161-6.
19. Colhoun HM, Hemingway H, Poulter NR. Socio-economic status and blood pressure: an overview analysis. Journal of human hypertension. 1998;12(2):91-110.
20. Van Minh H, Byass P, Chuc NTK, Wall S. Gender differences in prevalence and socioeconomic determinants of hypertension: findings from the WHO STEPs survey in a rural community of Vietnam. Journal of human hypertension. 2006;20(2):109-15.
21. Momin MH, Desai VK, Kavishwar AB. Study of socio-demographic factors affecting prevalence of hypertension among bank employees of Surat City. Indian journal of public health. 2012;56(1):44.

22. Neupane D, McLachlan CS, Sharma R, Gyawali B, Khanal V, Mishra SR, et al. Prevalence of hypertension in member countries of South Asian Association for Regional Cooperation (SAARC): systematic review and meta-analysis. Medicine. 2014;93(13):e74.
23. Collaboration NCDRF. Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19· 1 million participants. The Lancet. 2017;389(10064):37-55.
24. Ezzati M, Lopez AD, Rodgers A, Vander Hoorn S, Murray CJL, Comparative Risk Assessment Collaborating G. Selected major risk factors and global and regional burden of disease. The Lancet. 2002;360(9343):1347-60.
25. Ibrahim MM, Damasceno A. Hypertension in developing countries. The Lancet. 2012;380(9841):611-9.
26. Egan BM, Zhao Y, Axon RN. US trends in prevalence, awareness, treatment, and control of hypertension, 1988-2008. Jama. 2010;303(20):2043-50.
27. Mills KT, Bundy JD, Kelly TN, Reed JE, Kearney PM, Reynolds K, et al. Global Disparities of Hypertension Prevalence and ControlClinical Perspective. Circulation. 2016;134(6):441-50.
28. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. The lancet. 2005;365(9455):217-23.
29. Dalal J, Sethi KK, Kerkar PG, Ray S, Guha S, Hiremath MS. Vascular Disease in Young Indians (20-40 years): Role of Hypertension. Journal of clinical and diagnostic research: JCDR. 2016;10(8):OE01.
30. Krishnan A, Garg R, Kahandaliyanage A, editors. Hypertension in the South-East Asia region: an overview2013.
31. Aggarwal A, Aggarwal S, Sarkar PG, Sharma V. Predisposing factors to premature coronary artery disease in young (Age [Less-Than or Equal To] 45 years) smokers: A single center retrospective case control study from India. Journal of cardiovascular and thoracic research. 2014;6(1):15.
32. Singh RB, Suh IL, Singh VP, Chaithiraphan S, Laothavorn P, Sy RG, et al. Hypertension and stroke in Asia: prevalence, control and strategies in developing countries for prevention. Journal of human hypertension. 2000;14(10/11):749.
33. Friedman GD, Klatsky AL, Siegelaub AB. Alcohol, tobacco, and hypertension. Hypertension. 1982;4(5 Pt 2):III143.
34. Reddy KS, Naik N, Prabhakaran D. Hypertension in the developing world: A consequence of progress. Current Cardiology Reports. 2006;8(6):399-404.
35. Singh RB, FeDacko J, Pella D, MaceJova Z, Ghosh S, De AK. Prevalence and risk factors for prehypertension and hypertension in five Indian cities. Acta cardiologica. 2011;66(1):29.
36. Mohan S, Prabhakaran D, Krishnan A, editors. Promoting populationwide salt reduction in the South-East Asia Region: current status and future directions2013.
37. Jernigan DH, Monteiro M, Room R, Saxena S. Towards a global alcohol policy: alcohol, public health and the role of WHO. Bulletin of the World Health Organization. 2000;78(4):491-9.
38. Khan RJ, Stewart CP, Christian P, Schulze KJ, Wu L, LeClerq SC, et al. A cross-sectional study of the prevalence and risk factors for hypertension in rural Nepali women. BMC Public Health. 2013;13(1):55.
39. Shrestha S, Devkota R. Prevalence of hypertension and its associated risk factors in a sub-urban area of central Nepal. International Journal Of Community Medicine And Public Health. 2016;3(9):2477-86.
40. Jhingan HP, Shyangwa P, Sharma A, Prasad KMR, Khandelwal SK. Prevalence of alcohol dependence in a town in Nepal as assessed by the CAGE questionnaire. Addiction. 2003;98(3):339-43.
41. Sinha DN, Suliankatchi RA, Amarchand R, Krishnan A. Prevalence and sociodemographic determinants of any tobacco use and dual use in six countries of the WHO South-East Asia region: Findings from the demographic and health surveys. Nicotine & Tobacco Research. 2016:ntv286.
42. Sreeramareddy CT, Ramakrishnareddy N, Kumar HNH, Sathian B, Arokiasamy JT. Prevalence, distribution and correlates of tobacco smoking and chewing in Nepal: a secondary data analysis of Nepal Demographic and Health Survey-2006. Substance abuse treatment, prevention, and policy. 2011;6(1):33.

