

**Bibhuti Katel Karki**

# Behavioural Risk Factors of Non-Communicable Diseases Among Adult Women in Kathmandu

**Master's Thesis**

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**BEHAVIOURAL RISK FACTORS REGARDING  
NONCOMMUNICABLE DISEASES AMONG ADULT  
WOMEN OF GOTHATAR VDC, KATHMANDU**

By  
Bibhuti Katel

Thesis Submitted in Partial Fulfillment of the Requirements of Master of  
Nursing Program (Adult Nursing) from Tribhuvan University, Institute of  
Medicine, Maharajgunj Nursing Campus, Kathmandu

July, 2015

## ABSTRACT

Non Communicable Diseases are the leading cause of death worldwide causing nearly 80% of death in low and middle-income countries. World Health Organization has identified certain risk factors that are associated with an increase in the occurrence of Non Communicable Diseases they are Physical inactivity, tobacco use, alcohol use and unhealthy diets.

A cross sectional descriptive research design was used to assess the status of behavioural risk factors regarding Non communicable Diseases among the adult women of Gothatar Village Development Committee, Kathmandu. A total of 156 women were taken by using cluster random sampling technique. A semi-structured questionnaire developed on the basis of Non Communicable Diseases Risk Factors: STEPS Survey Nepal 2013 was used and face to face interview was done to collect the data. The analysis was done by using descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (Chi Square test, Fisher's exact test and Odds ratio).

The finding of the study revealed that 91.9% of women were taking inadequate fruit and vegetables as recommended by World Health Organization. Current smoking was present in 7.7% respondents, where older people were more likely to be current smoker ( $p < 0.001$ ), current alcohol consumption was present in 7.1 % and was higher in underprivileged ( $p = 0.020$ ). Physical inactivity was found in 6.4% with 6 time higher prevalence among older age group. Nearly half (51.9%) of women were found to be overweight and obese. Systolic hypertension was present in 9% and diastolic hypertension in 13.5% of the respondent.

The finding of study concluded that the use of smoking was higher among older women and among those women with education level below primary level. Alcohol consumption was found to be more among women of underprivileged group. The study highlighted the poor dietary habit among women indicating the need of education and awareness raising programs on diet and nutrition.

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## TABLE OF CONTENT

<b>Content</b>	<b>Page</b>
ABSTRACT	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	v
LIST OF TABLES AND FIGURES	vii
<b>CHAPTER I: INTRODUCTION</b>	<b>1-6</b>
1.1. Background of the Study	1
1.2. Need for the Study	2
1.3. Objectives of the Study	3
1.4. Significance of the Study	4
1.5. Conceptual Framework	4
1.6. Hypothesis/ Research questions	5
1.7. Operational Definitions	5
1.8. Delimitation	6
<b>CHAPTER II: REVIEW OF LITERATURE</b>	<b>7-17</b>
2.1. Introduction	7
2.2. Review of Literature	7
2.3. Summary of Reviewed Literature	16
<b>CHAPTER III: METHODOLOGY</b>	<b>18-23</b>
3.1. Research Design	18
3.2. Research Setting and Population	18
3.3. Sampling	18
3.4. Instrumentation	19
3.5. Data Collection Procedure	21
3.6. Ethical Considerations	22
3.7. Data Analysis Procedure	23
<b>CHAPTER IV: FINDINGS OF THE STUDY</b>	<b>24-41</b>

<b>CHAPTER V: DISCUSSION, CONCLUSION AND RECOMMENDATION</b>	42-48
3.1. Discussion	42
3.2. Conclusion	47
3.3. Limitations	47
3.4. Implications	47
3.5. Recommendations for Further Study	48
<b>REFERENCES</b>	49-52
<b>APPENDICES</b>	
Appendix A: Consent Form (English Version)	53
Appendix B: Consent Form (Nepali Version)	54
Appendix C: Research Instrument (English Version)	55
Appendix D: Research Instrument (Nepali Version)	62
Appendix E: Categorization of Physical Activity, BMI, Hypertension, Fruit and Vegetable serving and Alcohol drink	68

## LIST OF TABLES AND FIGURES

<b>Tables</b>		<b>Page</b>
1	Socio Demographic Information (Age, Education and Ethnicity)	25
2	Socio Demographic Information (Marital status, Income and Occupation)	26
3	Smoking Status of the Respondents	27
4	Use of Smokeless tobacco Products by the Respondents	28
5	Status of Use of alcohol among the Respondents	29
6	Consumption of Fruits and Vegetables by the Respondents	30
7	Frequency of Consumption of High Salt Food among the Respondents	31
8	Salt Consumption Characteristics of the Respondents	32
9	Status of Physical Activities of the Respondents	33
10	Physical Health Characteristics of the Respondents	34
11	Summary of Behavioural and Physical Risk Factors of Non Communicable Disease	35
12	Status of Combined Risk Factors in the Respondents	36
13	Association of Demographic Characteristics with Fruit and Vegetables consumption	37
14	Association between Demographic Characteristics of Respondents and current consumption of Tobacco Products	38
15	Association between Demographic Characteristics of Respondents and current consumption of Smokeless Tobacco Products	39
16	Association between Demographic Characteristics of Respondents and current consumption of Alcohol	40
17	Association between Demographic Characteristics of Respondents and physical Activity.	41

## LIST OF FIGURES

<b>Figure</b>		<b>Page</b>
1	Conceptual Framework on Behavioural Risk Factors regarding Noncommunicable Diseases among Adult Women of GothatarVDC, Kathmandu.	5

## CHAPTER I

### INTRODUCTION

#### 1.1 Background of the Study

Non Communicable Diseases (NCDs) are the biggest cause of death worldwide. A total of 57 million deaths occurred in the world during 2008, 36 million (63%) were due to NCDs mainly cardiovascular diseases (48%), cancers (21%), chronic respiratory diseases (12%) and diabetes (3%). In Nepal, the estimated death in 2008 by NCDs was 50% of all death with 48.8% in male and 42.8% in female (Alwan, Armstrong, Cowan, & Riley, 2011).

Low- and lower-middle-income countries have the highest proportion of deaths under the age of 60 years from NCDs. Premature deaths under age of 60 years for high-income countries were 13% and 25% for upper-middle-income countries. In lower-middle-income countries the proportion of premature NCD deaths under 60 years rose to 28%, more than double the proportion in high-income countries. In low-income countries, the proportion of premature NCD deaths under 60 years was 41%; which is three times the proportion in high-income countries (Alwan et al., 2011).

Non communicable diseases (NCDs) cause 63% of deaths globally and nearly 80% of deaths in low and middle income countries (Alwan, 2010). In Nepal, 42% of deaths are caused by NCDs and nearly 35% of deaths are caused by four particular NCDs – cardiovascular diseases (CVDs), cancer, chronic obstructive pulmonary diseases and diabetes mellitus (Aryal et al., 2014).

WHO has identified certain risk factors (personal behavior of lifestyle, an environmental exposure, hereditary characteristic) that is associated with an increase in the occurrence of NCDs. Physical inactivity, tobacco use, alcohol use and unhealthy diets are the four prioritized behavioral risk factors associated with occurrence of four leading NCDs.

The four NCDs diseases are preventable. Up to 80% of heart disease, stroke, and type 2 diabetes and over a third of cancers could be prevented by eliminating shared risk factors, mainly tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol (Alwan, 2010).

## **1.2. Need for the Study**

Use of tobacco and alcohol consumption among adults is higher in Nepal as compared to other South Asian neighbors. According to report of 2011, the number of female smokers is higher in Nepal compared to other countries with the prevalence of 25% current smoker followed by Pakistan and Myanmar with prevalence of 7% each. Similarly in India the prevalence of current smoking among women was 4% while China and Pakistan had prevalence of 2% each (Riley & Cowan, 2014).

According to Vaidya, Oli, Aryal, Karki, and Krettek (2014) low fruit and vegetable intake is a public health problem in the Nepalese context. A community based study showed fruit and vegetable intake in the community was low with only 2.1% of the study population consuming the WHO-recommended five servings per day. Low fruit and vegetable intake was present among them 98.3% of the male and 97.8% of the female respondents. While in Gujarat, low fruits and vegetables consumption was present among 91.6% male and 93.8% female (Aroor, Trivedi, & Jain, 2013).

Physical inactivity causes 6% of the burden of disease from coronary heart disease, 7% of type 2 diabetes, 10% of breast cancer, and 10% of colon cancer. The elimination of physical inactivity would increase the life expectancy of the world's population by 0.68 years (Lee et al., 2012).

A study conducted in Nagpur among 1964 men and 1807 women concluded that among men, overweight and obesity was present in 5.7% and 0.3% respectively while in women overweight and obesity was found in 7.2% and 0.7% respectively (Bhardwaj, Shewte, Bhatkule, & Khadse, 2012). But in contrast the prevalence of overweight and obesity among women is 1.8% and 24.5% respectively. The prevalence of obesity is higher in women having less frequency of fruit in comparison to women who took fruits frequently (Shahi, Rai, Adhikari, & Sharma, 2013).

The step survey conducted by NHRC on NCDs Risk Factors reveals that the percent of women who ate less than 5 servings of fruit and/or vegetables on average per day has increased from 63.5% in 2008 to 98.9% in 2013. The percentage of women who are obese ( $BMI > 30 \text{ kg/m}^2$ ) has increased from 2.4 in 2008 to 4.8 in 2013. Similarly percentage of women with raised BP ( $SBP > 140$  and/ or  $DBP > 90$  mmHg, who are not currently on medication for raised BP) was 18.1% in 2008 and 20.6% in 2013 (Aryal et al., 2014).

The available data and literature review shows that the behavioural risk factors of non-communicable disease are in increasing trends in Nepal. The number of female smokers is higher in Nepal compared to other countries similarly fruit and vegetables consumption is lower in women of Nepal and the prevalence high among them in compared to other countries which are the major causative risk of the four NCDs. However by eliminating behavioural risk factors the four NCDs can be prevented up to 80 percent. Hence the researcher aims to assess the status of behavioral risk factors regarding non-communicable disease among the women.

### **1.3. Objective of the Study**

#### **General objective**

The general objective of the study was to find out the status of the behavioral risk factors regarding non communicable diseases among adult women of Gothatar VDC, Kathmandu.

#### **Specific Objectives**

The specific objectives of the study were:

- To find out the status of tobacco consumption among adult women.

- To assess the status of alcohol consumption among adult women.

- To identify dietary habit of adult women.

- To assess the physical activity of adult women.

- To assess BMI and blood pressure of adult women.

To find out the association between selected socio-demographic variables (i.e. age, ethnicity, education, economic status) and behavioural risk factors of Non-communicable Diseases.

#### **1.4 Significance of the Study**

This study will help to identify the prevalence of behavioural risk factors in the concerned locality.

The finding of the study may be helpful for the local policy maker to develop plan and execute health program.

The study will also help the respondents to be aware of their risk behavior and make necessary change or modification of their behavior.

#### **1.5 Conceptual Framework**

The Conceptual Framework has been developed in order to achieve clear and in depth understanding of the study being conducted. This conceptual framework was developed on the basis of extensive literature review and consultation with experts. This framework highlights the behavioural risk factors regarding non communicable diseases among adult women. The behavioural risk factors have been categorized into use of tobacco, alcohol consumption, physical inactivity and poor dietary habit. The socio-demographic factors include age, ethnicity, education, marital status, occupation and economic status.



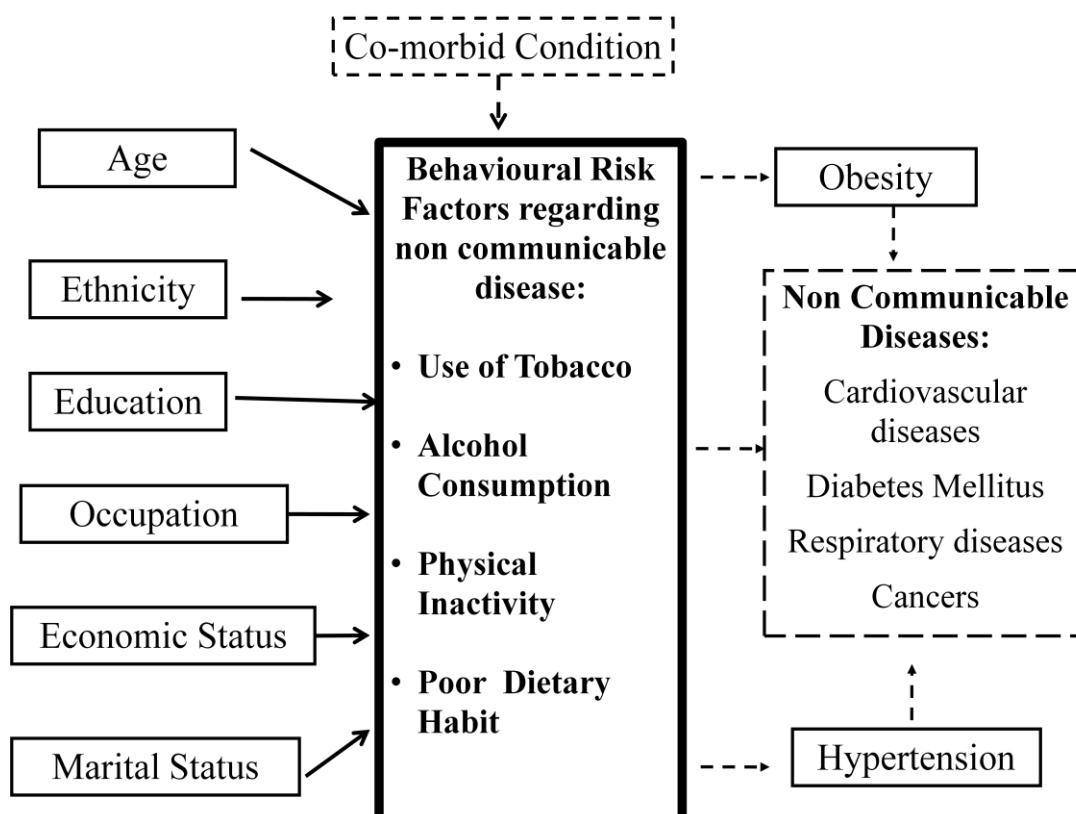


Fig 1: Conceptual Framework on Behavioural Risk Factors of Non communicable diseases among Adult Women of Gothatar VDC, Kathmandu.

(**Note:** The broken lines were not studied).

## 1.6 Research Questions

What is the prevalence of behavioural risk factors regarding non communicable diseases among adult women?

Is there any association between selected socio-demographic variables and the status of behavioural risk factors of non - communicable diseases?

## 1.7 Operational Definition

**Behavioral risk factors:** Physical inactivity, unhealthy dietary habits, tobacco use and alcohol consumption.

**Non Communicable Diseases:** The four leading NCDs (Non Communicable Diseases) i.e. Cardiovascular Diseases (CVDs), Diabetes, Cancer and Chronic Respiratory Diseases.

**Adult women:** Adult women refer to the women of the age group of 20-60 years and residing in Gothatar VDC, Kathmandu

**Physical inactivity:** Any women who will not meet the criteria of vigorous or moderate activity as given in the WHO steps manual i.e. less than 600 MET minutes per week.

**Poor dietary habits:** Consumption of less than 5 servings of fruits and vegetables per day.

**Tobacco users:** Those adult women who consume both smoking products and smokeless tobacco products (i.e. khaini and gutkha).

**Alcohol consumption:** Respondents taking any form of alcohol such as beer, jaand, tongba, local raksi, whisky, vodka (spirits), rum, wine (red and white).

**Hypertension:** It includes those who self-reported as having hypertension or those who had high blood pressure according to JNC-VII classification during the time of survey.

**Overweight and obesity:** Overweight BMI between 25-29.9 and obesity as BMI 30 or higher.

**Combined Risk Factors:** Presence of more than one behavioural risk factors, obesity and hypertension.

## 1.8 Delimitation

Study was conducted only among women of age group 20 -60 years of age.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

During the course of literature review many books, journals, internet, news, bulletin and articles were searched. The literature review has been arranged systematically covering each component of behavioural risk factors.

#### **2.2 Review of Literature**

##### **2.2.1 Overview of Non Communicable Disease**

Non-communicable diseases (NCDs), also known as chronic diseases, are not passed from person to person. They are of long duration and generally slow progression. The four main types of non- communicable diseases are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary diseases and asthma) and diabetes (WHO, 2013).

##### **2.2.2 Tobacco Use**

Tobacco is the single largest agent implicated in a number of diseases and is a risk factor for the six of the eight leading causes of death in the world. It has killed an estimated 100 million people in the 20th century and continues to kill 5.4 million people every year and this figure is expected to rise to 8 million per year by 2030, 80% of which will occur in the developing countries (WHO, 2008). (Pham et al., 2009).

Cigarette smoking is a popular method of tobacco consumption worldwide. In Nepal, tobacco used in various forms such as beedi smoking, a most popular form in tarai region followed by cigarette smoking and use of various smokeless tobacco preparations in hilly and urban areas. The prevalence of tobacco use is considerably higher in rural areas than in urban areas, particularly in youth population. Males

consume more tobacco products than females. The prevalence of tobacco products users is the highest (68.2%) in the high mountain region followed by the tarai region (42.4%) and mid hilly region (40.9%). In Nepal, chronic non-communicable diseases of respiratory, cardio-vascular and, nervous systems, including cancers of oral cavity, respiratory and digestive organs, as well as premature deaths cause around 42% mortality. Tobacco is the most common risk factor, which became the world's leading killer, responsible for many cancers. Lung cancer is the commonest tobacco-attributed cancer in both genders, which is one of the common causes of death from cancers in Nepal. The major part of population in Nepal is not aware of risk factors leading to cancers and other diseases (Subedi, D.M.R.D, & Sharma, 2013).

Tobacco use is a serious public health problem in the South East Asia Region where use of both smoking and smokeless form of tobacco is widely prevalent. The region has almost one quarter of the global population and about one quarter of all smokers in the world. Out of 5.1 million tobacco attributable deaths in the world, more than 1 million are in South East Asia Region (SEAR) countries. Smoking among men is high in the region and women usually take to chewing tobacco. The prevalence across countries varies significantly with smoking among adult men ranges from 24.3% (India) to 63.1% (Indonesia) and among adult women from 0.4% (Sri Lanka) to 15% (Myanmar and Nepal). The prevalence of smokeless tobacco use among men varies from 1.3% (Thailand) to 31.8% (Myanmar), while for women it is from 4.6% (Nepal) to 27.9% in Bangladesh (Thakur, Garg, Narain, & Menabde, 2011).

The prevalence of smoking among female tea pluckers in Srilanka is 7.27%. Among the smokers, most smoked cigar (55%), followed by beedi (39%) and cigarette (6%). Among them 92.8% has never smoked or used tobacco products while 16.5% uses tobacco occasionally and the regular (current) user of smoking and smokeless tobacco were 7.2% and 70 % respectively. The study further showed a significant positive association between smoking and illiteracy ( $p<0.05$ ) There was positive association of smoking and age more than 35 years ( $p<0.01$ ) (Weerakoon et al., 2009).

Smoking increases the risk of breast cancer among women. Compared with never smokers, women who smoke for at least 20 years and who smoke 10 cigarettes or more daily have the higher risk. Women who initiate smoking prior to their first birth

or before age of 15 have an increased risk. Women who start smoking as teenagers and continue to smoke for at least 20 years may increase their breast cancer risk (Gram et al., 2005).

A study finding showed that the current smokers with breast cancer have higher mortality. Compared with never smokers, current smokers at diagnosis had a slightly higher breast cancer-specific mortality, but not statistically significant. Among current smokers, breast cancer-specific mortality increased with total exposure to, intensity and duration of smoking. Compared to never smokers, breast cancer-specific mortality was 32 to 56% higher among heavy smokers (more than 30 pack years of smoking, more than 20 cigarettes per day or more than 30 years of smoking). Smoking at diagnosis was associated with an increased all-cause mortality rate (Bérubé, Lemieux, Moore, Maunsell, & Brisson, 2014).

A cross sectional study conducted in Nagpur shows that the prevalence of daily smoked tobacco was 20.5 % for men while all females were lifetime abstainer. Daily smokeless tobacco users were 62.6 % and 32.8 % in men and women respectively (Bhardwaj et al., 2012). While in Gujarat the prevalence of daily smoking is 0.4% and 0.5% of the women in urban and rural area respectively. Similarly daily use of smokeless tobacco in the urban and rural women is 5.5% and 19.8% respectively (Aroor et al., 2013).

Similarly the rate of smoking and lung cancer among women is rising in Europe. Smoking is significantly associated with older age, being divorced, having friends/family who smoke and having parents who smoke. The most frequently reported reason for initiation smoking was friend smoking, with 62.3% of ever smokers. Education and income measures were not significantly associated with smoking (Oh et al., 2010).

Tobacco use is a serious public health problem in the central developmental region of Nepal. 42.1% male and 18.4% female were currently using tobacco. 25.26% of male and 7.47% of female were currently using chewing tobacco. The highest proportion of current tobacco users falls under the age group of 55-64 years closely followed by 45-54. Of the total smoking tobacco users, majority (98.9%) consume cigarette followed by beedi (37.4%). Only 4% of total current smokers use hukka (pipes). Of the total

smokeless tobacco users, highest percentage i.e. 93.0% consume chewing tobacco which is commonly known as surti or tamakhu in Nepal, which is, followed by chewing battle which is consumed nearly half of the smokeless tobacco users. Majority of tobacco users were influenced by friends for using tobacco (48.4%) followed by parents (24.9%). More percentages of female were influenced by friends (53.8%) than their male counterpart (Adhikari & Gupta, 2014).

The mean number of years of current tobacco use in female of West Bengal was 18.0 years (Basu, Biswas, & Chatterjee, 2013). Similarly the study of Adhikari and Gupta (2014) reveals that the mean age of initiation of smoking in women was 17.38 years. Likewise the mean age of smoking among European women was 18.2 years with over 80% beginning smoking by the age of 20 (Oh et al., 2010).

### **2.2.3 Alcohol Consumption:**

Alcohol remains a major contributor to cancer mortality and years of potential life lost (YPLL). Alcohol consumption resulted in an estimated 3.2% to 3.7% of all US cancer deaths. The majority of alcohol-attributable female cancer deaths were from breast cancer (56% to 66%), whereas upper airway and esophageal cancer deaths were more common among men (53% to 71%). Alcohol-attributable cancers resulted in 17.0 to 19.1 YPLL for each death. Daily consumption of up to 20 grams of alcohol ( $\leq 1.5$  drinks) accounted for 26% to 35% of alcohol-attributable cancer deaths. Reducing alcohol consumption is an important and underemphasized cancer prevention strategy (Nelson et al., 2013).

Alcohol is the most prevalent addictive substance used in Sri Lanka and this practice has been in existence for centuries. About 24 percent of the adult female tea pluckers are current alcohol users, 65.3 percent has never used alcohol while 10.8 percent are occasional user. Among those who take alcohol majority of the females' reason for taking alcohol is to forget their worries (Weerakoon et al., 2009).

A case control study conducted by Qian et al. (2014) shows positive relationship between alcohol consumption and breast cancer risk, suggesting that this modifiable risk factor should be addressed in breast cancer prevention programs in Africa. Compared with non-drinkers, women who had drunk for  $<10$  years had 41% higher

risk of having breast cancer, and those who had drunk for 10–19 years had 71% risk where as those who drink for  $\geq 20$  years had 82% higher risk of having breast cancer. Every 10-year increase in the duration of drinking was associated with a 54% increase in breast cancer risk. Alcohol consumption was associated with breast cancer risk, regardless of alcohol amount; breast cancer risk increase was shown even in the category of women who consume 0.1–4.9 g/day.

Similarly, Peter and Paolo (2009) concluded that alcohol consumption increases the risk of breast cancer. There is consistent evidence from large, prospective studies that even moderate alcohol consumption increases the risk of breast cancer. Most studies have confirmed a gradient of increasing risk of breast cancer associated with increasing levels of alcohol consumption, even at moderate levels of consumption. In France, 9.4% of breast cancer is attributable to alcohol consumption; and 7.7% of all breast cancers in Europe are attributable to alcohol consumption

In regard to Nepal, Aryal et al. (2014) reported that the prevalence of alcohol consumption (current drinkers) among Nepalese women is 7.1 percent. Among those who drank in the past 12 months, 17.5 percent drank daily. Among the current drinkers, 13.2% of were heavy drinkers ( $\geq 40$  grams on a single occasion).

#### **2.2.4 Dietary Habit**

Fruit and vegetable intake is crucial in health promotion and disease prevention. Findings of research studies shows fruit and vegetables consumption are one of the several important protective factors against non-communicable diseases such as several cancers, cardiovascular diseases, diabetes and obesity. Inadequate intake of fruit and vegetable is found among adult populations worldwide. WHO recommends adults to consume at least five serving of fruits or 400 grams of fruits and vegetables daily (Lock, Pomerleau, Causer, Altmann, & McKee, 2005).

A higher intake of fruits and vegetables has been associated with a lower risk of ischemic heart disease (IHD). The burden IHD and ischemic stroke can be reduced by 31 and 19 percentage respectively, if the individual daily intake of fruit and vegetables can be increased up to 600 grams (Lock et al., 2005).

A study done among Portuguese mothers showed that the mean intake of fruit and vegetables was below the WHO recommendations of  $\geq 400$  g/day. Only 46% of the mothers met this recommendation. Educational level was positively associated with daily vegetable intake. Mothers belonging to higher educational levels were more likely to have a daily vegetable intake. Similarly mothers belonging to higher social classes were more likely to eat fruit and vegetables daily (Franchini, Poínhos, & Klepp, 2013).

The consumption of fruit and vegetable is low in Nepalese people. When compared to other South-Asian countries such as India (approximately 74 percent inadequate fruit and vegetable intake), Sri Lanka (68 percent) and Bangladesh (47 percent), Nepal with prevalence of 97.9% stands next to Pakistan (99 percent) when it comes to the overall insufficient fruit and vegetable consumption (Vaidya et al., 2014).

Similarly a study in conducted in China by Li, Wang, Jiang, Zhang, and Wang (2013) shows that 51.7% women were consuming less than 400 grams of fruits and vegetables. While in Gujarat the prevalence of low fruits and vegetables consumption among women was 93.8% and 97.1% of the women in urban and rural areas respectively (Aroor et al., 2013).

The burden of low fruit and vegetable intake as a cardio metabolic risk factor is a public health problem in the Nepalese context. The study conducted by Vaidya et al. (2014) shows that the average intake of fruit and vegetables is half the recommended amount. The burden of low fruit and vegetable in the population is alarmingly high at 97.9 percent. In comparison to male, females consumed more fruits in terms of both days/week and serving/day. Females consumed vegetables on more number of days than males. The average number of serving of vegetables was also higher in women. However 97.8 percent of the females had low fruit and vegetables intake. Newar women had less fruit intake compared to other ethnic groups. Occupation wise those doing government jobs, took fruits on more number of days. Similarly insufficient fruit and vegetables intake by women has also been shown by other study conducted in Sindhuli where 96.5% females were having insufficient fruit and vegetables intake (Dhungana et al., 2014).