43. Utsugi MT, Ohkubo T, Kikuya M, Kurimoto A, Sato RI, Suzuki K, et al. Fruit and vegetable consumption and the risk of hypertension determined by self measurement of blood pressure at home: the Ohasama study. Hypertension Research. 2008;31(7):1435-43.
44. Forouzanfar MH, Liu P, Roth GA, Ng M, Biryukov S, Marczak L, et al. Global Burden of Hypertension and Systolic Blood Pressure of at Least 110 to 115 mm Hg, 1990-2015. JAMA. 2017;317(2):165-82.
45. Vasan RS, Beiser A, Seshadri S, Larson MG, Kannel WB, D'Agostino RB, et al. Residual lifetime risk for developing hypertension in middle-aged women and men: The Framingham Heart Study. Jama. 2002;287(8):1003-10.
46. Busingye D, Arabshahi S, Subasinghe AK, Evans RG, Riddell MA, Thrift AG. Do the socioeconomic and hypertension gradients in rural populations of low-and middle-income countries differ by geographical region? A systematic review and meta-analysis. International journal of epidemiology. 2014:dyu112.
47. Kruithof N, de Jongh MAC, de Munter L, Lansink KWW, Polinder S. The effect of socio-economic status on non-fatal outcome after injury; a systematic review. Injury. 2017.
48. Winkleby MA, Jatulis DE, Frank E, Fortmann SP. Socioeconomic status and health: how education, income, and occupation contribute to risk factors for cardiovascular disease. American journal of public health. 1992;82(6):816-20.
49. Fan AZ. State socioeconomic indicators and self-reported hypertension among US adults, 2011 behavioral risk factor surveillance system. Preventing chronic disease. 2015;12.
50. Dutta A, Ray MR. Prevalence of hypertension and pre-hypertension in rural women: A report from the villages of West Bengal, a state in the eastern part of India. Australian Journal of Rural Health. 2012;20(4):219-25.
51. Cois A, Ehrlich R. Analysing the socioeconomic determinants of hypertension in South Africa: a structural equation modelling approach. BMC public health. 2014;14(1):414.
52. Barro RJ, Lee JW. A new data set of educational attainment in the world, 1950–2010. Journal of development economics. 2013;104:184-98.
53. Razak F, Subramanian SV. Commentary: Socioeconomic status and hypertension in low-and middle-income countries: can we learn anything from existing studies? International journal of epidemiology. 2014;43(5):1577-81.
54. Dong G, Sun Z, Zheng L, Li J, Zhang X, Zhang X, et al. Prevalence, awareness, treatment, and control of hypertension in rural adults from Liaoning Province, northeast China. Hypertension Research. 2007;30(10):951.
55. Gupta R, Kaul V, Agrawal A, Guptha S, Gupta VP. Cardiovascular risk according to educational status in India. Preventive medicine. 2010;51(5):408-11.
56. Kaur P, Rao SR, Radhakrishnan E, Rajasekar D, Gupte MD. Prevalence, awareness, treatment, control and risk factors for hypertension in a rural population in South India. International journal of public health. 2012;57(1):87-94.
57. Sabri S, Bener A, Eapen V, Azhar AA, Abdishakure A, Singh J. Correlation between hypertension and income distribution among United Arab Emirates population. Medical Journal of Malaysia. 2005;60(4):416.
58. Florêncio TT, Ferreira HS, Cavalcante JC, Sawaya AL. Short stature, obesity and arterial hypertension in a very low income population in North-eastern Brazil. Nutrition, Metabolism and Cardiovascular Diseases. 2004;14(1):26-33.
59. Freitas OdC, Carvalho FRd, Neves JM, Veludo PK, Parreira RS, Gonçalves RM, et al. Prevalence of hypertension in the urban population of Catanduva, in the State of São Paulo, Brazil. Arquivos brasileiros de cardiologia. 2001;77(1):16-21.
60. Basu S, Millett C. Social Epidemiology of Hypertension in Middle-Income CountriesNovelty and Significance. Hypertension. 2013;62(1):18-26.
61. Moser KA, Agrawal S, Smith GD, Ebrahim S. Socio-demographic inequalities in the prevalence, diagnosis and management of hypertension in India: analysis of nationally-representative survey data. PloS one. 2014;9(1):e86043.

62. Marmot M, Friel S, Bell R, Houweling TAJ, Taylor S, Commission on Social Determinants of H. Closing the gap in a generation: health equity through action on the social determinants of health. The Lancet. 2008;372(9650):1661-9.
63. Gupta R, Deedwania PC, Achari V, Bhansali A, Gupta BK, Gupta A, et al. Normotension, prehypertension, and hypertension in urban middle-class subjects in India: prevalence, awareness, treatment, and control. American journal of hypertension. 2013;26(1):83.
64. Meshram, II, Arlappa N, Balkrishna N, Rao KM, Laxmaiah A, Brahmam GNV. Prevalence of hypertension, its correlates and awareness among adult tribal population of Kerala state, India. Journal of postgraduate medicine. 2012;58(4):255.
65. Woldometers. Nepal, population http://www.worldometers.info: woldometers; 2017 [Population by country]. Available from: http://www.worldometers.info/world-population/nepal-population/.
66. Bank TW. World Bank Country and Lending Groups: The World Bank; 2017 [Available from: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.
67. World Health O. Health systems in Nepal: challenges and strategic options. Geneva: WHO. 2007.
68. Bank GoNaW. Nepal living standard survey 2010/11. cbs.gov.np: Central Bureau of Statistics; 2010/2011.
69. Cox T. The current socio-economic status of untouchables in Nepal. Occassional papers in sociology and anthropology. 1994;4:90-109.
70. Vaidya A. Is Ethnicity an Important Determinant of High Blood Pressure in Nepalese Population? A Community-Based Cross-Sectional Study in Duwakot, Nepal. Kathmandu University Medical Journal. 2012;10(1):16-9.
71. Karmacharya BM, Koju RP, LoGerfo JP, Chan KCG, Mokdad AH, Shrestha A, et al. Awareness, treatment and control of hypertension in Nepal: findings from the Dhulikhel Heart Study. Heart Asia. 2017;9(1):1-8.
72. Koju R, Manandhar K, Gurung R, Pant P, Bedi TRS. Prevalence of Hypertension in Semi-urban area of Nepal. Nepalese Heart Journal. 2013;7(1):35-9.
73. Chataut J, Adhikari RK, Sinha NP. Prevalence and risk factors for hypertension in adults living in central development region of Nepal. Kathmandu University Medical Journal. 2012;9(1):13-8.
74. Dhungana RR, Devkota S, Khanal MK, Gurung Y, Giri RK, Parajuli RK, et al. Prevalence of cardiovascular health risk behaviors in a remote rural community of Sindhuli district, Nepal. BMC cardiovascular disorders. 2014;14(1):92.
75. Vaidya A, Pokharel PK, Karki P, Nagesh S. Exploring the iceberg of hypertension: a community based study in an eastern Nepal town. 2007.
76. Organization WH. Global Physical Activity Questionnaire (GPAQ), Analysis Guide. who.org.
77. World Health O, editor Fruit and vegetables for health: report of a Joint FAO/WHO Workshop, 1-3 September, 2004, Kobe, Japan2005: WHO.
78. Dhungana RR, Pandey AR, Bista B, Joshi S, Devkota S. Prevalence and associated factors of hypertension: a community-based cross-sectional study in municipalities of Kathmandu, Nepal. International journal of hypertension. 2016;2016.
79. Hu FB. Globalization of food patterns and cardiovascular disease risk. Am Heart Assoc; 2008.
80. Vaidya A. Prevalence of coronary heart disease in the urban adult males of eastern Nepal: a population-based analytical cross-sectional study. 2009.
81. Devkota S, Dhungana RR, Pandey AR, Bista B, Panthi S, Thakur KK, et al. Barriers to Treatment and control of hypertension among hypertensive Participants: a community-Based cross-sectional Mixed Method study in Municipalities of Kathmandu, nepal. Frontiers in Cardiovascular Medicine. 2016;3.

Appendixes

Appendix 1 Consent form

REQUEST FOR PARTICIPATION IN A RESEARCH PROJECT

Please read this form carefully. This is a request for you to participate in a research study that intends to measure the extent of high blood pressure (hypertension) and its association with socio-economic factors, such as education, occupation and income, of the adult population in your district.

You have the right to take your time in making decisions about participating in this research. If you have any questions about the research or any portion of this form, please ask. If you decide to participate in this research, you will be asked to sign this form. A copy of the signed form will be provided to you for your records.

Background and purpose

Hypertension increases the risk for heart disease, stroke, renal failure and mortality. Certain sections of the society such as elderly and older individuals, obese and poor people might be at a higher risk. Blood pressure is not routinely assessed or reported in rural health facilities in Nepal. Little is known about the relation between hypertension and its association with socio-economic factors such as education, occupation and income in these areas. To study how we can prevent high blood pressure in rural communities it is important to document this relation.

In rural areas of Nepal, to our knowledge, no studies have been conducted to give a realistic insight of the burden of hypertension and diseases associated with it. Furthermore, in rural settings of other low-income countries majority of people with hypertension are not aware of their future risk of developing diseases, such as heart diseases, diabetes etc. Therefore, to raise awareness and develop interventions to prevent future risk of diseases associated with high blood pressure it is important to assess the prevalence and socio-economic factors associated with it, mainly education, occupation, and income.

Aim

1. To estimate the prevalence of hypertension among adult patients visiting a primary level health facility in Nepal.

2. To examine the association of the hypertension with social and economic characteristics among adult patients visiting a primary level health facility.

What does participation in the study entail for you?

The study population will consists of adults (18 years or older) who come to the Kirnetar Health Center in Dolakha district from Sahare, Phulasi, Gelu, Farpu, Betali, Chyama, Melung and Dandakharka. We will ask you questions about your age, gender, ethnicity, smoking status, occupation, alcohol consumption, physical activity and diet. Thereafter, we will

measure your blood pressure (using a digital blood pressure monitor), height and weight. The interview and measurement will last 45 minutes at most.

Potential advantages and disadvantages

Advantages

The present research will help us to better understand the extension of high blood pressure among the adult population in the rural area of the Dholakhal district in Nepal. It will also increase our knowledge about the relation between high blood pressure and socio-economic factors, such as education, income and occupation, in rural areas. In the future, this might help us in designing interventions and awareness programs, which eventually might reduce the burden of high blood pressure and diseases associated with it.

Disadvantages

You might feel uncomfortable answering some of the questions in the questionnaire. If so, please feel free not to respond those questions.

What will happen to the samples and the information about you?

The data registered about you will only be used for the research purpose described above. All the data will be processed without name. A code number (ID number) will be generated and linked to your questionnaire with respective answers. The data that will be collected about you will be transferred to Norway for analysis. The data that is transferred to Norway will be de-identified and transferred back to Nepal when the analysis has been concluded. We will not reveal your name or any other information that will identify you in future publications or any presentations. Only authorized project personnel will have access to this data. For audit purpose, the project data will be stored for five years after completion of the project.

Privacy

De-identification the data

We will collect the identifiers in separate page (name, address, telephone number) with a code. We will use the codes in the data collection form. The identifiers page will be kept in a safe locker. All the data will be entered with a code. The de-identified data will be taken to Norway for data-analysis, while the identifiers will be kept in a safe locker at Dhulikhel hospital and only a project manager will have access to these files.

Right to access and right to delete your data and samples

If you agree to participate in the study, you are entitled to have access to the information that is registered about you. You are further permitted to correct any mistakes in the information we have registered. If you wish to withdraw consent to participate at any point of time, you are allowed to claim that the information collected about you must be deleted unless the data have already been incorporated in the analyses or used in scientific publications. As mentioned above, your answers will not be linked to your name and your personal data will be held anonymous by using identification number and the data will only be used by the researchers for the master thesis as well as co-researchers Archana Shrestha and Biraj Karmacharya.

Voluntary participation

Participation in this study is voluntary. You are free to withdraw your consent to participate at any time without stating any reason. The data that has been collected about you will then be

deleted, except if it has already been included in analysis. If you wish to withdraw from the study it would not have any consequences on your further treatment. If you wish to participate, please sign the declaration of consent on the final page, using your signature or alternatively your thumb impression. In the future, if you wish to withdraw your consent or have questions concerning the study, you may contact:

Name of Research assistant and contact address
(Yet to be filled).

Criteria for participation

Inclusion

You must be above 18 years

Exclusion:

If you are pregnant

Consent for participation in the study

I am willing to participate in the study.