Regarding the consumption of dietary salt 91.0% consumed powdered salt from the packet with two children on its logo. Around 4.7 percent of the respondents always or often added salt before eating or while eating. Similarly, 11.5 percent of respondents always or often consumed processed food containing high amounts of salt. Around 10.9 percent thought that they consumed far too much or too much salt, 42.2 percent ate meals without adding salt (Aryal et al., 2014).

Eating a high-salt diet for several years may damage blood vessels. People with this type of blood vessel damage who eat a high-salt diet are more likely to develop hypertension; therefore, the impact of a high-salt diet is greater on this group of people (Scheven, Jong, Bakker, Curhan, & Gansevoort, 2012). This is further supported by a large scale study conducted in Japan by among 10,422 participants (4585 men and 5837 women) concluded a positive relationship of dietary salt intake to BP (Miura et al., 2009).

### **2.2.5 Physical Inactivity:**

Insufficient physical activity can be defined as less than five times 30 minutes of moderate activity per week, or less than 20 minutes of vigorous activity per week or equivalent (Mendis, Puska, & Norrving, 2011).

Insufficient physical activity is the fourth leading risk factor for mortality. Approximately 3.2 million people die each year due to physical inactivity. People who have insufficient physical activity have a 20% to 30% increased risk of all-cause mortality. Regular physical activity reduces the risk of cardiovascular disease including high blood pressure, diabetes, breast and colon cancer, and depression (Alwan et al., 2011).

Physical inactivity (lack of physical activity) has been identified as the fourth leading risk factor for global mortality (6% of deaths globally). Moreover, physical inactivity is estimated to be the main cause for approximately 21–25% of breast and colon cancers, 27% of diabetes and approximately 30% of ischemic heart disease (WHO, 2015).

Physical inactivity is a leading risk factor for cardiovascular and other non-communicable diseases in high, low and middle-income countries. Nepal, a low-

income country in South Asia, is undergoing an epidemiological transition. Although the reported national prevalence of physical inactivity is relatively low, studies in urban and peri-urban localities have always shown higher prevalence. Furthermore, women and housewives and older, more educated and self-or government-employed respondents showed a greater prevalence of physical inactivity. Respondents with hypertension, diabetes or overweight/obesity reported less physical activity than individuals without those conditions (Vaidya & Krettek, 2014).

Physical inactivity causes 6% of the burden of disease from coronary heart disease, 7% of type 2 diabetes, 10% of breast cancer, and 10% of colon cancer. Inactivity is responsible for 9% of premature mortality (5.1% to 12.5%), or >5.3 of the 57 million deaths that occurred worldwide in 2008. The elimination of physical inactivity would increase the life expectancy of the world's population by 0.68 years (Lee et al., 2012).

Warburton, Nicol, and Bredin (2006) conclude that there is irrefutable evidence of the effectiveness of regular physical activity in the primary and secondary prevention of several chronic diseases (e.g., cardiovascular disease, diabetes, cancer, hypertension, obesity, depression and osteoporosis) and premature death. There is a linear relationship between physical activity and health status.

Low physical activity was present in 22.3% of the urban women and 13.6% of the rural women of India (Aroor et al., 2013). Similarly the prevalence of physical inactivity among Chinese women was 18.3% (Li et al., 2013). While in Nepal, 2.4% of women is having low physical activity i.e. less than 600 MET (Aryal et al., 2014).

## **2.2.6 Biological risk of Non communicable Diseases**

### **Obesity**

Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. Body or equal mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight (WHO, 2015b). (WHO, 2015).

In Srilanka, the prevalence of obesity among women was 36.5 percent (Wijewardene et al., 2005). The prevalence of overweight and obesity among the urban women was 29.7% and 54.1% respectively while among rural women was 13.4% and 24.7% in Gujarat (Aroor et al., 2013). Similarly the study of Pham et al. (2009) among 1978 respondents showed that 8.8% of men and 12.6% of women were overweight (body mass index (BMI)  $\geq 25$  kg/m<sup>2</sup>) and 2.3% of men and 1.5% of women were obese (BMI  $\geq 30$  kg/m<sup>2</sup>).

Likewise in Nepal, the prevalence of overweight among women was 24.5% and prevalence of obesity was 1.8%. Overweight and obesity of women was not associated with physical activities, whether women were vegetarian or non-vegetarian and frequency of food they usually took. But the women who took fruits frequently in their diet had low body mass index than women who took fruits less frequently. In other word, overweight and obesity among women was associated with fruits intake less frequently (Shahi et al., 2013).

According to P.Aacharya, Prasad, and P.Gupta (2006) the finding of retrospective study among the clients attending General Health Check-up Clinic at TUTH, Katmandu revealed that 5.8% were underweight, 52.2% normal, 37.9% overweight and 4.1% to be obese. Out of those obese cases, 73.7% had hypertension, 10.5% had diabetes mellitus and 5.3% had Ischemic Heart Disease (IHD). Similarly, out of the overweight cases 46.0% had hypertension, 6.8% had diabetes mellitus and 3.4% had IHD. The cases with normal weight or underweight had significantly lower incidence of these diseases; 21.1% had hypertension, 5.4% had diabetes mellitus and 2.9% had IHD. Out of 27 underweight cases, 3.7% had hypertension, 3.7% had diabetes mellitus and none had IHD.

### **Hypertension**

A cross sectional study conducted in Kathmandu concluded Hypertension is an emerging public health challenge in urban areas of Nepal. Most importantly, it may be increasing among young population. Moreover, awareness, treatment and control rates are not satisfactory. The study revealed that the prevalence of hypertension was 23.7%, pre-hypertension was 30% and 46.3% had ideal blood pressure. Prevalence of hypertension was higher among male (30.39% vs. 10%). Almost two third of the

hypertensive subjects were less or equal to 40 years (64.35%). Awareness, treatment and control of hypertension were 39.13%, 18.26% and 7.38% respectively (Shakya et al., 2012).

Similarly there is high prevalence of hypertension and pre-hypertension among population of Puducherry in South India. Among 856 participants 27.6 percent were hypertensive and 57% pre-hypertensive; the magnitude of both stage 1 and stage 2 hypertension increased with the age. Of the hypertensive, 26.3% and 28.7% were from rural and urban area respectively, whereas in pre-hypertension the corresponding figures were 61 and 53.4 percent. Significantly increased risk of hypertension was noted among adults with increasing age, having less than six members in the family, suffering from obesity (general and abdominal obesity) and living sedentary life. On the other hand, the probability of having increased risk of pre-hypertension was significantly higher among adults living in the rural areas, having non-vegetarian dietary habit, suffering from obesity (general and abdominal obesity), living sedentary life and having family history of hypertension (Bharati, Pal, Rekha, & Yamuna, 2011).

In Srilanka, the prevalence of hypertension as defined was 18.8% (CI 14.5–23.1) for men and 19.3% (CI= 12.2 -26.4) for women (Wijewardene et al., 2005). Likewise a study conducted in Vietnam with total sample of 1978 showed that the prevalence of hypertension (systolic BP  $\geq$  140 mmHg and/or diastolic BP  $\geq$  90 mmHg, or taking medication for hypertension) was 27.3% for men and 16.2% for women (Pham et al., 2009).

Similarly the prevalence of hypertension among rural women in India was 27.8% (Bansal et al., 2012). Similarly the study conducted to assess the prevalence among rural Nepali women showed that 3.3% had hypertension and 14.4% had pre-hypertension. Hypertension and prehypertension was higher among women of age 46 years than women of age below 46. The study concluded that although the prevalence of hypertension was low in this cohort, it was more prevalent among the poorer women and was strongly associated with other cardiovascular risks (Khan et al., 2013).

## 2.3 Summary

Non -communicable diseases are of long duration and generally slow progression. They are the leading cause of death worldwide with low and lower middle income countries having the highest proportion of death under 60 years of age. WHO has identified certain risk factors (personal behaviour of lifestyle, an environmental exposure, and hereditary characteristics) that are associated with an increase in the occurrence of NCDs. The prioritized behavioural risk factors associated with occurrence of NCDs are tobacco use, use of alcohol, unhealthy diets and physical inactivity. Nearly 80% of the NCDs can be prevented by eliminating these behavioural risk factors.

Several research studies shows that the prevalence of smoking among women in Nepal is higher compared to other South Asian countries. On average women initiate smoking before the age of 20 years. Regarding dietary habit studies shows that majority of the women do not consume adequate fruit and vegetables as recommended by WHO. Similarly in Nepal the adequate consumption of fruit and vegetable is very low among women.

Many research studies shows high prevalence of obesity and hypertension among women. Therefore there is need to estimate the prevalence of behavioural risk factors of non-communicable diseases among women and plan preventive action to reduce non-communicable disease among them.

Literature review shows that there have been studies among Nepalese women regarding smoking habit, obesity, hypertension, fruit intake, but the study that includes all the four behavioural risk factors among women is lacking, so this study aims to assess the status of behavioural risk factor among women.

## CHAPTER III

### RESEARCH METHODOLOGY

#### 3.1. Research Design

The cross-sectional descriptive study design was used to find out the status of behavioural risk factors regarding non communicable diseases.

#### 3.2. Setting and Study Population

Gothatar VDC of Kathmandu was chosen for the study area as it is moving towards urbanization and life style of people is changing with urbanization.

**Population:** The study population was adult women (20-60 years) residing permanently in Gothatar VDC.

#### 3.3 Sampling

**Sampling technique:** Cluster random sampling technique was adopted for selecting the subject. Out of total 9 wards, 2 wards were selected randomly using lottery method. Then systematic random technique was applied to select respondents as it was not feasible to include all the respondents from each cluster. For this total household number of selected 2 wards was taken in reference from the District Profile Kathmandu. The total household were 1160, which was divided by required sample size which was calculated using standard formula to find sampling interval. The sampling interval was 7. First sample was drawn randomly from 1-7 which was sample 1 and then the rest sample was taken by adding sample interval.

The researcher stood in the area from where ward no 3 starts and then the first house of the researcher approach was taken as first sample and every 7 houses of both side from the road nearby the sample were excluded and next house was taken. One respondent from one house was taken.

**Sample Size:** Sample size was calculated by standard formula on the basis of prevalence of one risk behavior i. e. smoking among women – 10.3% (Non-communicable Disease Risk Factor Step Survey Nepal 2013, NHRC) at 95% confident interval with 6% allowable error.

Sample size when estimating a proportion:-

$$n = (Z\alpha^2 pq)/d^2 \text{ (Lwanga \& Lemeshow, 1991)}$$

Where, **n** = required sample size

**Z $\alpha^2$**  = the value of standard normal variate at desired level of confidence;

**d** = allowable error;

**p** = proportion of required characteristics    **q** = 1-p.

$$\text{Sample size (n)} = (Z\alpha^2 pq)/d^2 = (1.96)^2 (Pham et al., 2009)/(0.06)^2 = 98.59 \sim 99$$

To minimize the design effect, sample was multiplied by 1.5 as Cluster sampling technique was adopted. So the calculated sample size was 148.5~149. Assuming a non-response rate of 5% of the 149, total of 156 respondents were included in the study.

### **Exclusion Criteria:**

The women of age less than 20 years or more than 60 years

Those who were not permanent residence

Pregnant women and women with any known mental disorder

There was 100% response rate from the respondents and the respondents were co-operative and enthusiastically participated in the study.

### **3.4 Instrumentation**

Semi structured Questionnaire was developed by extensive literature review and taking reference from “Non Communicable Diseases Risk Factors: STEPS Survey Nepal 2013 NHRC”. NHRC has adopted WHO NCD STEPS instrument version 2.2 which consists of three Steps for measuring NCD risk factors. Step I includes socio-demographic and behavioural information which included tobacco use, harmful alcohol consumption, low fruit and vegetable consumption, history of raised blood pressure and blood glucose levels, oral health, dietary salt consumption, and housing and energy (indoor air pollution). Step II includes physical measurements such as

height, weight and blood pressure, waist, hip circumference and heart rate. Step III includes biochemical measurements as blood glucose and cholesterol levels. Each step consists of a number of core, expanded and optional questions.

The research instrument consisted of three parts:

Part I: questions related to socio-demographic information of adult women

Part II: consisted of questions about risk behaviors related to non-communicable disease.

Part III: consisted of physical measurement: weight, height and blood pressure.

Part I consisted of 6 questions and it included age, ethnicity, education, marital status and family income. Ethnicity was categorized according to Non-communicable Disease Risk Factor Step Survey Nepal, NHRC (2013).

Part II consisted of questions related to behavioural risk factors. It was developed by researcher on the basis Non Communicable Diseases Risk Factors: STEPS Survey Nepal 2013 NHRC. It consisted of questions regarding the use of tobacco products, consumption of alcohol, dietary pattern and physical activity.

Questions related to use of tobacco products consisted of 12 questions and it included smoking tobacco and smokeless tobacco i.e. khaini and gutkha and they were coded as A (A1-A12). Questions related to use of alcohol consisted of 8 questions and were coded as B (B1-B8). Dietary habit related questions consisted of 9 questions and it included fruit intake, vegetables intake, and salt consumption, they were coded as C (C1-C9). Physical activity related questions consisted of 16 questions and it included work related, transportation and recreational activities related questions and they were coded as D (D1-D16).

Part III consisted of physical measurements which were included height, weight and blood pressure.

### **Validity and Reliability of the instrument:**

The content validity of the instrument was established by consultation with advisors, subject matter experts, nursing research faculty as well as peer review.