(Signed by the project participant using signature or thumb impression/date)

Witness signature when the participant signs using his/her thumb impression

---
(Signed witness x 2 / date)

I confirm that I have given information about the study.

(Signed, role in the study/ date)

Appendix 2 Front page questionnaire

Questionnaire -

Relation Between Socio Economic status with Obesity and Hypertension in rural Nepal

General information: This questionnaire is validated as per WHO STEPS survey. This questionnaire was also used for STEPS survey in Nepal in 2013: Risk factors for non-communicable diseases.

Page 1 (Identifiers)
(This will be a separate page than the questionnaire

तपाईको नाम के हो ?
What is your name: _____

तपाईको ठेगाना के हो ?गा.वि.स. _____ वडा न:_____टोल_____
What is your address: VDC Ward no Tole

तपाईको phone number के हो ?
What is your phone number : _____

Appendix 3 Questionnaire

From Non-Communicable disease factors:

STEPS Survey Nepal 2013

Demographic Information:

Questions	Response	Code
लिङ्ग (हेरेर लेख्नुस): Sex (Record Male / Female as observed)	1 Male ____ 0. Female_____	A1
Village name	_____	A2
तपाइको जन्म मिति के हो ? What is your date of birth?	_____ _____ _____ dd mm year Don´t know 99 99 9999	A3
तपाइको उमेर कति भयो? How old are you?	Years_____	A4
तपाईले कति सम्मको (वर्षको) पढाई पूरा गर्नु भएको छ? In total, how many years have you spent at school and in full- time study (excluding pre-school)? Until +2: 12; Bachelors: 15; Masters: 17 Above masters: 17; If illiterate or never been to school: 0	Years_____	A5
तपाई कतिसम्म पढ्नु भएको छ ? What is the highest level of education you have completed?	0. No formal schooling_____ 1. Less than primary school_____ 2. Primary school completed_____ 3. Secondary school completed_____ 4. High school completed_____ 5. College/University completed____ 6. Post graduate degree____ Refused 9____	A6
तपाईको वैवाहिक स्थिति के छ ? What is your marital status?	0 Never married_____ 1 Currently married_____ 2 Separated_____ 3 Divorced_____ 4 Widowed_____ 5 Cohabitating_____ Refused 9	A7
बिगत १२ महिना मा तपाईको मुख्य पेशा के थियो? Which of the following best describes your main work status over the past 12 months?	0. Government employee____ 1. Non-government employee____ 2. Self-employed____ 3. Non-paid____ 4. Student____ 5. Homemaker____ 6. Retired____ 7. Unemployed (able to work)____ 8. Unemployed (unable to work)____ 9. Farming_____ Refused 99	A8
तपाई कुन जातिमा पर्नु हुन्छ? What is your [insert relevant ethnic group / racial group / cultural subgroup / others] background?	0 Brahman/Chhetri____ 1 Tamang/Rai/Limbu 2. Newar 3. Dalits_____ 4. Madhesi/Terai_____ Other (Specify)_____ Refused 9	A9
तपाईको परिवारमा तपाई समेत गरेर कति जना हुनहुन्छ? How many people including yourself, live in your household ?	Less than 18 years ____ 18 years or older ____	A10a A10b
विगतको १ बर्षको कमाई हेरर, तपाईको घरको वार्षिक आम्दानि कति जति छ होला ? From the last year, can you tell me what the average earnings of the **household** have been? (RECORD ONLY ONE, NOT ALL 3)	Per week_____ or, Per month_____ or, Per year_____ Refused 99	A11a A11b A11c
तपाईको जग्गा जमिन छ कि छैन?	1 Yes_____	A12

Do you own land?	0. No_____**IF NO, GO TO B1**	
तपाईको खेती किसानीबाट भएको उब्जनीले वर्षको कति महिना खान पुग्छ ? How many months is it enough for you for using your own land ownership, to feed yourself and your family?	Months_____	A13

Tobacco: अब म तपाई लाई धुम्रपान सम्बन्धि केहि प्रश्न हरु सोध्छु है | (Now I am going to ask you some questions about tobacco use

Questions: Smoking tobacco	Response	Code
के तपाईले धुम्रपान गर्नुहुन्छ ? जस्तै; चुरोट, बिडी, सिगार, हुक्का ? Do you **currently** smoke any **tobacco** products, suchas cigarettes, cigars, pipes, bidis, hukahs or tamakhus? (USE SHOWCARD)	1 Yes_____ 0. No_____ **IF NO GO TO B6**	B1
के तपाई अहिले धुम्रपान दिनहु गर्नु हुन्छ ? Do you currently smoke tobacco products **daily?**	1 Yes_____ 0 No_____	B2
तपाईले धूम्रपान गर्न सुरु गर्दा कति वर्षको हुनुहुन्थ्यो ? How old were you when you **first started** smoking?	Age(years)_____ Refused 99	B3
लगभग हप्तामा कति ओटा खानु हुन्छ? On average, how many of the following products do you smoke each day/week? (USE SHOWCARD)	Daily Weekly 0. चुरोट (Manufactured cigarettes) _____ _____ 1. बिडी (Hand-rolled cigarettes) _____ _____ 2. Pipes full of tobacco _____ _____ 3. Cigars, cheroots, _____ _____ 4. Other _____ ____ (please specify): _____	B4
यो १२ महिनामा तपाईले कहिल्यै धुम्रपान छोड्ने प्रयास गर्नु भएको थियो? During the past 12 months, have you tried to stop smoking?	1 Yes_____**GO TO B9** 0 No_____ **GO TO B9**	B5
के तपाई बिगतमा धुम्रपान गर्नु हुन्थियो? In the **past**, did you **ever smoke** any tobacco products? (USE SHOWCARD)	1. Yes _____ 0. No _____ **IF NO GO TO B9**	B6
के तपाई बिगतमा धुम्रपान दिनहु गर्नु हुन्थियो ? In the **past**, did you ever smoke **daily**?	1.Yes_____ 0. No_____	B7
तपाई धुम्रपान छोड्दा कति वर्षको हुनुहुन्थ्यो? When you stopped smoking, how old were you? (only ask if partcipant only smoked in the past)	Years_____	B8