The instrument was written in English and after validity was establishment, it was translated in the Nepali by researcher herself and was revised by the Nepali teacher of College of International Language and then back translated into English version with the help of English teacher of Brishpati Vidyasadan School. The researcher then compared original version of the tool with back to back translated version to ensure the consistency in meaning provided by the English and Nepali version. For clarity, consistency and easiness, the Nepali version of questionnaire was used to collect data. (Refer to Appendix D)

Pretesting of the instrument was done among 10% (16) women in Mulpani VDC, Kathmandu. On the basis of pretesting, some items on physical activity and alcohol consumption were modified. In alcohol consumption the place of taking alcohol was added to validate the amount of alcohol taken similarly physical activity portion was divided into work, transportation and recreational/ leisure activities. The pretested samples were excluded in final data analysis.

The reliability of physical measurement instruments was maintained by making periodical cross check with the weighing scale, blood pressure measuring instrument and height scale that were used in Medical OPD of Tribhuvan University Teaching Hospital (TUTH). Same weighing scale, blood pressure instrument and measuring tape were used. Pointer of the weighing scale and blood pressure instrument was calibrated to 0 before taking weight and blood pressure. Researcher herself measured the height, weight and blood pressure.

### **3.5. Data Collection Procedure**

Data was collected after getting approval from the research committee Nursing Campus Maharajgunj and Institutional Review Board of Institute of Medicine. Formal permission was obtained from Village Development Committee Office, Gothatar by submitting written request letter. Data collection was done within the period of 4 weeks (5th September, 2014 to 4th October, 2014). On an average 5-6 respondents were interviewed per day to prevent exhaustion in the researcher which might hamper the quality of data obtained.

### **3.6. Ethical Consideration**

Before collecting data, administrative approval was obtained from the authorities of Maharajgunj Nursing Campus. Formal approval was obtained from the Institutional Review Board, IOM. Formal Permission was obtained from Gothatar Village Development Committee. Purpose of the data collection was explained to the respondents. The respondents were assured voluntary participation and also assured that the individual identity would not be disclosed in the report and the information would be used for study purpose. Informed written consent was obtained from the respondents prior to data collection.

Confidentiality was maintained throughout the study period. Data collection was done by the researcher only. Data obtained was used for the research purpose only.

Interview was taken by the researcher herself with each respondent in friendly environment in their own home setting. It took 20-25 minutes to fill each questionnaire and after that physical measurement was done which took about 10 minutes for each respondent.

Weight was measured by removing heavy jackets, sweater and shoes. Height was measured by attaching the non-stretchable inch tape in wall. Then the study participants were asked to take off their shoes and stand erect with their back to the wall and their heel touching the wall. Blood pressure was measured by aneroid sphygmomanometers and stethoscope. For blood pressure measurement the respondents were made to sit in a quiet and restful position for at least 5 minutes and the blood pressure was measured in two different occasions at the sitting position at an interval of 5 minutes and the mean pressure was taken as reference value. Blood Pressure was taken at right arm of each respondents and the same aneroid sphygmomanometer and stethoscope was used for all the respondents. The respondents with pre-hypertension, hypertension were advised for physical exercise, healthy diet and hypertensive respondents were referred for health facility for checkup.

### 3.7. Data Analysis Procedure

Data were analyzed on the basis of research objectives and research questions. The collected data were checked for completeness, organized, coded and entered in Statistical Package for Social Science (SPSS) version 20. Referencing and citation was done through software Endnote 7.0 version. Classification of physical activity and blood pressure was done with reference value (Refer to Appendix E).

BMI was calculated as weight in kilograms divided by the square of the height in meter square. BMI was classified into underweight, normal weight, overweight and obesity (WHO, 2006) (Refer to Appendix E).

Analysis was done by using non parametric test. Descriptive statistics .i.e. frequency, percentage, means, range standard deviation was used to describe demographic variables and behavioural risk factors. Inferential statistics namely Pearson Chi square, Fisher's Exact test and Odds ratio (OR) were used to test the association between selected variables and the behavioural risk factors. To see association Odds Ratio (OR) and Confidence Interval (CI) was seen

For ease in computing association, age was categorized into two age groups 20-40 (young adult) and 40-60 years (middle adult and above) which was taken as reference from (Mandal, 2012). Ethnicity was sub-grouped in privileged and underprivileged, reference was taken from (Sharma, Poudyal, Devkota, & Singh, 2014). Similarly education was later sub-grouped into below primary (including illiterate and up to 5 grades) and above primary. Similarly, occupation has been later sub-grouped into homemaker and others. Agriculture, service holder, business and students have been grouped into others.

For analyzing amount of alcohol consumption, it was categories as standard drink. One standard drink was equal to 10 grams of alcohol. It was calculated by the formula (Refer Appendix E) (Aryal et al., 2014).

## **CHAPTER IV**

### **FINDINGS OF THE STUDY**

This chapter deals with the finding and interpretation of the data obtained from the respondents to find out the status of behavioural risk factors of non-communicable diseases among adult women of Gothatar VDC, Kathmandu. The data were analyzed according to the objectives and research questions of the study and presented in tables.

Descriptive analysis of this chapter consists of the description of tables of socio demographic variables of the respondents, self-reported behaviour regarding tobacco use, alcohol consumption, fruits and vegetables intake, intake of dietary salt and physical activity and combined risk factors. It also includes physical measurements of the respondents.

**TABLE 1**  
**Socio-Demographic Information (Age, Education and Ethnicity) of the Respondents**

		n=156
<b>Socio-Demographic Characteristics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Age Group (in years)</b>		
20-30	40	25.6
30-40	50	32.1
40-50	38	24.4
50-60	28	17.9
Mean Age $\pm$ SD = 38.46 $\pm$ 10.51		
<b>Education Level</b>		
Unable to read and write	22	14.1
Able to read and write	37	23.7
Primary level	17	10.9
Secondary level	21	13.5
Higher secondary level and above	59	37.8
<b>Ethnic background</b>		
Dalit	5	3.2
Disadvantaged janjatis	12	7.7
Relatively advantaged janjatis	15	9.6
Upper caste groups	124	79.5
<b>Upper caste specification (n=124)</b>		
Brahman	92	59.0
Chhetri	30	19.2
Thakuri	2	1.3

Table 1 shows the socio-demographic characteristics of the respondents. The mean of the respondent was 38.46  $\pm$  10.51. Most of the respondents (32.1%) were 30-40 years of age group followed by 25.6% of age group 20-30 years. Among 156 respondents 37.8% had achieved higher secondary or above education while 14.1% of them were

unable to read and write. Majority (79.5%) were from upper caste while 3.2% were dalits.

**TABLE 2**

**Socio-Demographic Information: (Marital status, Income and Occupation) of the Respondents**

n=156		
<b>Socio-Demographic Characteristics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Marital status</b>		
Unmarried	15	9.6
Married	135	86.5
Separated	1	0.6
Divorced	1	0.6
Widowed	4	2.6
<b>Household income to fulfill the expenses</b>		
Surplus	41	26.3
Sufficient	82	52.6
Hardly sufficient	33	21.2
<b>Occupation</b>		
Government employee	6	3.8
Non-government employee	11	7.1
Self-employed	18	11.5
Home maker	102	65.4
Others	19	12.2
<b>Specification of "Others" (n=19)</b>		
Farmer	6	3.8
Student	13	8.3

Table 2 shows marital status, income and occupation of the respondents. Regarding marital status the highest proportion (86.5%) was married. More than half (52.6%) had sufficient income to fulfill the expenditure and 65.4 % of the respondents (65.4%) were home makers.

**TABLE 3**

**Smoking Status of the Respondents**

<b>Smoking Status related Variables</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Smoking Habit (n=156)</b>		
Current Smoking	12	7.7
Past Smoking	16	10.3
Never smoked	128	82.1
<b>Among Smoker (n=28)</b>		
<b>Type of Product Used</b>		
Manufactured cigarettes	25	89.3
Hand-rolled cigarettes	3	10.7
<b>Average use of smoke tobacco products</b>		
Occasionally	4	14.3
< 10 sticks/day	19	67.9
10-20 sticks/day	5	17.9
<b>Initiation of smoking</b>		
30± years of age	1	3.6
20-30 years of age	2	7.1
< 20 years of age	25	89.3
<b>Mean Age of Initiation ± SD = 16.42 ± 0.44</b>		
<b>Duration exposed to smoking</b>		
<10 years	10	35.7
10-20 years	5	17.9
>20 years	13	46.4

Table 3 shows smoking status of the respondents. Majority (82.1%) had never smoked tobacco. Among those who smoke 89.3% used manufactured cigarettes, 67.9% took less than 10 stick per day. The mean age of the initiation of smoking was 16.42 years ± 0.44. Among them, 46.4% were exposed to smoking for more than 20 years.

**TABLE 4**

**Use of Smokeless Tobacco Products by the Respondents**

<b>STPs Status related Variables (n=156)</b>	<b>Frequency</b>	<b>Percentage</b>
Current Using STPs	11	7.1
Past Using STPs	1	0.6
Never used STPs	144	92.3
<b>Among STPs (n=12)</b>		
<b>Type of Product Used</b>		
Khaini	7	58.3
Chewing tobacco	5	41.7
<b>Average use of STPs products</b>		
Occasionally	5	41.7
≤ 5 times/day	7	58.3
<b>Duration exposed to STPs</b>		
≤ 10 years	10	83.3
>10 years	2	16.7

Table 4 shows respondents' status of the use of smokeless tobacco products. Among 156 respondents, 7.1 % were current user and 0.6% was past user of smokeless tobacco products. Among the user 58.3 % took khaini. The average use of those products was less than 5 times in 58.3 % of respondents. 83.3 % of the respondents were exposed to STPs for less than 10 years.



**TABLE 5**

**Status of Use of Alcohol among the Respondents**

<b>Alcohol Consumption Status (n=156)</b>	<b>Frequency</b>	<b>Percentage</b>
Never Used	116	74.4
Past User	29	18.5
Current User	11	7.1
<b>Type of alcohol used among current alcohol user (n=11)</b>		
Beer	4	36.4
Jaand	1	9.1
Wine	2	18.2
Local raksi	4	36.4
<b>Average frequency of intake of Alcohol</b>		
1-2 days per month	10	90.9
5-6 days per week	1	9.1
<b>Standard drink taken on one occasion</b>		
1 standard drink	5	45.5
2 standard drink	4	36.4
5 standard drink	2	18.2

Table 5 shows respondents' responses regarding alcohol consumption. Majority (74.4%) of the respondents had never taken alcohol and 7.1% were current users. Among current user the consumption of beer and local raksi was found in 36.4 % each. Majority (90.9%) of the respondents took alcohol for 1-2 days per month. Highest proportion (45.5%) of the respondent took one standard drink on one occasion while nearly one fifth (18.2%) of the respondents took 5 standard drinks on one occasion.

**TABLE 6**

**Consumption of Fruits and Vegetables by the Respondents**

**n=156**

<b>Fruits and Vegetables Consumption</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Fruits Consumption (days/week)</b>		
7	28	17.9
4-6	15	9.6
1-3	103	66.0
None	10	6.4
Mean days/week = 3.15		
<b>Fruit Serving /day</b>		
≥ 3	16	10.3
1-2	130	83.3
None	10	6.4
Mean serving per day = 1.75		
<b>Vegetables Consumption (days/week)</b>		
7	97	62.2
4-6	54	34.6
1-3	5	3.2
Mean days/week = 6.42		
<b>Vegetable serving /day</b>		
≥ 3	44	28.2
1-2	112	71.8
Mean serving per day = 2.71		
<b>Combined Fruits and Vegetables Consumption</b>		
Less than 5 serving of fruit and vegetables per day	142	91.9
Daily	22	14.1
Not Daily	134	85.9
Mean days/week = 4.88		
Mean serving/day = 2.2		

Table 6 shows the respondents' consumption of fruit and vegetables. The average days of fruit consumption was nearly 3 days per week with more than half (66%) of the respondents taking fruit 1-3 days per week while 6.4 % were found not taking fruit at all. The mean serving of the fruit was less than two serving per day with majority (83.3%) of them taking 1-2 serving of fruit per day. Regarding vegetable consumption, the mean vegetable consumption was about six days per week with more than half (62.2%) taking vegetable daily. The average serving of vegetable consumption per day was less than 3 serving per day with majority (71.8%) taking 1-2 serving. The daily consumption of fruits and vegetables was present in 14.1%. The mean days of combined fruit and vegetable consumption were more than 4 days and the average serving of combined fruit and vegetables was 2 serving per day.

**TABLE 7**

**Frequency of Consumption of High Salt Food among the Respondents**

		<b>n=156</b>					
<b>High Salt Consumption related responses</b>		<b>Never n (%)</b>	<b>Rarely n (%)</b>	<b>Sometimes n (%)</b>	<b>Often n (%)</b>	<b>Always n (%)</b>	
Add salt to food before eating		76 (48.7)	23(14.7)	48 (30.8)	6 (3.8)	3 (1.9)	
Consumption of processed food high in salt		20 (12.8)	27 (17.3)	87 (55.8)	22(14.1)	-	

Table 7 shows respondent's responses on consumption of salt. Nearly half (48.7%) of the respondents never add salt to food before eating. More than half (55.8%) consume processed food high in salt sometimes.

**TABLE 8**

**Salt Consumption Characteristics of the Respondents**

<b>n=156</b>		
<b>Consumption of salt in meal</b>	<b>Frequency</b>	<b>Percentage</b>
Far too little	3	1.9
Too little	20	12.8
Just the right amount	96	61.5
Too much	36	23.1
Far too much	1	0.6

Table 8 shows more than half (61.5%) of the respondents take just the right amount of salt while nearly one fifth (23.1%) of them take too much salt.