Questions: Smokeless tobacco	Response	Code
के तपाईले खैनी, सुर्ती, जर्दा पान खानु हुन्छ? Do you **currently use** any **smoke- less tobacco** products such as *[snuff , chewing tobacco, nasal snuff , khaini, surti , gutka]*? (USE SHOWCARD)	1.Yes_____ 0. No_____**IF NO GO TO B12**	B9
के तपाईले खैनी, सुर्ती, जर्दा पान दिनहु खानु हुन्छ? Do you **currently use smokeless tobacco** products **daily?**	1.Yes_____ 0. No_____	B10
सामान्य महिनामा तपाई कति दिन जति खैनी या सुर्ती या जर्दा पान खानु हुन्छ? On average, how many **times a day/week** do you use .... (IF LESS THAN DAILY, RECORD WEEKLY) (RECORD FOR EACH TYPE, USE SHOWCARD) *Don't know 7777*	Daily weekly 0. Snuff, by mouth _____ _____ 1. Snuff, by nose _____ _____ 2. सुर्ती (Chewing tobacco) ___ _____ 3.Chewing tobacco खैनी _____ _____ 4. Betel जर्दा पान _____ _____ 5. Other (please specify):_____ _____ **GO TO B14**	B11a B11b B11c B11d B11e B11f

के तपाई बिगतमा खैनी, सुर्ती, जर्दा पान खानु हुन्थियो? In the **past**, did you **ever use** smoke- less tobacco products such as *snuff , chewing tobacco, nasal snuff , khaini, sur , gutka* ?	1.Yes_____ 0. No_____**IF NO GO TO B14**	B12
के तपाई बिगतमा खैनी, सुर्ती, जर्दा पान दिनहु खानु हुन्थियो? In the **past**, did you **ever use** smoke- less tobacco products such as *snuff , chewing tobacco, nasal snuff , khaini, sur , gutka* **daily**?	1.Yes_____ 0. No_____	B13
बिगत एक हप्तामा तपाइको घरमा कसैले तपाइको नजिक बसेर चुरोट खानुभएको छ? छ भने, हप्ताको कति दिन यसरी नजिकै बसेर चुरोट खानु भयो ? During the **past 7 days,** on how many days did someone **in your home** smoke when you were present?	Number of days_____ Don´t know 99	B14
बिगत एक हप्तामा घर बाहिर तर कुनै बन्द कोठामा कसैले तपाइको नजिक बसेर चुरोट खानुभएको छ? छ भने, हप्ताको कति दिन यसरी नजिकै बसेर चुरोट खाने भयो ? During the **past 7 days**, on how many days did someone smoke in closed areas **in your workplace** (in the building, in a work area or a specicfic office) when you were present?	Number of days_____ Don´t know 99	B15

Alcohol drinking: अब म तपाईलाई जाँड रक्सि सम्बन्धि केहि प्रश्नहरु सोध्छु ।
Now I will ask you some questions about alcohol drinking

Questions	Response	Code
के तपाईले कहिल्ये रक्सी खानु भएको छ ? बियर, वाइन, जाँड आदि पिउनु भएको छ ? (तस्विर/ फोटो (Have you **ever** consumed any alcohol such as beer, wine, spirits, fermented cider or [Jaad, raksi, tungba?] (USE SHOWCARD)	1. Yes_____ 0. No_____ **IF NO GO TO D1**	C1
के तपाईले, बितेको १२ महिनामा दिन रक्सी खानु भएको छ ? बियर, वाइन, जाँड आदि पिउनु भएको छ ? Have you consumed any alcohol within the **past 12 months?**	1. Yes_____ 0. No_____**IF NO GO TO D1**	C2
During the past 12 months, how frequently have to you had **(SHOW PICTURE)**		C3
यो बर्ष भित्र Beer **कतिको खानु भयो**? How often do you drink **beer**? **खाएको दिनमा कति जती खानु हुन्छ** ? On the days you drink, how much do you drink?	Days per year____ Days per month____ Days per week_____ _____ ml	C3a
यो बर्ष भित्र Jaad **कतिको खानु भयो**? How often do you drink **jaad**? **खाएको दिनमा कति जती खानु हुन्छ** ? On the days you drink, how much do you drink?	Days per year ____ Days per month____ Days per week_____ _____ ml	C3b
यो बर्ष भित्र wine **कतिको खानु भयो**? How often do you drink **wine**? **खाएको दिनमा कति जती खानु हुन्छ** ? On the days you drink, how much do you drink?	Days per year ____ Days per month____ Days per week_____ _____ ml	C3c
यो बर्ष भित्र Nigar **कतिको खानु भयो**? How often do you drink **nigaar**? **खाएको दिनमा कति जती खानु हुन्छ** ? On the days you drink, how much do you drink?	Days per year ____ Days per month____ Days per week_____ _____ ml	C3d
यो बर्ष भित्र Rakshi, Sealpack **कतिको खानु भयो**? How often do you drink **rakshi, rum, vodka, scotch**? **खाएको दिनमा कति जती खानु हुन्छ** ? On the days you drink, how much do you drink?	Days per year ____ Days per month____ Days per week_____ _____ ml	C3e