**TABLE 9**

**Status of Physical Activities of the Respondents**

		<b>n=156</b>
<b>Physical Activities</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Vigorous Intensity Work</b>		
Yes	31	19.9
No	125	80.1
<b>Moderate-Intensity Work</b>		
Yes	153	98.1
No	3	1.9
<b>Use of Transportation</b>		
Walking/Bicycle	103	66.0
Vehicle	53	34.0
<b>Vigorous Intensity Recreational activity</b>		
Yes	2	1.3
No	154	98.7
<b>Moderate-Intensity Recreational activity</b>		
Yes	34	21.8
No	122	78.2
<b>Activity per Week</b>		
Adequate ( $\geq 600$ *MET)	146	93.6
Inadequate ( $< 600$ MET)	10	6.4

\*MET= Metabolic Equivalent

Table 9 shows physical activities of the respondents. Among 156 respondents, 80.1 percentages were not performing vigorous intensity work. Majority (98.17%) of them were engaged in moderate intensity work. More than half (66.0%) respondents walk or use bicycle for transportation. Regarding recreational activities, majority (98.7%) were not engaged in vigorous intensity recreational activities and 78.2 % respondents were not engaged in moderate intensity activity. The table also highlights that majority (93.6%) of the respondents were active as they expended  $> 600$  MET per week.

**TABLE 10**

**Physical Health Characteristics of the Respondents**

		n=156
Physical Health Characteristics	Frequency	Percentage
<b>BMI Status</b>		
Under Weight	1	0.6
Normal Weight	74	47.4
Over Weight	66	42.3
Obesity	15	9.6
Mean BMI $\pm$ SD = 25.46 $\pm$ 3.82		
Range = 17.51- 40.17		
<b>Blood Pressure</b>		
<b>Systolic Blood Pressure</b>		
Normal	120	76.9
Prehypertension	22	14.1
Hypertension Stage 1	10	6.4
Hypertension Stage 2	4	2.6
Mean Systolic BP $\pm$ SD = 115.87 $\pm$ 15.48		
Range = 90-180		
<b>Diastolic Blood Pressure</b>		
Normal	133	85.3
Prehypertension	2	1.3
Hypertension Stage I	16	10.3
Hypertension Stage II	5	3.2
Mean Diastolic BP $\pm$ SD = 73.61 $\pm$ 10.90		
Range = 55-105		

Table 10 indicates body mass index and blood pressure of the respondents. Less than half (47.4%) of the respondent had normal weight followed by overweight (42.3%) and 9.6 % were found obese. The mean BMI was 25.46  $\pm$  3.82.

Regarding systolic blood pressure, more than three fourth (76.9%) of the respondents were having normal blood pressure. 14.1% were pre-hypertensive, 6.4% of the respondents were hypertension stage 1 and 2.6% respondents were hypertension stage 2. Similarly regarding diastolic blood pressure majority of the respondents (85.5%) were having normal blood pressure, 10.3% were having hypertension stage 1 and 3.2% of them had hypertension stage 2. The mean systolic and diastolic blood pressure was 115.87 and 73.61 respectively.

**TABLE 11**

**Summary of Behavioural and Physical Risk Factors of Noncommunicable Diseases**

**n=156**

<b>Behavioural and Physical Risk Factors</b>	<b>Frequency</b>	<b>Percentage</b>
Inadequate fruit and Vegetable Consumption	142	91.9
Current Tobacco (smoking) consumption	11	7.7
Current Tobacco (smokeless) consumption	11	7.1
Current Alcohol consumption	11	7.1
Inadequate Physical activity	10	6.4
Overweight + Obesity	81	51.9
<b>Hypertension</b>		
Systolic Hypertension	14	9.0
Diastolic Hypertension	21	13.5

Table 11 reveals behavioural risk factors and physical risk factors of NCDs. The top most risk behaviour was the consumption of inadequate fruit and vegetable that is 91.9 %. Current tobacco smoking and smokeless consumption was 7.1 % each. Inadequate physical activity was found in 6.4% of the respondents. The overall prevalence of the overweight and obesity was 51.9 %. There were 9.0 % systolic hypertensive and 13.5 % diastolic hypertensive respondents.

**TABLE 12**  
**Status of Combined Risk Factors in the Respondents**

**n=156**

	Number of Risk Factors			Total
	0 n (%)	1-2 n (%)	3-5 n (%)	
<b>Total</b>	<b>13 (8.3)</b>	<b>106 (67.9)</b>	<b>37 (23.7)</b>	<b>156 (100.0)</b>
<b>Age Group</b>				
20-30	3 (7.5)	34(85.0)	3 (7.5)	40 (100.0)
30-40	5 (10.0)	35 (75.00)	10 (20.0)	50 (100.0)
40-50	3 (7.9)	25 (65.8)	10 (26.3)	38 (100.0)
50-60	2 (7.1)	12 (42.9)	14 (50.0)	28(100.0)
<b>Education Level</b>				
Unable to read and write	1 (4.5)	11 (50.0)	10 (45.5)	22 (100.0)
Able to read and write	3 (8.1)	19 (51.4)	15 (40.5)	37 (100.0)
Primary level	0 (0.0)	12 (70.6)	5 (29.4)	17 (100.0)
Secondary level	1 (4.8)	17 (81.0)	3 (14.3)	21 (100.0)
Higher secondary level and above	8 (13.6)	47 (79.7)	4 (6.8)	59 (100.0)
<b>Ethnic background</b>				
Dalit	0 (0.0)	5 (100.0)	0 (0.0)	5 (100.0)
Disadvantaged janjatis	1 (8.3)	6 (50.0)	5 (41.7)	12 (100.0)
Relatively advantaged janjatis	0 (0.0)	11 (73.3)	4 (26.7)	15 (100.0)
Upper caste groups	12 (9.7)	84 (67.7)	28 (22.6)	124 (100.0)
<b>Marital status</b>				
Unmarried	1 (6.7)	10 (66.7)	4 (26.7)	15 (100.0)
Married	12 (8.9)	90 (66.7)	33 (24.4)	135 (100.0)
Separated	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)
Divorced	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)
Widowed	0 (0.0)	4 (100.0)	0 (0.0)	4 (100.0)
<b>Household income</b>				
Surplus	6 (14.6)	32 (78.0)	3 (7.3)	41 (100.0)
Sufficient	7 (8.5)	56 (68.3)	19 (23.2)	82 (100.0)
Hardly sufficient	0 (0.0)	18 (54.5)	15 (45.5)	33 (100.0)
<b>Occupation</b>				
Government employee	0 (0.0)	6 (100.0)	0 (100.0)	6 (100.0)
Non-government employee	1 (9.1)	9 (81.8)	1 (9.1)	11 (100.0)
Self-employed	0 (0.0)	13 (72.2)	5 (27.8)	18 (100.0)
Home maker	11 (10.8)	64 (62.7)	27 (26.5)	102 (100.0)
Others	1 (5.3)	14 (73.7)	4 (21.1)	19 (100.0)

Table 12 reveals the presence of combined risk factors among the respondents. Majority (67.9%) of the respondents had the presence of 1-2 combined risk factors. More than one fifth (23.7%) of the respondents had presence of 3-5 combined risk



factors and only 8.3% respondents had none of the risk factors. Three to five combined risk factors was present in half (50%) of the respondents of age group 50-60 years, 45% respondents who were unable to read and write and 45.5% respondents with household income hardly sufficient.

**TABLE 13**  
**Association of Demographic Characteristics with Fruit and Vegetables consumption**

**n=156**

Socio Demographic Characteristics	Adequate consumption Fruit and Vegetables		Total	p value	OR (95% CI)
	Yes n (%)	No n (%)			
<b>Age</b>					
40-60 years	8 (12.1)	58 (87.9)	66	0.239 <sup>a</sup>	Reference
20-40 years	6 (6.7)	84 (93.3)	90		1.931 (0.636- 5.860)
<b>Ethnicity</b>					
Privileged	14 (10.1)	125 (89.9)	139		
Underprivileged	-	17 (100)	17		
<b>Educational Level</b>					
Below primary	8 (10.5)	68 (89.5)	76	0.509 <sup>a</sup>	Reference
Above Primary	6 (7.5)	74 (92.5)	80		1.451 (0.479-4.396)
<b>Occupation</b>					
Homemaker	10 (9.8)	92 (90.2)	102	0.772 <sup>b</sup>	Reference
Others	4 (7.4)	50 (92.6)	54		1.359 (0.405-4.554)
<b>Family income</b>					
Hardly sufficient	4 (12.1)	29 (87.9)	33	0.497 <sup>b</sup>	Reference
Sufficient/surplus	10 (8.1)	113 (91.9)	123		1.559 (0.456-5.328)

Note: a: Pearson's Chi square test

b: Fisher's Exact Test

Table 13 shows association of Socio demographic characteristics of respondents and consumption of fruits and vegetables. Adequate consumption of fruit and vegetables was found more in respondents of age group above 40 years (12.1%) than respondents of age group below 40 years (6.7%), which is not statistically significant ( $p=0.239$ ). Similarly respondents of privileged group were found consuming adequate fruits and vegetables more (10.1%) than respondents of underprivileged group (0%), eventually the result revealed no association between fruit consumption and ethnicity ( $p=0.367$ ). There was no association of adequate fruit and vegetables consumption with education, family income and occupation of the respondents.

**TABLE 14**  
**Association between Demographic Characteristics of Respondents and Current Consumption of Tobacco Product**

**n=156**

Socio Demographic Characteristics	Tobacco Consumption No n (%)	Yes n (%)	Total	<i>p</i> value	OR (95% CI)
Age					
20-40 years	89 (98.9)	1 (1.1)	90	0.000 <sup>b*</sup>	Reference
40-60 years	55 (83.3)	11 (16.7)	66		17.800 (2.236-141.703)
Ethnicity					
Underprivileged	16 (94.1)	1 (5.9)	17	1.000 <sup>b</sup>	Reference
Privileged	128 (92.1)	11 (7.9)	139		1.375 (0.166-11.365)
Educational Level					
Above Primary	79 (98.8)	1 (1.2)	80	0.002 <sup>b*</sup>	Reference
Below Primary	65 (85.5)	11 (14.5)	76		13.369 (1.682- 106.295)
Occupation					
Homemaker	97 (95.1)	5 (4.9)	102	0.072 <sup>a</sup>	Reference
Others	47 (87.0)	7 (13.0)	54		2.889 (0.871-9.587)
Family income					
Sufficient/surplus	115 (93.5)	8 (6.5)	123	0.282 <sup>b</sup>	Reference
Hardly sufficient	29 (87.9)	4 (12.1)	33		1.983 (0.558-7.042)

Note: a: Chi square test; b:Fisher's Exact Test; \*: p value significant at  $\leq 0.05$

Table 14 shows the association between demographic characteristics of respondents and current consumption of tobacco products. More respondents of age group above 40 years (16.7%) were consuming tobacco products than respondents of age group below 40 years (1.1%). The result showed that there was association between current tobacco consumption and age. Older women were more likely to be current smoker than younger women ( $p= 0.000$ ,  $OR=17.80$ ,  $CI= 2.23-141.70$ ). The women with education below primary level were more likely have current consumption of tobacco than the respondent with education above primary level, which is statistically significant ( $p= 0.002$ ;  $OR=13.369$ ,  $CI=1.682-106.295$ ). There is no association of tobacco consumption with ethnicity, family income and occupation.

**TABLE 15**

**Association between Demographic Characteristics of Respondents and Current Consumption of Smokeless Tobacco Product**

**n=156**

Socio Demographic Characteristics	Smokeless Tobacco Consumption		Total	p value	OR (95% CI)
	No n (%)	Yes n (%)			
Age					
20-40 years	86 (95.6)	4 (4.4)	90	0.205 <sup>b</sup>	Reference
40-60 years	59 (89.4)	7 (10.6)	66		2.551 (0.715-9.105)
Ethnicity					
Privileged	131 (94.2)	8 (5.8)	139	0.102 <sup>b</sup>	Reference
Underprivileged	14 (82.4)	3 (17.6)	17		3.509 (0.834- 14.763)
Educational Level					
Above Primary	78 (97.5)	2 (2.5)	80	0.029 <sup>b*</sup>	Reference
Below primary	67 (88.2)	9 (11.8)	76		5.239(1.094- 25.095)
Occupation					
Homemaker	96 (94.1)	6 (5.9)	102	0.433 <sup>a</sup>	Reference
Others	49 (90.7)	5 (9.3)	54		1.633 (0.475-5.618)
Family income					
Sufficient/surplus	117 (95.1)	6 (4.9)	123	0.041 <sup>a</sup>	Reference
Hardly sufficient	28 (84.8)	5 (15.2)	33		3.482 (0.991-12.232)

Note: a: Chi square test; b: Fisher's Exact Test; \*: p value significant at  $\leq 0.05$  level

Table 15 shows that the respondents with education below primary level were 5 times more likely to have current consumption of smokeless tobacco than the respondents with education above primary level showing statistical significance ( $p=0.029$ ,  $OR=5.239$ ,  $CI=1.094-25.095$ ). Respondents of under privileged group (17.6%) were taking smokeless tobacco products more than respondents of privileged group (5.8%), which is not statistically significant ( $p=0.102$ ). There was no association of age, ethnicity, income and occupation of respondents with current consumption of smokeless tobacco products.