यो बर्ष भित्र Tongba **कतिको खानु भयो**? How often do you drink **rakshi, rum, vodka, scotch**? **खाएको दिनमा कति जती खानु हुन्छ** ? On the days you drink, how much do you drink?	Days per year ____ Days per month____ Days per week_____ _____ ml	C3f
यो बर्ष भित्र Apple cider **कतिको खानु भयो**? How often do you drink **rakshi, rum, vodka, scotch**? **खाएको दिनमा कति जती खानु हुन्छ** ? On the days you drink, how much do you drink?	Days per year ____ Days per month____ Days per week_____ _____ ml	C3g
बिगत ३० दिन भित्र रक्सी खानु भएको छ ? बियर, वाइन, जाँड आदि पिउनु भएको छ Have you consumed any alcohol within the past 30 days?	1.Yes____ 0. No____	C4
यदि छ भने, ३० दिन भित्र <u>बढीमा</u> एक चोटीमा Beer **कति खानु भयो** ? Jaad **कति खानु भयो** ? Wine **कति खानु भयो** ? Nigaar **कति खानु भयो** ? Raksi / Seal pack **कति खानु भयो** ? IF yes, During the past 30 days, when you drank alcohol, on average how much of following alcoholic drink did you have during one drinking occasion ?	Beer _____ ml Jaad _____ ml Wine_____ml Nigaar _____ ml Raksi/Seal pack___ ml	C5

Diet: Fruit and vegetables

Questions	Response	Code
Fruit:		
एउटा सामान्य हप्तामा, कति दिन जती तपाई फल फूल खानु हुन्छ? In a typical **week**, on how many days do you **eat fruit**? (LOOK AT SHOWCARD)	Number of days_____ 99 Don't know	D1
खाएको दिनमा कति ओटा जती फलफूल खानु हुन्छ ? How many **servings** of fruit do you eat on **one** of those **days**? (LOOK AT SHOWCARD)	Number per day_____ 99 Don't know	D2
Vegetables:		
एउटा सामान्य हप्तामा, कति दिन जती तपाई तरकारी खानु हुन्छ? (आलू, दाल मासु नगनिकन) In a typical **week**, on how many days do you eat vegetables? (LOOK AT SHOWCARD)	Number of days_____ 99 Don't know	D3
खाएको दिनमा, कति पटक तरकारी खानु हुन्छ ? (Hint: एकै थरी दुइ-तीन पटक खाएमा, जती पटक खायो त्यति पटक गन्नुस) How many **servings** of vegetables do you eat on one of those **days**? (LOOK AT SHOWCARD)	Number per day_____ 99 Don't know	D4

Dietary S

alt अब म तपाईलाई नून सम्भन्धि प्रश्न हरु सोध्छु है ।

Question ;-Now I will ask you questions about dietary salt	**Response**	**Code**
खानु भन्दा अगाडी, तपाई खानामा नून थप्नु हुन्छ? (Probe how often) How often do you add salt or a salty sauce such as soya sauce to your food **right before** you eat it or as you are eating it? (SELECT ONLY ONE) (USE SHOWCARD	0. Never_____(0%) 1. Rarely_____(25%) 2. Sometimes_____(50%) 3. Often_____(75%) 4. Always_____(100%) Don't know 9____	E1
तपाईको घरमा खाना पकाउँदा, तरकारीमा नून हाल्छ? (Probe how often) How often is salt, salty seasoning or a salty sauce added in **cooking or preparing** foods in your household?	0. Never_____(0%) 1. Rarely_____(25%) 2. Sometimes_____(50%) 3. Often_____(75%) 4. Always_____(100%)	E2

	Don't know 9	
तपाई packet को खानेकुरा हरु जस्तै की चाउचाउ, अचार, दालमोट, चीज़ खानु हुन्छ ? How often do you eat processed food high in salt? By processed food high in salt, I mean foods that have been altered from their natural state, such as packaged salty snacks, canned salty food including pickles and preserves, salty food prepared at a fast food restaurant, cheese, bacon and processed meat [add country specific examples]. [INSERT EXAMPLES] (USE SHOWCARD)	0. Far too little_____(0%) 1. Too little_____(25%) 2. Just the right amount_____(50%) 3. Too much_____(75%) 4. Far too much_____(100%) Don't know 9	E3
एसो बिचार गर्दा, अरुहरुले भन्दा तपाई कत्तिको नुनिलो खाने हुन्छ? How much salt or salty sauce do you think you consume?	0. Far too little_____(0%) 1. Too little_____(25%) 2. Just the right amount____(50%) 3. Too much_____(75%) 4. Far too much_____(100%) Don't know 9	E4

Physical activity:

अब म तपाईलाई शारीरिक क्रियाकलाप बारे सोध्छु है ।

Now I will ask you about your physical activity.

Questions	Response	Code
Work activity		
तपाई के काम गर्नु हुन्छ? तपाइले स्वास तथा मुटुको धड्कन धेरै बढ्ने कठिन शारीरिक परिश्रम लाग्ने काम १० मिनेट वा बढी गर्नुपर्छ? जस्तै: भारी सामान बोक्ने, खन्ने, घर बनाउने आदी । Does your work involve **vigorous-intensity** activity that causes large increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at **least 10 minutes** continuously? (LOOK AT SHOWCARD)	1. Yes_____ 0. No_____ **IF NO GO TO F4**	F1
यदि पर्छ भने, एक हफ्तामा कति दिन जति यस्तो कठिन शारीरिक परिश्रम गर्नुहुन्छ ? In a typical **week**, on how many days do you do **vigorous- intensity** activities as part of your work? (LOOK AT SHOWCARD)	Number of days_____	F2
एक दिनमा तपाइंले कठिन शारीरिक परिश्रम गरेर कति समय बिताउनुहुन्छ? How much time do you spend doing **vigorous-intensity** activities at work on a typical **day**? (CHOOSE HOURS OR MINUTES)	Hours :_____ Minutes: _____	F3
के तपाईले थोरै मात्र मुटुको धड्कन बढ्ने सामान्य परिश्रमको काम लगातार १० मिनेट गर्नुपर्छ? जस्तै कि हल्का भारी बोक्ने ,चाडै चाडै हिड्ने Does your work involve **moderate-intensity** actvity that causes small increases in breathing or heart rate. [brisk walking, carrying light loads, manual washing clothes, mopping of floor, gardening at home] for at least 10 minutes continuously? (USE SHOWCARD)	1. Yes_____ 0. No_____ **IF NO GO TO F7**	F4
यदि पर्छ भने, एक हप्तामा तपाईंले कति दिन यस्तो सामान्य परिश्रम लाग्ने काम गर्नुहुन्छ? In a typical week, on how many days do you do **moderate-intensity** activities as part of your work?	Number of days_____	F5
एक दिनमा तपाइंले कति समय यस्तो सामान्य परिश्रम लाग्ने काम गरेर बिताउनु हुन्छ? How much time do you spend doing **moderate- intensity** activities at work on a typical day? (CHOOSE HOURS OR MINUTES)	Hours :_____ Minutes: _____	F6
Travel to and from places: *Explination: For example to work, for shopping, to market, to place of worship.*		
के तपाइंले आवत-जावत गर्न पैदल अथवा साइकल लगातार १० मिनेट वा बढी चलाउनुहुन्छ? Do you walk or use a bicycle *pedal cycle* for at least 10 minutes con nuously to get to and from places?	1. Yes_____ 0. No_____ **IF NO, GO TO F10**	F7
यदि गर्नु हुन्छ भने, एक हप्तामा तपाईं कति दिन यसरी कम्तिमा १० मिनेट पैदल वा साइकल चलाएर यात्रा गर्नु हुन्छ ?	Number of days_____	F8

In a typical week, on how many days do you walk or bicycle for at least 10 minutes con nuously to get to and from places?		
एक दिनमा तपाईंले कति समय हिडेर अथवा साइकलमा यात्रा गरेर बिताउनु हुन्छ? How much time do you spend walking or bicycling for travel on a typical day?	Hours:_____ Minutes:_____	F9
Recreational activity: *Explanation: Sport, fitness and recreational activites(leisrue) like cycling, swimming, volleyvall, badminton, yoga.*		
तपाई फुर्सदको समयमा के गर्नु हुन्छ? तपाइले स्वास तथा मुटुको धड्कन धेरै बढ्ने खेलकुद, ब्यायाम, तथा मनोरंजनका काम १० मिनेट वा बढी गर्नुपर्छ? जस्तै: फुटबल, उकालोमा साइकल चलाउने आदि। Do you do any **vigorous-intensity** sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football**] for at least 10 minutes** continuously? (USE SHOWCARD)	1. Yes_____ 0. No_____ **IF NO GO TO F13**	F10
यदि गर्नु हुन्छ भने, एक हप्तामा तपाईंले कति दिन जति यस्तो कठिन शारीरिक परिश्रम लाग्ने खेलकुद, ब्यायामतथा मनोरंजनको काम गर्नुहुन्छ? In a typical week, on how many days do you do **vigorous- intensity** sports, fitness or recreational (leisure) activities?	Number of days_____	F11
एक दिनमा तपाईंले कति समय कठिन शारीरिक परिश्रम गरेर बिताउनु हुन्छ? How much time do you spend **doing vigorous-intensity** sports, fitness or recreational activities on **a typical day**? (CHOOSE HOURS OR MINUTES)	Hours:_____ Minutes _____	F12
के तपाई थोरै मात्र मुटुको धड्कन बढ्ने हल्का खेलकुद, ब्यायाम, तथा मनोरंजनका काम लगातार कम्तिमा १० मिनेट गर्नुहुन्छ ? जस्तै: सम्म बाटोमा साइकल चलाउने, भलिबल, badminton, पौडी खेल्ने, चाडै हिड्ने, योगा, आदि। Do you do **any moderate-intensity** sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, swimming, volleyball] **for at least 10 minutes** continuously? (LOOK AT SHOWCARD)	1. Yes_____ 0. No_____**IF NO GO TO G1**	F13
यदि गर्नु हुन्छ भने, एक हप्तामा तपाईंले कति दिन जति यस्तो थोरै मात्र मुटुको धड्कन बढ्ने खेलकुद, ब्यायाम तथा मनोरंजनको काम गर्नुहुन्छ? In a typical week, on how many **days** do you do **moderate- intensity** sports, fitness or recreational (leisure) activities?	Number of days_____	F14
एक दिनमा तपाईंले थोरै मात्र मुटुको धड्कन बढ्ने कति समय खेलकुद, ब्यायाम गरेर बिताउनु हुन्छ? How much time do you spend doing **moderate-intensity** sports, fitness or recreational (leisure) activities on a typical day? (CHOOSE HOURS OR MINUTES)	Hours:_____ Minutes:_____	F15

History of: Diabetes and hypertension

Questions	Response	Code
Diabetes: अब म तपाईलाई सुगर रोग (मधुमेह,Diabetes) सम्बन्धि प्रश्न हरु सोध्छु । Now I will ask you questions about diabetes		
के तपाई ले कहिले चीनी रोग (**मधुमेह**) छ छैन हेर्न को लागि रगत जांच गराउनु भएको छ? Have you ever had your blood glucose measured by a doctor or other health worker? IF NEEDED, EXPLAIN DIABETES	1. Yes_____ 0. No_____**IF NO GO TO G5** Refused 9	G1
तपाईलाई कहिल्यै स्वास्थ्य कर्मीले चीनी रोग (**मधुमेह**) छ भनेर पत्ता लगाएको थियो? Have you ever been told by a doctor or other health worker that you have raised blood glucose or diabetes?	1. Yes_____ 0. No_____**IF NO GO TO G5** Refused 9	G2

यो दुइ हप्ता भित्र चीनी रोग (**मधुमेह**) को औषधि खानु भएको छ? In the past two weeks, have you taken any drugs (medication) for diabetes prescribed by a doctor or other health worker?	1. Yes_____ 0. No_____	G3
यो दुइ हप्ता भित्र चीनी रोग (**मधुमेह**) को सुई लिनु भएको छ?? Are you currently taking insulin for diabetes prescribed by a doctor or other health worker?	1. Yes_____ 0. No_____	G4