**TABLE 16**

**Association between Demographic Characteristics of Respondents and Current Consumption of Alcohol**

**n=156**

Socio Demographic Characteristics	Alcohol Consumption		Total	p value	OR (95% CI)
	No n(%)	Yes n (%)			
Age					
40-60 years	63 (95.5)	3 (4.5)	66	0.358	Reference
20-40 years	82 (91.1)	8 (8.9)	90		2.049 (0.522-8.038)
Ethnicity					
Privileged	132 (95.0)	7 (5.0)	139	0.020*	Reference
Underprivileged	13 (76.5)	4 (23.5)	17		5.802 (1.498- 22.475)
Educational Level					
Below primary	72 (94.7)	4(5.3)	76	0.535	Reference
Above Primary	73 (91.2)	7 (8.8)	80		1.726 (0.484- 6.152)
Occupation					
Others	51 (94.4)	3 (5.6)	54	0.749	Reference
Homemaker	94 (92.2)	8 (7.8)	102		1.447 (0.365- 5.694)
Family income					
Hardly sufficient	31 (93.9)	2 (6.1)	33	1.000	Reference
Sufficient/surplus	114 (92.7)	9 (7.3)	123		1.224 (0.251- 5.957)

Note: Test Statistics: Fisher's Exact Test

\*: p value significant at  $\leq 0.05$  level

Table 16 shows respondent's current consumption of alcohol. The current alcohol consumption was higher among respondents of underprivileged group (23.5%) than respondents of privileged group (5.0%) which is statistically significant ( $p= 0.020$ ,  $OR=5.802$ ,  $CI=1.498-22.475$ ). The study shows no association between alcohol consumption and age, education, income and occupation of respondents.

**TABLE 17**

**Association between Demographic Characteristics of Respondents and Physical Activity**

**n=156**

Socio	Activity per Week		Total	p value	OR (95% CI)
Demographic Characteristics	Adequate (≥600 MET) Frequency %	Inadequate (<600 MET) Frequency %			
Age					
20-40 years	88 (97.8)	2 (2.2)	90	0.018*	Reference
40-60 years	58 (87.9)	8 (12.1)	66		6.069(1.244- 29.599)
Ethnicity					
Underprivileged	17 (100)	-	17		
Privileged	129 (92.8)	10 (7.2)	139		
Educational Level					
Above Primary	78 (97.5)	2 (2.5)	80	0.052	Reference
Below primary	68 (89.5)	8 (10.5)	76		4.588(0.942 -22.348)
Occupation					
Others	53 (98.1)	1 (1.9)	54	0.166	Reference
Homemaker	93 (91.2)	9 (8.8)	102		5.129(0.632 -41.607)
Family income					
Hardly sufficient	31 (93.9)	2 (6.1)	33	1.000	Reference
Sufficient/surplus	115 (93.5)	8 (6.5)	123		1.078(0.218 -5.338)

Note: Test Statistics: Fisher's Exact Test

\*: p value significant at ≤0.05 level

Table 17 shows association between demographic characteristics of respondents and physical activity. Respondents of age equal to 40 years and above were 6 times more likely to be physically inactive than the respondents below 40 years of age, which is statistically significant ( $p=0.018$ ,  $OR=6.069$ ,  $CI= 1.244-29.599$ ). There was no association of physical activity with ethnicity, education level, occupation and family income.

## **CHAPTER V**

### **DISCUSSION, CONCLUSION AND RECOMMENDATIONS**

This chapter deals with discussion, conclusion, limitation, implication and recommendations based on the findings of the study. Discussion presents all the findings in comparison with those of other studies from reviewed literature and conclusion are drawn from each of the findings. Recommendations include suggestion for improving the present study for generalization and for future research.

#### **5.1 Discussion**

The cross sectional descriptive study was used to find out the status of behavioural risk factors of non-communicable diseases among adult women. It is organized around the major variables investigated behavioural risk and biological risks of non-communicable diseases i.e. using tobacco products, alcohol consumption, less fruits and vegetables consumption, physical inactivity, obesity and hypertension.

#### **Socio-demographic Characteristics**

Demographic findings revealed that the mean age of the respondent was 38.46 years  $\pm$  10.51. Most of the respondents (32.1%) were 30-40 years of age group followed by 25.6 percent of age group 20-30 years. Among 156 respondents, 37.8% had achieved higher secondary or above education while 14.1% of them were unable to read and write. Majority (79.5%) were from upper caste while 3.2 percent were dalits. Higher proportion of the respondents (86.5%) was married. More than half (52.6%) respondents had family income sufficient to fulfill the expenditure. Most of the respondents (65.4%) were home makers.

## **Consumption of Tobacco Products**

This study showed the prevalence of past smoker was 10.3% and current smoker was 7.7% which is similar to the finding of Bansal et al. (2012) which showed prevalence of current smoker in women was 7.0 percent. A study conducted by Weerakoon et al. (2009) in Srilanka among female tea pluckers revealed current smoking prevalence was 7.27% which has consistency with the present finding.

Similarly a study conducted by Adhikari and Gupta (2014) on tobacco use in central Nepal among 1240 respondents with female of number 575 showed 18.4% women were current smoker which is higher than the finding of present study. The difference in finding of the study may be due to small sample size of this study. But in contrast the finding of Li et al. (2013) shows the prevalence of current smoking among women in China is 2.4% current smoker which is less than the finding of the present study.

The mean age of the initiation of smoking in the present study was 16.42 which is similar to the findings of study of (Adhikari & Gupta, 2014) and (Oh et al., 2010) where mean age of initiation of smoking was 17.38 years 18.2 years respectively.

The study conducted by (Oh et al., 2010) revealed that over 80% of participants started smoking by the age of 20 which is similar to the result of the present study where majority (89.3%) respondents had started smoking before 20 years of age.

Regarding the use of smokeless tobacco products, the present study showed that 0.6% of the respondents were past user and 7.1 % of the respondents were current user of smokeless tobacco products. Among the smokeless tobacco users 58.3% used those products daily and 41.7% used it occasionally while finding of the study by Adhikari and Gupta (2014) shows 69.4% used smokeless tobacco products daily and 30.6% used it occasionally.

The present study revealed that 46.4% of the respondents were found being exposed to active smoking for more than 20 years. There were no supportive literatures found. The present study showed association of smoking with age and education. Older women were more likely to smoke than younger ( $p=0.00$ ). Similarly women with lower education were more likely to smoke than those with higher education ( $p=0.002$ ). This finding is similar with the finding of (Weerakoon et al., 2009) which

showed a significant positive association between smoking and illiteracy ( $p < 0.05$ ) There was positive association of smoking and age more than 35 years ( $p < 0.01$ ).

### **Alcohol consumption**

In response to alcohol consumption, the study showed that 7.1% respondents were currently using alcohol which is consistent with the finding of Aryal et al. (2014) where the prevalence of current use of alcohol among women was 7.1%.

Likewise the study conducted in Srilanka showed prevalence of current alcohol consumption in female was 24% (Weerakoon et al., 2009) which is contradictory to the finding of present study. This might be due to respondents' unwillingness to reveal information use regarding use of alcohol due to fear of known by others.

### **Dietary Pattern**

Regarding fruit consumption the mean days of fruit consumption in the present study was 3.15 days per week with a mean serving of fruit 1.75 per day while the study of Aryal et al. (2014) with sample of 1,136 men and 2,807 women revealed that mean days of fruit consumption was 1.9 per week with serving 0.5 per day which is lower than the present study. The differences in the findings may be due to small sample size of the present study.

Regarding vegetable consumption, the mean vegetable consumption of the present study was 6.42 days per week with more than half (62.2%) taking vegetable daily. The mean serving of vegetables consumed on average day was 2.71. Similarly the findings of Aryal et al. (2014) shows the mean number of days of vegetables consumed was 4.8 and the mean serving of vegetables consumed on average per day was 1.3. The dissimilarity in the finding may be due to small sample size of the present study.

The present study revealed that 91.1% respondents were consuming inadequate fruit and vegetables consumption. This finding is further supported by another study conducted in Nepal by Vaidya et al. (2014) where 97.8% of females had low fruit and vegetable intake. But in contrast study conducted in China by Li et al. (2013) showed 51.7% women were consuming less than 400 grams of fruits and vegetables which is



inconsistent with the finding of present study. The inconsistency may be due to difference in the setting.

Regarding the amount of fruit and vegetables, the present study showed the mean number servings of fruits and vegetables per day was 2.2 which has consistency with the findings of the study conducted in rural Nagpur by Bhardwaj et al. (2012) where the mean serving of fruit and vegetable was 2.2.

In response to salt consumption, the present study showed that 23.6% of the respondents are taking salt higher than just the right amount. Around 5.7% of the respondent always or often added salt before eating, 14.1% respondents often consumed processed food containing high amounts of salt, only 12.8% of the respondents avoided consumption of processed food. This finding is supported by the study done in Nepal which showed 4.7% of the respondents always or often added salt before eating, similarly 11.5% respondents always or often consumed processed food and 15.2% avoided or minimized their consumption of processed food (Aryal et al., 2014).

### **Physical Activity**

This study revealed that 6.4% of the respondents were inactive as they expended less than 600 MET per week. While the study done by Li et al. (2013) showed the prevalence of physical inactivity among Chinese women was 18.3%, which is higher than the present study. The dissimilarity in the result may be due to difference in the life style pattern.

The present study showed that physical inactivity was present among 6.4% women. While a survey report shows the prevalence of low physical activity among women was 2.4% (Aryal et al., 2014). This finding is slightly lower than in the present study. The higher prevalence of low physical activity in present study may be due to increase in feasibility of transportation and changing life style of women with time.

In the present study inadequate physical activity was more among the respondents of higher age group showing statistical significance ( $p= 0.018$ ). Similarly Vaidya and Krettek (2014) stated that physical activity was associated with age. Low physical activity was greatest among the oldest age group women.

## **Obesity**

Present study revealed that mean BMI was 25.46 with standard deviation 3.82. BMI within normal range was present in 47.4% of the respondent in this study. Similar finding is shown in a cross sectional study on prevalence of obesity among adult women in Nepal, conducted by (Shahi et al., 2013) shows that 46.7% of respondents BMI within normal range, with the mean BMI and 21.3 and standard deviation 4.1.

Regarding overweight and obesity 42.3% and 9.6 % were found overweight and obese, respectively in this study. Similarly another study conducted in Sindhuli showed 34.7% women were overweight (Dhungana et al., 2014). This finding is slightly lower than the findings of present study. But in contrast, 12.6% of the Vietnam women are overweight and 1.5% of them are obese (Pham et al., 2009). This is contradictory to the finding of this study. The differences in the finding may be due to the difference in lifestyle pattern among the women of different countries.

## **Hypertension**

In this study the mean systolic blood pressure of the respondents was 115.87 mm of Hg and mean diastolic blood pressure was 73.61 mm of Hg which is similar to the findings of Bansal et al. (2012) which showed the mean systolic and diastolic blood pressure among women was 118 and 76.6 mm of Hg respectively

Regarding hypertension, the present study revealed that prehypertension was found among 15.4% of the respondents which is similar with the finding of Khan et al. (2013) which showed 14.4% women of rural Nepal had prehypertension.

Similarly the prevalence of hypertension in the present study was 22.5%, while the prevalence of hypertension among rural Indian women was 27.8% (Bansal et al., 2012). This inconsistency in the findings may be due to small sample size of the present study as that study included 572 women.

Likewise a study conducted in Vietnam revealed that 16.2% women had hypertension (Pham et al., 2009). This finding is quite lower than the findings of present study. The higher prevalence of hypertension in the present study may be due to the lack of knowledge and awareness about hypertension.

## **5.2 Conclusion**

This study was conducted to assess behavioural risk factors of non-communicable diseases among adult women of Gothatar. On the basis of findings of the study it may be concluded that the use of smoking and smokeless tobacco products was higher among women with age above 40 years and among those women with education level below primary level. Alcohol consumption was found to be more among women of underprivileged group. Older women were found to be physically inactive than younger women. Majority of the women were not taking combined fruit and vegetables daily and they were not consuming adequate amount of fruit and vegetables as recommended by WHO. Therefore it can be concluded that most of the women have poor dietary habit which may lead to non-communicable diseases.

## **5.3 Limitation**

Recall bias may exist in the result relating to fruit and vegetable intake, physical activity, smoking and alcohol consumption which may lead to distortion in the exact result.

The co-morbid conditions of the respondents were not assessed in the study which may also influence the presence of behavioural risk factors.

Questions on dietary information in this study were based on the frequency of consumption of fruits and vegetables without much regard to quantity or portion size. This could have influenced the information relating to dietary habits.

The assessment of blood pressure measurements have been performed in a single day, which may overestimate the prevalence of high blood pressure.

## **5.4 Implications**

The findings of the study might be helpful to the community health workers to encourage adult women as well as family members to adopt healthy lifestyles.

These finding might be helpful to the concerned Village Development Committee to plan health programs that focus on awareness and preventive approaches like healthy

dietary pattern, weight maintenance and prevention of tobacco and alcohol use among women.

The findings might be relevant for policy makers as well as NGO and INGO to focus on community awareness program, training program related to identification and reduction of behavioural risk related to non-communicable disease.

### **5.5 Recommendations for further study:**

Replication of the study can be done with giving much regard to quantity or portion size of food items and central obesity as well.

The study can be replicated on a wider geographical area for better generalization.

The study can be replicated with giving regard to co-morbid condition that affects the behavioural risk factors.

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## **APPENDIX A: Consent Form (English Version)**

### **Informed Consent Form:**

Namaskar, I am Bibhuti Katel, a student of Master of Nursing from Tribhuvan University Institute of Medicine, Nursing Campus Maharajgunj, Kathmandu. I am here for a study on “Behavioural Risk Factors regarding Non-communicable Diseases among Adult Women of Gothatar VDC, Kathmandu” as a partial fulfillment of the requirement of Master of Nursing Program. The study has been approved by the Research Committee, Maharajgunj Nursing Campus and Institutional Review Board, Institute of Medicine. The study involves no foreseeable risks or harm to you. You will be asked some questions and the researcher expects answers of those questions. The researcher will note down your response in the tool. The researcher will also take Physical measurement of your body (height, weight and Blood Pressure). It will take around 25-30 minutes to fill the form. Your valuable answers will help to find out prevalence of behavioural risk factors regarding Non communicable Diseases.

I would like to inform you that your participation in this study is voluntary and you have the full right to withdraw from the study at any time you want without fear and without giving any reasons. All the information given by you will be kept confidential and will be used only for study purpose. Your personal identity will not be disclosed to anyone. I hope, you will participate in this study by providing your authentic response to the questions. Do you understand all the information I have given you and will you agree to be a part of this research?

### **Consent:**

In signing this consent form, I state that I have read this document completely and I understand its content and purpose. I further state that I have no questions regarding the procedure and my questions have been answered to my satisfaction. I hereby give permission to enroll me as a candidate. By signing this form I have not waived any of my legal rights in a research study.

.....

Participant's signature

Date:

## APPENDIX B: Consent Form (Nepali Version)

त्रिभुवनविश्वविद्यालय  
चिकित्साशास्त्रअध्ययन संस्थान  
महाराजगञ्ज नर्सिङ्ग क्याम्पस  
काठमाण्डौ, नेपाल  
सुसूचित मञ्जुरीनामा फाराम

नमस्कार, म विभूति कटेल, अनुसन्धानकर्ता त्रिभुवन विश्वविद्यालय, चिकित्साशास्त्र अध्ययन संस्थान, नर्सिङ्ग क्याम्पस, महाराजगञ्जमा स्नातकोत्तर तह द्वितीय वर्षमा अध्ययनरत छात्रा हुँ । म यहाँ “काठमाण्डौको गोठाटार गा.वि.स. का वयस्क महिलाहरुमा नसर्ने रोगका व्यवहारिक जोखिम तत्वहरु” शीर्षकमा अनुसन्धानको लागि उपस्थित भएकी हुँ । यो अनुसन्धान नर्सिङ्ग विषयको स्नातकोत्तर तहको आंशिक आवश्यकता पूरा गर्नको लागि गरिन लागिएको हो । महाराजगञ्ज नर्सिङ्ग क्याम्पसको अनुसन्धानविभाग र चिकित्साशास्त्र अध्ययन संस्थानको इन्स्टिट्युसनल रिभ्यू बोर्डबाट यो अध्ययन गर्नका लागि अनुमति प्राप्त भइसकेको छ । यस अनुसन्धानबाट तपाईंलाई कुनै पनि क्षति हुनेछैन । तपाईंलाई केही प्रश्नहरु सोधिनेछ जसमा तपाईंलाई लागेको जवाफको अपेक्षा गरिनेछ । तपाईंको जवाफअनुसार फाराम भरिने छ । साथै तपाईंको शारीरिक मापन (उँचाई, तौल र रक्तचाँप) पनि लिइने छ । यसका लागि तपाईंले २५ देखि ३० मिनेट समय दिनुपर्नेछ ।

यस अध्ययनमा तपाईंको सहभागिता पूर्ण स्वैच्छिक हुनेछ । तपाईंले आफ्नो ऐच्छिक सहभागीता लाई चाहेमा कुनैपनि समयमा छोड्न सक्नुहुनेछ । अनुसन्धानकर्ता तपाईंलाई यो विश्वास दिलाउन चाहन्छु कि यहाँहरुबाट प्राप्त सम्पूर्ण विवरण गोपनीय ढंगले राखिनेछ र प्राप्तविवरण विशुद्ध यस अध्ययनको लागि मात्र प्रयोग गरिनेछ । यहाँको व्यक्तिगतविवरण कतै पनि उल्लेख गरिने छैन । यहाँ प्रस्तुत गरिएका प्रश्नहरुको उत्तर दिई अनुसन्धानमा सहयोग पुर्याइदिनु हुनेछ भन्ने आशा व्यक्त गरिएको छ ।

के यहाँउल्लेखित सम्पूर्ण जानकारीहरु बुझ्नु भयो र के तपाईं यस अनुसन्धानमा सहभागी हुन चाहनु हुन्छ ?

### मञ्जुरीनामा

मैले यस मञ्जुरीनामा पूरै पढेको छु र यहाँ उल्लेखित सबै कुरा बुझेको छु । यसबाहेक मलाई कुनै प्रश्न सोध्नु छैन । मेरा सबै प्रश्नहरुको चित्त बुझ्ने गरी उत्तर पाइसकेको छु । तसर्थ यस अनुसन्धानमा मलाई सहभागी बनाउन म अनुमति दिन्छु । यस मञ्जुरीनामा सही गर्दा मैले आफ्नो कुनै पनि कानुनी अधिकार हनन् हुन दिएको छैन ।

.....

सहभागीको सही

## **APPENDIX C: Research Instrument (English Version)**

### **INTERVIEW SCHEDULE**

#### **Tribhuvan University, Institute of Medicine**

#### **Maharajgunj Nursing Campus, Maharajgunj, Kathmandu, Nepal**

**Date:**

**Form No:**

**Study Title:** "Behavioural Risk Factor regarding Non-communicable Disease among Adult Women in a community of Kathmandu"

After obtaining written consent from each respondent, interviewer will read out each and every question clearly and obtained answer will be circled in the option number of filled in the blank space.

#### **PART-I DEMOGRAPHIC INFORMATION**

1. How old are you? Years (in complete years) -----
2. What is your education Level?
  - a. No formal schooling
  - b. Less than primary school
  - c. Primary school completed
  - d. Secondary school completed
  - e. Higher secondary (10+2)/ PCL completed
  - f. Bachelor degree completed
  - g. Post graduate degree
3. Ethnic Background
  - a. Dalit
  - b. Disadvantaged Janajatis
  - c. Disadvantaged non dalit Terai caste groups
  - d. Religious minorities
  - e. Relatively advantaged Janajatis

- f. Upper caste group
- 4. Marital Status:
  - a. Unmarried
  - b. Married
  - c. Separated
  - d. Divorced
  - e. Widowed
- 5. Occupation
  - a. Government employee
  - b. Non-government employee
  - c. Self-employed
- 6. Other
- 7. How sufficient is your household income to fulfill the expenses?
  - a. Hardly sufficient
  - b. Sufficient
  - c. Surplus

## **PART-II BEHAVIOUR RELATED QUESTIONS**

### **A.QUESTIONS RELATED TOTOBACCO USE:**

- 1. Do you smoke any tobacco products at present?
  - a. Yes
  - b. No **(If No go to Q.4)**
- 2. What type of products do you use?
  - a. Manufactured cigarettes
  - b. Hand rolled cigarettes
  - c. Others
- 3. On an average, how often do you use those products?
  - a. Occasionally
  - b. < 10 sticks/day
  - c. 10-20 sticks/day
  - d. >20sticks/day

4. In the past, did you ever smoke tobacco products?
  - a. Yes
  - b. No **(If No go to Q.8)**
5. In the past, how often did you ever smoke tobacco products?
  - a. Occasionally
  - b. < 10 sticks/day
  - c. 10-20 sticks/day
  - d. >20 sticks/day
6. Since when did you start smoking?
  - a. < 20 years of age
  - b. 20-30 years of
  - c. 30± years of age
7. For how long duration did smoke tobacco products?
  - a. <10 years
  - b. 10-20 years
  - c. >20 years
8. Do you currently(within past 1month)useany smokeless tobacco products?
  - a. Yes
  - b. No **(If No go to Q.11)**
9. What type of products do you use? (Specify)
  - a. Khaini
  - b. Chewing tobacco (gutkha)
10. On average, how often you use those products?
  - a. Once a day
  - b. 2-4 times/day
  - c. > 5 times/day
11. In the past, did you ever use smokeless tobacco products?
  - a. Yes
  - b. No **(If no go to Q.B)**
12. How often did you use smokeless tobacco products in the past?
  - a. Occasionally
  - b. Daily

**B.QUESTIONS RELATED TOALCOHOL CONSUMPTION:**

1. Have you ever consumed an alcoholic drink?
  - a. Yes
  - b. No **(If No go to Q.C)**
2. Have you consumed an alcoholic drink within the past 12 months?
  - a. Yes
  - b. No
3. Which type of alcohol did you use? (Specify) -----
4. During the past 12 months, how frequently have you had at least one alcoholic drink?
  - a. Daily
  - b. 5-6 days per week
  - c. 1-4 days per week
  - d. 1-3 days per month
  - e. Less than once a month
5. Have you consumed an alcoholic drink within the past 1 month?
  - a. Yes
  - b. No
6. During the past 1 month, on how many occasions did you have at least one alcoholic drink?
  - a. Daily
  - b. 5-6 days per week
  - c. 1-4 days per week
  - d. 1-3 days per month
7. Where do you usually take alcohol?
  - a. Home
  - b. Outside
8. On average, how much amount of alcohol did you have on one occasion?
  - a. 50-100ml
  - b. 100-150ml
  - c. 150-200ml
  - d. 200-250ml
  - e. >250ml

### C. QUESTIONS RELATED TODIETARY HABIT:

1. Do you include fruits in your diet?
  - a. Yes
  - b. No (If No go to Q.
2. In a week, on how many days do you eat fruit? -----
3. How often do you eat fruit on one of those days? -----
4. In a week, on how many days do you eat vegetables? -----
5. How many servings of vegetables do you eat on one of those days? -----  
-----
6. What type of oil is most often used for meal preparation in your household? --  
-----
7. How often do you add salt to your food before you eat it or as you are eating it? -----
8. How often do you eat processed food high in salt(such as chau chau, lays, kurkure, salty biscuit, dry meat, titaura, preserved pickle, bhujia, mixture, papad etc)? -----
9. How much salt do you think you consume in your meal? -----  
-----

### D. QUESTIONS RELATED TO PHYSICAL ACTIVITY

#### Work related questions

1. Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate for at least 10 minutes continuously?
  - a. Yes
  - b. No (If No go to Q.4)
2. In a week, on how many days do you do vigorous-intensity activities? -----  
-----
3. How much time do you spend doing vigorous-intensity activities at work on those days? -----
4. Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate for at least 10 minutes continuously?
  - a. Yes
  - b. No (If No go to Q.7)

5. In a week, on how many days do you do moderate-intensity activities? -----  
-----
6. How much time do you spend doing moderate-intensity activities at work on those days? -----

**Travel to and from places**

7. What do you use for transportation? -----
8. Do you walk or use a bicycle (pedal cycle) to get to and from places?  
a. Yes  
**b. No (If No go to Q.11)**
9. In a week, on how many days do you walk or to get to and from places?-----  
-----
10. How much time do you spend walking or bicycling for travel those days? -----  
-----

**Recreational activities**

11. Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate?  
a. Yes  
**b. No If (No go to Q. 14)**
12. In a week, how many days do you do vigorous-intensity sports, fitness or recreational activities? -----
13. How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on those days? -----
14. Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate?  
a. Yes  
**b. No (If No skip others)**
15. In a week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities? -----
16. How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on those days? -----



### **PART-III PHYSICAL MEASUREMENT**

Height in Centimeters (cm) .....	Weight in Kilograms (kg).....
BMI (Kg/m <sup>2</sup> )	
Blood Pressure Reading 1	Systolic ( mm of Hg) ..... Diastolic(mm of Hg) .....
Blood Pressure Reading 2	Systolic ( mm of Hg) ..... Diastolic(mm of Hg) .....
Mean BP	Systolic ( mm of Hg) ..... Diastolic(mm of Hg) .....

THANK YOU FOR YOUR CO-OPERATION

## APPENDIX D

त्रिभुवन विश्वविद्यालय, चिकित्सा बिज्ञान अध्ययन संस्थान

महाराजगञ्ज नर्सिङ क्याम्पस

महाराजगञ्ज, काठमाण्डौ, नेपाल

वयस्क महिलाहरुमा नसर्ने रोगका व्यवहारीक जोखिम तत्वहरु

अन्तर्वार्ता तालिका

मिति:

फारम नं.:

हरेक सहभागीहरुसँग लिखित अनुमति प्राप्त गरिसकेपछि अनुसन्धानकर्ताद्वारा हरेक प्रश्नहरु पढेर सुनाइनेछ र प्राप्त उत्तरमा गोलोचिन्ह लगाइने छ अथवा खालि ठाउँमा लेखिनेछ ।

### खण्ड १: सामाजिक तथा व्यक्तिगत विवरण

- १ तपाईंको उमेर कति भयो ? \_\_\_\_\_
- २ तपाईंको शैक्षिक योग्यता कति हो ?
  - १ लेखपढ गर्न नसक्ने
  - २ साधारण लेखपढ गर्न सक्ने
  - ३ प्राथमिक तह
  - ४ माध्यमिक तह
  - ५ प्रविणता वा उच्च शिक्षा
- ३ तपाईंको जातिय पृष्ठभूमि के हो ?
  - १ दलित
  - २ पहुँच नभएका जनजाति
  - ३ पहुँच नभएका गैर दलित तराई जाति
  - ४ धार्मिक रुपले अल्पसंख्यक
  - ५ तुलनात्मक रुपले पहुँच भएका जनजातिहरु
  - ६ उपल्लो समूह
- ४ तपाईंको वैवाहिक स्थिति के हो ?
  - १ ऋविवाहित
  - २ विवाहित
  - ३ छुट्टिएको
  - ४ सम्बन्ध विच्छेद
  - ५ अन्य
- ५ तपाईंको पेशा के हो ?

- १ सरकारी जागिर
  - २ गैरसरकारी जागिर
  - ३ आफ्नै स्वामित्वको
  - ४ अन्य
- ६ तपाईंको आयश्रोत खर्च धान्न कतिको पर्याप्त छ ?
- १ बचत गर्न पुग्ने
  - २ पर्याप्त
  - ३ मुस्किलले पर्याप्त

## खण्ड २: आचरण सम्बन्धि प्रश्नहरू :

### क. धुम्रपान सम्बन्धि प्रश्नहरू :

- १ तपाईं हाल धुम्रपान गर्नुहुन्छ ?
  - १ गर्छु
  - २ गर्दिन (यदि गर्दिन भने प्रश्न नं. ४ मा जाने)
- २ तपाईं कस्तो प्रकारको धुम्रपान गर्नुहुन्छ ?
  - १ उत्पादित चुरोट
  - २ हातले बेरेको चुरोट
  - ३ अन्य
- ३ औसतमा यस्तो धुम्रपान कति पटक गर्नु हुन्छ ?
  - १ कहिलेकाँही
  - २ दैनिक १० खिली भन्दा कम
  - ३ दैनिक १०-२० खिली
  - ४ दैनिक २० खिली भन्दा बढी
- ४ विगतमा तपाईंले कुनै पनि प्रकारको धुम्रपान गर्नुहुन्थ्यो ?
  - १ गर्थे
  - २ गर्दिनथे यदि गर्दिन भने प्रश्न नं. ८ मा जाने
- ५ औसतमा कति पटक धुम्रपान गर्नुहुन्थ्यो ?
  - १ कहिलेकाँही
  - २ दैनिक १० खिली भन्दा कम
  - ३ दैनिक १०-२० खिली
  - ४ दैनिक २० खिली भन्दा बढी
- ६ तपाईंले धुम्रपान कहिले देखि शुरु गर्नु भयो ?
  - १ ३० वर्षको उमेर पछि
  - २ २०-३० वर्षको उमेरमा
  - ३ २० वर्ष भन्दा कम उमेरमा
- ७ तपाईंले कति अवधि सम्म धुम्रपान गर्नु भयो ?
  - १ १० वर्ष भन्दा कम अवधि सम्म

- २ १०-२० वर्ष अवधि सम्म
- ३ २० वर्ष भन्दा बढि अवधि सम्म
- ८ तपाईं हाल (एक महिना अवधि भित्र) कुनै धुँवा रहित सुर्तिजन्य पदार्थ सेवन गर्नुहुन्छ ?
  - १ गर्छु
  - २ गर्दिन यदि गर्दिन भने प्रश्न नं. ११ मा जाने
- ९ तपाईं कस्तो प्रकारको धुँवा रहित सुर्तिजन्य पदार्थ सेवन गर्नुहुन्छ ?
  - १ खैनी
  - २ गुट्खा
  - ३ अन्य
- १० औसतमा तपाईं कति पटक धुँवा रहित सुर्तिजन्य पदार्थ सेवन गर्नुहुन्छ ?
  - १ कहिलेकाँही
  - २ दिनमा ५ पटक भन्दा कम
  - ३ दिनमा ५-१० पटक
  - ४ दिनमा १० पटक भन्दा बढि
- ११ बिगतमा तपाईंले धुँवा रहित सुर्तिजन्य पदार्थ सेवन गर्नुहुन्थ्यो ?
  - १ गर्थे
  - २ गर्दिनथे यदि गर्दिन भने खण्ड ख मा जान
- १२ बिगतमा तपाईंले धुँवा रहित सुर्तिजन्य पदार्थ कति अवधि सम्म सेवन गर्नु भयो ?
  - १ ५ वर्ष भन्दा कम
  - २ १० वर्ष भन्दा कम
  - ३ १० वर्ष भन्दा बढि

**ख. मदिराजन्य पदार्थ सेवन सम्बन्धि प्रश्नहरू :**

- १ तपाईंले जीवनमा कहिल्यै मदिराजन्य पदार्थसेवन गर्नुभएको छ ?
  - १ छ
  - २ छैन (यदि छैन भने खण्ड ग मा जाने)
- २ तपाईंले बिगत १२ महिना भित्रमा कुनै मदिराजन्य पदार्थको सेवन गर्नुभएको छ ?
  - १ छ
  - २ छैन (यदि छैन भने प्रश्न नं. ग मा जाने)
- ३ तपाईंले कस्तो प्रकारको मदिराजन्य पदार्थ सेवन गर्नु हुन्थ्यो ?
- ४ तपाईंले बिगत १२ महिना भित्रमा कुन प्रकारका मदिराजन्य पदार्थको सेवन गर्नुभएको छ ?
  - १ महिनामा एकपटक भन्दा कम
  - २ महिनामा १-३ दिन
  - ३ हप्तामा १-४ दिन
  - ४ हप्तामा ५-६ दिन
  - ५ दैनिक

- ५ तपाईले बिगत एक महिनामा मदिराजन्य पदार्थको सेवन गर्नु भएको छ ?
- १ छ
  - २ छैन यदि छैन भने खण्ड ग मा जाने
- ६ बिगत एक महिनामा तपाईले कति दिन (कम्तिमा एक पटक) मदिराजन्य पदार्थको सेवन गर्नुभएको छ ?
- १ महिनामा १-३ पटक
  - २ हप्तामा १-४ पटक
  - ३ हप्तामा ५-६ पटक
  - ४ दैनिक
- ७ तपाई मदिराजन्य पदार्थको सेवन कहाँ गर्नुहुन्छ ?
- १ घरमा
  - २ अन्यत्र
- ८ सेवन गरेको बेला औसतमा एक पटकमा कति मात्रामा मदिराजन्य पदार्थको सेवन गर्नुभएको छ ?
- १ ५०-१०० मि.लि.
  - २ १००-१५० मि.लि.
  - ३ १५०-२०० मि.लि.
  - ४ २००-२५० मि.लि.
  - ५ २५० मि.लि. भन्दा बढि

**ग.आहार सम्बन्धिप्रश्नहरु :**

- १ तपाई आफ्नो खानामा फलफूललाई समावेश गर्नुहुन्छ ?
- १ गर्छु
  - २ गर्दिन (यदि गर्दिन भने प्रश्न नं. ४ मा जाने)
- २ हप्तामा कति दिन फलफूल खानु हुन्छ ?
- ३ फलफूल खानामा समावेश गरेको दिन मध्ये एकदिनमा कति सर्भिड खानुहुन्छ ?
- ४ तपाई हप्तामा कति दिन हरियो तरकारीलाई खानामा समावेश गर्नुहुन्छ ?
- ५ ति दिन मध्ये एक दिनमा कति सर्भिड हरियो तरकारीखानुहुन्छ ?
- ६ तपाईको घरमा खाना पकाउनको लागि कस्तोप्रकारको तेलको प्रयोग हुन्छ
- ७ तपाई खाना खानु अघि खानामा नुन थपेर खानु हुन्छ ?
- १ कहिले पनि खान्न
  - २ आकलभुकल खान्छु
  - ३ कहिलेकाँही खान्छु
  - ४ प्राय खान्छु
  - ५ सधैं खान्छु
- ८ तपाई नुन बढि मात्रामा हालेको तयारी खानेकुरा (चाउचाउ, लेज, नुनिलो बिस्कुट, कुकुरे, क्यान फिस, अचार, भुजिया, पापड )कति खानुहुन्छ?

- १ कहिले पनि खान्छ
  - २ आकलभुकल खान्छु
  - ३ कहिलेकाँही खान्छु
  - ४ प्राय खान्छु
  - ५ सधैं खान्छु
- ९ तपाईलाई खानामा नुन कति खानु हुन्छ ?
- १ धेरै कम
  - २ कम
  - ३ ठीक्क
  - ४ धेरै
  - ५ अति धेरै

**घ.शारीरिक क्रियाकलाप सम्बन्धि प्रश्नहरु :**

**कामसम्बन्धि प्रश्नहरु :**

- १ तपाईले काम गर्दा श्वास र मुटुको धडकन जोडले बढ्ने गरि (बढि परिश्रम पर्ने क्रियाकलाप प्रयोग हुने गरि) काम गर्नुहुन्छ ?
- १ गर्छु
  - २ यदि (गर्दिन भने प्रश्न नं. ४ मा जाने)
- २ तपाईले हप्तामा कति दिन बढि परिश्रम पर्ने क्रियाकलाप गर्नुहुन्छ ?
- ३ उक्त दिनहरुमा काम गर्दा कतिसमय बढि परिश्रम पर्ने क्रियाकलाप गर्नुहुन्छ ?
- ४ तपाईले काम गर्दा श्वास र मुटुको धडकन मध्यम तरिकाले बढ्ने गरि (मध्यम खालको परिश्रम पर्ने क्रियाकलाप प्रयोग हुनेगरि) काम गर्नुहुन्छ ?
- १ गर्छु
  - २ गर्दिन ( यदि गर्दिन भने प्रश्न नं. ७ मा जाने)
- ५ तपाईले हप्तामा कति दिन मध्यम खालको परिश्रम पर्ने क्रियाकलाप गर्नुहुन्छ ?
- ६ उक्त दिनहरुमा काम गर्दा कति समय मध्यम खालको परिश्रम पर्ने क्रियाकलाप गर्नुहुन्छ ?

**हिंडुल (शारीरिक क्रियाकलाप सम्बन्धिप्रश्नहरु)**

- ७ तपाई आवतजावतका लागि के प्रयोग गर्नुहुन्छ ?
- १ पैदल
  - २ साइकल
  - ३ गाडी
  - ४ अन्य ( यदि पैदल वा साइकल भने प्रश्न नं. ९ मा जाने )
- ८ के तपाईले आवतजावतका लागि कम्तिमा १० मिनेट हिंड्ने वा साइकलको प्रयोग गर्ने गर्नुभएको छ ?
- १ छ
  - २ छैन ( यदि छैन भने प्रश्न नं. ११ मा जाने)

- ९ तपाईं हप्तामा कति दिन आवतजावतका लागि हिंड्ने वा साइकलको प्रयोग गर्ने गर्नुहुन्छ ?  
१० तपाईं उक्त दिनहरुमा कति समय हिंड्ने वा साइकल चलाउने गर्नुहुन्छ ?

**मनोरञ्जनात्मक क्रियाकलाप सम्बन्धि प्रश्नहरु**

- ११ के तपाईंले श्वास र मुटुको धडकन बढ्ने गरि शरिरलाई बढि परिश्रम पर्ने खालका कुनैव्ययाम वा मनोरञ्जनात्मक क्रियाकलाप गर्नुहुन्छ?  
१ छ  
२ छैन ( यदि छैन भने प्रश्न नं. १४ मा जाने )  
१२ तपाईं हप्तामा कति दिन बढि परिश्रम पर्ने व्ययाम वा मनोरञ्जनात्मक क्रियाकलाप गर्नुहुन्छ ?  
१३ उक्त दिनमा तपाईं कति समय बढि परिश्रम पर्ने व्ययाम वा मनोरञ्जनात्मक क्रियाकलाप गर्नुहुन्छ ?  
१४ के तपाईंले श्वास र मुटुको धडकन मध्यम तरिकाले बढ्ने गरि (शरिरलाई मध्यम परिश्रम पर्ने) व्यायाम वा मनोरञ्जनात्मक क्रियाकलाप गर्नुहुन्छ ?  
१ छ  
२ छैन (यदि छैन भने बाँकी प्रश्न छोडिदिने)  
१५ तपाईं हप्तामा कति दिन मध्यम परिश्रम पर्ने व्ययाम वा मनोरञ्जनात्मक क्रियाकलाप गर्नुहुन्छ ?  
१६ उक्त दिनमा तपाईं कति समयमध्यम परिश्रम पर्ने व्यायाम वा मनोरञ्जनात्मक क्रियाकलाप गर्नुहुन्छ ?

**खण्ड ३: शारीरिक मापन**

**शारीरिक मापन**

- |   |          |  |
|---|----------|--|
| १ | उँचाइ    | से.मि.मा                               |
| २ | तौल      | कि.ग्रा.मा                             |
| ३ | BMI      | कि.ग्रा./मि. <sup>२</sup>              |
| ४ | रक्तचाँप | प्रथम नाप<br>द्वितिय नाप<br>औम्कृत नाप |

सहभागिता को लागि धन्यवाद !

## APPENDIX E

### Classification of Physical Activity

Vigorous Intensity Activities	Moderate Intensity Activities
Football, basketball, hockey, swimming, labouring, ploughing, carrying heavy loads, digging ditch, jumping rope, karate, judo.	Household and domestic chores, kitchen work, gardening, weaving, walking, volleyball, badminton, aerobic dance, cycling, walking, jogging, cricket

MET is the rate of person's working metabolic rate relative to resting metabolic rate. One MET is defined as the energy cost of sitting quietly, and is equivalent to a caloric consumption of 1 kcl/kg/hour.

Moderate Intensity Activities = 4.0 MET value.

Vigorous Intensity Activities = 8.0 MET value

(WHO STEP wise approach to Noncommunicable Disease Risk Surveillance, 2008).

### Classification of Blood pressure

Classification of blood pressure according to The Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7), 2004 criteria

Category	SBP (mm of Hg)	DBP (mm of Hg)
Normal	< 120	<80
Pre hypertension	120-139	80-89
Hypertension, Stage 1	140-159	90-99
Hypertension, Stage 2	160 or above	100 or above

### Classification of BMI

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m<sup>2</sup>) (WHO, 2006)



Category	BMI (kg/m <sup>2</sup> )
Underweight	< 18.50
Normal	18.50-24.99
Overweight	25-29.99
Obesity	≥30.00

### Fruit and Vegetable and serving size

Fruit	1 serving
Apple, banana, orange	1 medium size piece
Vegetable	
Raw, green leafy vegetable	1 cup
Others vegetables cooked	1/2 cup

### Alcohol (Calculation of Standard drink)

Type of alcohol	Concentration of alcohol	1 standard drink
Beer, Jaand, Tongba	5%	250 ml
Local raksi	27%	45 ml
Whisky, Vodka, Rum	40%	30 ml
Wine	12%	105 ml

Calculation formula: volume of alcohol\*percentage of alcohol\*specific gravity of ethyl alcohol (0.789).

One standard drink=10 gram alcohol.

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