Hypertension

अब म तपाईलाई प्रेशर सम्भन्धि प्रश्न हरु सोध्छु है ।

Now I will ask you questions about Hypertension

तपाईले कहिल्यै आफ्नो प्रेसर जचाउनु भएको छ? Have you ever had your blood pressure measured by a doctor or other health worker?	1. Yes_____ 0. No_____ **IF NO, END**	G5
तपाईलाई कहिल्यै स्वास्थ्य कर्मीले प्रेसर बढेको (high blood pressure) छ भनेर भनेको थियो? Have you been told by a doctor or other health worker that you have raised blood pressure?	1. Yes_____ 0. No_____**IF NO, END**	G6
यदि थियो भने, के यो प्रेशर बढेको कुरा बिगत १२ महीनामा भनेको हो ? Have you been told the last 12 months?	1. Yes_____ 0. No_____	G7
यदि थियो भने, तपाईंले प्रेसर घटाउने औषधि खानु भएको छ? Have you ever used blood pressure medication?	1.Yes____ 0.No____**IF NO, END**	G8
यो दुइ हप्ता भित्र प्रेशर को औषधि खानु भएको छ? During the past two weeks, have you been treated for raised blood pressure with drugs (medication) prescribed by a doctor or other health worker?	1.Yes___ 0.No___	**9** G9

तपाई को सहभागिता को लागि धन्यबाद | अब हाम्रो नॉर्वे बाट आउनु भएको साथी हरुले तपाईको उचाई, तौल, प्रेशर, कम्मर र हिप नाप्नेछन |

Thank you for your participation. Now our friends from Norway will measure your height, weight and blood pressure.

Measurments	**Response**
Interviewer ID	
Device ID for blood pressure	Model: GT-702
Cuff size used	Small_____ Medium_____ Large_____
Reading1	Systolic (mmHg)_____ Diastolic (mmHg)_____
Reading2	Systolic (mmHg)_____ Diastolic (mmHg)_____
Device IDs for height and weight	Height_____ Weight_____
Height	In centimeters (cm)_____
Weight	In kilograms (kg)_____

References:
STEPS Survey Nepal 2013. Non Communicable Diseases Risk Factors. Located at: http://www.searo.who.int/nepal/mediacentre/non_communicable_diseases_risk_factors_steps_survey_nepal_2013..pdf
WHO STEPS Instrument. Located at: http://www.who.int/chp/steps/instrument/STEPS_Instrument_V3.1.pdf?ua=1

Appendix 4 Show cards

From Non-Communicable disease factors:

STEPS Survey Nepal 2013

Tobacco Products:

Cigerrates

Hookah

Bidi

Betel leaf

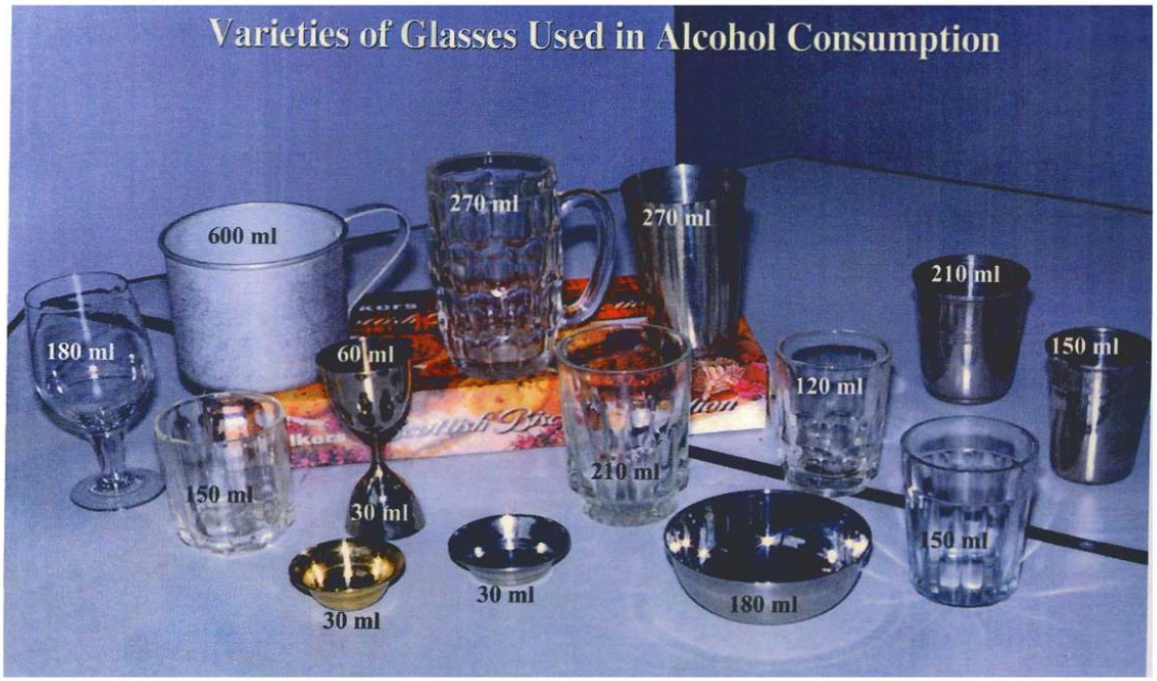
Cigar

Chewing tobacco

Pipe

Snuff available in wet and dry form

Alcohol vessel:



Diet:

JACK FRUIT 	BANANA 	 GRAPES	MANGO 
APPLE 	ORANGE 	PEACH 	PEAR 
STRAWBERRIES 	WATERMELON 	PINEAPPLE 	LYCHEES 
POMELO 	PLUM 	GRAPEFRUIT 	GUAVA 

Serving size: One standard serving = 80 grams

Typical Physical Activities: