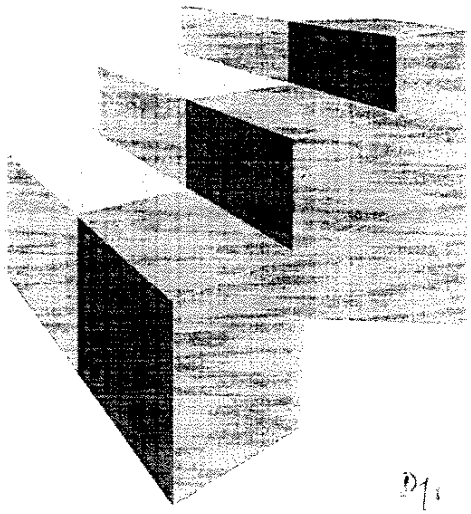
SURVEILLANCE OF RISK FACTORS FOR NON-COMMUNICABLE DISEASES IN NEPAL

REPORT OF SURVEY IN ILAM, LALITPUR AND TANAHU



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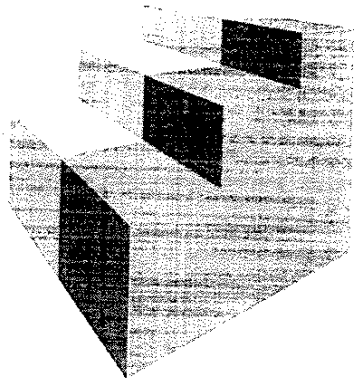

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LIST OF ABBREVIATIONS

CBS	Central Bureau of Statistics
CVD	Cardio Vascular Diseases
COPD	Chronic Obstructive Pulmonary Diseases
GDP	Gross Domestic Products
GON	Government of Nepal
ICD	International Classification of Diseases
MOHP	Ministry of Health and Population
mmHg	Millimeter of Mercury
NCD	Non-communicable diseases
NGO	Non-governmental Organization
NHRC	Nepal Health Research Council
SEAR	South East Asia Region
SEARO	South East Asia Regional Office
SOLID Nepal	Society for Local Integrated Development Nepal
WHO	World Health Organization

TABLE OF CONTENTS

LIST OF TABLE
LIST OF TABLE

Page no.
Page no.

EXECUTIVE SUMMARY

INTRODUCTION

According to WHO, nearly 52 percent of deaths and 38 percent burden of diseases (BOD) in South East Asia Region (SEAR) are related to Non communicable Diseases (NCDs). Particularly, cardiovascular disorders, cancer, diabetes mellitus, chronic lungs disease and conditions arising from accidents and injuries are in the top in the region. [1]

Degenerative and non communicable disease in Nepal accounted for 42 percent of the causes of all deaths and contributes 23 percent to the loss of all Disability Adjusted Life Years (DALYs). It has also been estimated that within 15 years, degenerative and all other NCDs would account for almost 30 percent of the total DALYs lost. Nepal World Health Survey (2002) data revealed that Non-Communicable disease death toll was 41.96 percent of all deaths. Data in World Health Report 2003 estimated the NCDs deaths accounted for 48.9 percent of the total deaths and a death rate of 4.7 deaths /1000 population; Nepal is categorized as a country in South east Asia with high child and high adult mortality stratum.[2] According to the Annual report of DoHS 2002, NCD deaths accounted for 8.17percent of the total inpatient and 24.84 percent of total hospital deaths. Out of hospital recorded NCD deaths, cardiovascular deaths accounted for 44.38 percent and deaths due to COPD were 37.38 percent. [3]

WHO STEPwise NCD Survey in Kathmandu Metropolitan city (2003), carried out among 2030 individuals of 25-64 years population group, revealed that 33 percent of the total respondents consumed tobacco (smoke and smokeless). In total, about half of the surveyed population (48 percent) had ever consumed alcohol in their life time. Of total consumers, 63 percent were male and 33 percent were female. Respondents had low fruit and vegetable intake. Only 0.4 percent of the male respondents had consumed five or more than five servings per day. Study shows that 74 percent of male respondents and 91 percent of female respondents were physically inactive physically. Similarly, 27 percent of the male and 42 percent of female were overweight. Among the surveyed people, 20 percent of males and 17 percent of the females were hypertensive.[4]

Information on distribution and determinants of risk factors especially for NCDs in population provide basis for selecting strategies for effective prevention and control. Such strategies aim to promote healthy behaviors and lower risks in the entire population. Thus, it is essential to quantify and know the distribution of risk factors in the community. So, the STEP Survey was carried out in three additional districts, namely Lalitpur, Ilam and Tanahu in 2004/5.

Main aim of this study was to identify and describe the level of selected NCD risk factors by age and sex among 15-64 aged populations, using recommended WHO definitions and to provide appropriate and sufficient information needed for designing and implementing NCD risk factors prevention and control interventions. The selected variables for this study were tobacco, alcohol, physical inactivity, nutrition, weight, height, waist girth and blood pressure. This WHO STEPwise approach had collected the information through interview (STEP 1) and physical measurements (STEP 2). [5]

OBJECTIVES

The main objectives of the study were

1. To estimate the distribution of NCD risk factors, as a first step in a sequential process that aims to establish and maintain a comprehensive, integrated, systematic and sustainable population-based data collection system as part of the National Action Plan for the Prevention and Control of Non-communicable diseases in Nepal.

2. To establish NCD surveillance sentinel network in Nepal

3. To establish baseline level of population level risk factors for NCDs.

STUDY DESIGN

DESIGN

A descriptive cross sectional study design was followed. In order to generalize the risk factor distribution for NCDs in the population, sufficient sample size was taken under study. In order to study the risk factors, the WHO STEPwise approach was implemented in three districts namely Ilam, Lalitpur and Tanahu. A total of 7792 sample was taken out of nineteen VDCs and two municipalities in the three districts.

INCLUSION CRITERIA

Males and females 15-64 years of age (inclusive), who were willing to participate and were also the permanent residents of the study area were included in the study.

EXCLUSION CRITERIA

Individuals in institutionalized settings e.g. in hotels, motels, hospitals, nursing homes and other institutions and also the temporary residents of the study area were being excluded from the study. Burning armed conflict and emergency sites were planned to be excluded, but fortunately, there was no any site like this and the field team did not face any difficulties to collect the data.

SAMPLING DESIGN

SAMPLING FRAME

Among the decentralized program districts, three districts were selected. Those districts were Tanahu (Western region), Lalitpur (Central region) and Ilam (Eastern region). This was purposively selected taking into account the local condition, the local capacity and existing resources. The sampling frame is Probability Proportionate to Size for all wards in Lalitpur Municipality (Urban population of Lalitpur district), Byas municipality and other Village Development Committee (VDC) in Tanahu (both Urban and rural population of Tanahu district) and only rural VDC in Ilam district.

The three Districts had a total population of 508,695 according to the 2001 census [6]. Of this, estimated 270,042 or 53 percent were the NCD surveillance target group population.

SAMPLING METHOD

The sampling method for this survey was Multi-stage cluster sampling.

a. Using the 2001 Census data the sample size had been determined in the three districts producing a ward's list in the VDC and municipalities, number of expected individuals to be interviewed by each age category based on the proportion of the age group in the population and the sample size needed.

b. **At the district level:** For household information of the wards in the randomly selected VDCs and Municipalities in Ilam and Tanahu and lalitpur, house holds were to be sampled by the local health workers. During the preparation phase, the management committee of each selected VDC was asked to provide the household list. DHO had disseminated the information concerning the survey in order to get more cooperation from the health stakeholders. But, the household list was not available at the VDC level and because of that we could not get updated and recent information of households.

c. **VDC and Municipality level:** In the selected VDCs, all wards in the VDC had to be covered and initially it was proposed purposed to obtain the household listing to implement the systematic sampling for the household selection but later, when the list was not available, the samples were collected by using the cluster methods. The required sample number from each ward was calculated using PPS method. The information was disseminated throughout the VDC and municipality to participate in the study.

d. **At the household Level:** The interviewers went to the centre of the ward and tossed a coin. If head came, they started from the first HH in front of the interviewer. If tail came, they started from the HH in the back (HH: One group of residents sharing a kitchen), they went in clockwise direction in the ward until reaching the required number of each age group.

e. **At the HH:** Among the eligible participants only one member of the household was selected using simple random sampling. The information related to risk factors was collected from the selected person using STEP 1 and STEP 2 tools of the WHO STEPwise approach.

SAMPLE SIZE ESTIMATION

A total 8,500 individuals distributed proportionally in the nineteen VDCs and two municipalities were selected for the study. At least 250 individuals in each age group were identified as respondents. Efforts were made to minimize non-response, and to interview as many people in the survey sample as possible.

PRETEST

The instruments were pre tested by organizing pretest work shop from February 1st to 3rd 2005. The resource persons for the workshop were the members of organizing committee. The workshop was targeted to the District team (of supervisors), interviewers and data management team.

WHO Regional NCD advisor had attended the pilot testing work shop. Necessary amendments in the instruments were done after the pilot test in Imadol VDC of Lalitpur district.The instrument (questionnaire) was field tested and necessary amendments were done by incorporating the

suggestions and finalization of the instrument was done by the end of the workshop. (For details of the schedule of the workshop see annex 4)

DATA COLLECTION

DATA COLLECTION AND QUESTIONNAIRE DESIGN

The WHO STEPwise approach to surveillance had been adopted to develop this surveillance structure, with a focus on the core behavioral risk factors as outlined within the framework of STEP 1and 2. One person between 15-64 years of age in each household was randomly selected and interviewed, until the desired quota was fulfilled. Once the quota for 250 members for specific age group were fulfilled in one cluster, the member of household belonging to the particular age group was excluded for the selection. The Quota of 125 male and 125 female of the respective age group was obtained in similar manner.

Data was collected through face-to-face interviews with the help of a structured questionnaire. Informed consent was taken from the respondents before each interview. The questionnaire had been translated into *Nepali* and back translated into English ensuring consistency in phrasing of questions so that the responses would not generate a bias. The questionnaire (survey instrument) used in this study was of version 1.4. [5] (Respondents did not receive any incentives. It was decided that offering incentives might tend to generate a bias as respondents in poor urban and rural areas tend to respond in the affirmative, assuming that such replies would be linked to rewards. Our previous experiences with community interviews were encouraging.

A series of consultations were used to fully develop and refine the tool of assessment. The questionnaire was piloted and modified as necessary. It was ensured that all questions were valid and reliable. The questions and instructions were clear, non-ambiguous and fair. Almost all questions had been designed to fixed alternative responses for greater uniformity and simplicity for the analysis. A few questions were open-ended so as not to loose valuable information. These were subsequently coded.

GETTING THE QUALITY DATA

In order to ensure quality information the data collectors trainers and supervisors were selected from sampled districts considering male: female ratio of 1: 1 for interviewers. 8 supervisors of posts like District Health Officer, District Public Health Officer, Medical Officer, and Seniors Nurse in each District were selected. Similarly, 16 data collectors of posts like staff Nurse, Health Assistant, Auxiliary Health Worker and Auxiliary Nursing Midwife from local health institution were selected as data collectors for data collection. The data collectors' data managers and supervisors were trained for the task allocated for them. (For the details of training see annexes 4)

There were Show cards of glasses to quantify the alcohol content and pictures of fruits to quantify the numbers of serving. Supervisor had to attend 25% sample of interviews and check the questionnaire filled by the interviewers. Ten percent of the questionnaire had to be re-interviewed and the result checked and compared to the interviewer result. The data collectors were closely supervised during data collection. The result was discussed to improve the quality of the information.

Questionnaire then was submitted to the Statistical assistant and s/he had again checked the reliability of the data and gave feedback to the supervisor.

The District's DHOs were responsible to overcome technical problems and s/he was a field decision maker for the NCD surveillance activity.

QUALITY ASSURANCE PROCEDURES

Different approaches were used to ensure consistency of interviewing and good quality data (i.e. random checks by field supervisor, co investigator and re-interviewing the important questions from 10 percent of the respondents by supervisor). In addition to these all double data entry of the whole data was done. A verification check on 5% of the sample was conducted after double entry. Measures were taken to attain complete reliability and to reduce variation to reasonable limits. To this end, clearly defined standardized procedures were developed; questions were asked in a standard manner and the wording and the order of the questions were decided well in advance. Particular attention was paid to reproducibility of similar information, when the question was asked more than once, so as not to generate a bias and to minimize variability of responses. Questions were asked in a neutral manner without showing a preference for a particular response; it was made sure that the respondents understand them in the same way. The data collectors, data managers and supervisors were trained for the task allocated for them. Questionnaire, survey guidelines were pilot tested. In order to maintain the quality in implementation procedures frequent meetings were held among the technical and organizing committees and necessary correction were done if any deviation in the standard was traced.

DATA MANAGEMENT

As 3 days training to District Statistical assistants and medical recorders was done by SOLID NEPAL team for specific data management in district level, Data was edited, coded and double entered in sample districts health office by statistical assistants and medical recorders. Later on the data was again managed by trained expertise from SOLID NEPAL with senior statistician technical input. Data verification, validation and reliability were tested on certain variable such as age group, gender. Confidentiality of data was ensured.

DATA ANALYSIS

SPSS Ver 10 was used for final data processing because SPSS 10 was more advance software for statistical package for sociological studies. Data was analyzed in terms of different aspects of statistics such as percentage, mean, median and confidence limits in terms of mean and median. Cross tabulation of the tables was done as per the TOR.

CONFIDENTIALITY

A commitment to confidentiality was ensured in the consent forms and training exercise. In addition, data entry was done on the same day; questionnaires were taken from the field staff and transferred away safely on a daily basis. Computer systems were password protected.

ETHICAL CONSIDERATION

The study followed NHRC research Guidelines, which emphasizes on respect to study subjects, their justice, informed consent and control of possible risks to the subjects in the study.[7] Informed consent was obtained from each perspective study subject. There was no risk to the subject as there was no intervention in the study. Supervisors and enumerators were trained on making informed consent, step in interview and physical measurement measurements. If the subject was found having non communicable diseases or problem such as hypertension during our survey, s/he was referred to near by health institution with referral slip. There were cases referred for the needful management

of their hypertension as they had for the fist time noticed the conditions during physical measurement. (For ethical clearance please see annex 7)

CONSTRAINTS AND LIMITATIONS

Followings were the constraints and limitations of the study.

Since the survey was done with selection of 3 districts devolution district purposively, the results can not be fully generalized and thus is not nationally representative.

During the survey, the capacity of the supervisors, data operators and interviewers were over estimated. There was difficulty in standardization in quantification of the issues like physical activities, diet consumption in relation to local context.

MAJOR FINDINGS

DEMOGRAPHIC INFORMATION

Out of 8500 proposed, a total of 7792 population participated in the survey of which 3674 were male and 4118 were Female. Male and female sex ratio was 0.9:1. The Mean number of adults over 15 years in each household was almost 4.

The survey revealed that among the surveyed population, 39 percent were illiterate , 48% percent had completed primary and secondary level, and only 11 % had completed intermediate level and above. Greater variation in education attainment was observed among different age groups and among male and female respondents. It showed that majority of the surveyed population were less knowledgeable and indicated that they had little knowledge about the NCD prevention and control.

A significant majority (unpaid - 71percent), of the population were unemployed. One fifth of them (22 percent) were self-employed, 4 percent were employed in Non-Government sector. Only 3 percent of the total participants were government employed and among unpaid 55 percent were involved in household works. The proportion of the male who were government employed was almost six times greater than the female respondents. Similarly, less female were involved in paid jobs.

TOBACCO USE

Present study in three districts showed that 41 percent of the total respondents consumed either form of tobacco. Almost 21% of the respondents had ever smoked and 20 percent had consumed smokeless tobacco. On average, the people started smoking at the age of 19 years but the young's of 15-24 years had started smoking earlier (16.42 years) in compared to male (19.76 years) in the 55-64 years of age group. The tobacco consumers consumed tobacco for about 27 years with mean duration of smoking to be almost 40 years in the 55-64 years age group. The data showed that the younger population will continue smoking for longer years.

On the other hand, a positive trend of quitting smoking was observed among the younger the age. Higher percentage of young respondents never smoked compared to the older age group. A significant number of participants (23 percent) had left smoking. It indicates that anti-smoking trend has gradually been developed in the population.

ALCOHOL USE

In total, 38 percent of the surveyed population had ever consumed alcohol in their life time. Out of total, 37 percent were current consumers. More than a half of the male population (52 percent) had ever consumed alcohol.

Mean number of standard drinks consumed by current drinkers per week was 3.3 (M: 3.7, F: 1.9) but mean standard drinks per day (while consumed) was 4.36 (M: 5.03, F: 3.45)

Largest number of drinks consumed during a single occasion in the last 12 months by Male 8.7 standard drinks and among female it was 4.8 with the average of 7.3 among both sexes. One standard drink was equivalent to one standard bottle of regular beer (285 ml) one single measure of spirit (30ml), one medium size glass of wine (120ml) and one measure of aperitif (60ml) with net alcohol content of a standard drink is 8-13 g of ethanol depending on the country.

Mean number of occasions for >5 standard drinks in single occasion among male was 79 and >4 standard drinks among female was 65.

DIET

The numbers of daily servings of vegetable was found to be 2.49 with 2.57 for male and 2.42 for female

The male respondents consumed 2.53 servings of fruits and female respondents consumed 2.14 servings of fruits per day with average of 2.32 servings of fruits per day for both sexes.

One serving of fruit was considered equivalent to one medium piece of fruit like banana, orange apple etc.; half a cup of cooked, chopped or canned fruit or half a cup of juice. Similarly, one servings of vegetable was considered equivalent to one cup of raw green leafy vegetables, half a cup of other vegetables cooked or chopped raw or half a cup of vegetable juice.

The majority of the respondents (96.1%) consumed less than five servings of fruits or vegetables per day. Almost one (0.9%) percent of the respondents had consumed more than five servings of the fruits and vegetables in a day. Three percent of the respondents did not consume any vegetables or fruits servings daily. It clearly showed that the surveyed population did not eat fruits and vegetables as standardized by WHO.

Use of vegetable oil during meal preparation was found to be universal (97.20%). Use of lard or lust, butter or ghee, margarine and other comprise of less than 2 % of the oil like substances used during meal preparation. The vegetable oil does not contain cholesterol.

PHYSICAL ACTIVITY

More than half of the respondents (M: 46%, F: 57%; mean 51.5%) did not work, almost one in five respondents (M: 12%, F: 26%; mean19.1%) were inactive in transport related physical activities and 86 percent of [M: 84%, F: 88%] of them did not involve in recreation related physical activities. The higher prevalence of physical inactivity was observed among female and older age groups. There are threats or risks of acquiring of non communicable diseases because of less involvement in physical activities.

HISTORY OF HYPERTENSION AND DIABETES

Forty eight percent of participants had checked blood pressure in past 12 months. Among them 7 percent were found to have condition with raised blood pressure. Not all the people who develop Hypertension get the appropriate life style advices from doctors or health worker. The respondents who were hypertensive (M 3.42%, F 8.52%; mean 6.15%) visited traditional healer and 5.7 % of the respondents were using herbal remedies for the hypertension.

Similarly, percentage of participants who checked blood sugar in 12 months was 9 percent and of them 2 percent was found to have high level of blood sugar. Out of the 700 respondents who had seen health workers for last 12 months, 155 i.e. 22% (M 24.3%, F 20.3%) were found to have elevated sugar level. Of those who are diabetic, 15.03% are currently taking herbal remedies, 7.19% had visited traditional healer. Less number of female gets advices than male. Twelve percentages of those who were diagnosed were neither using oral drugs nor insulin.

PHYSICAL MEASUREMENT

Average height of male was 1.6 meter and of female was 1.55 meter. Average weight of male was 58 Kgs and of Female was 50.5 Kgs. BMI calculation showed that an equal percentage of male and female (10 percent) were underweight; 68 percent male and 76 percent female were in normal range. Data further revealed that 20 percent male and 11 percent female were overweight. More than two percent female and 1.4 percent of male were found being obese.

Mean systolic and diastolic blood pressure for both sexes remained 129 mmHg and mean 80 mmHg respectively. Among male mean systolic blood pressure was 133mmHg and diastolic was 82 mmHg and among Female systolic blood pressure 126 and diastolic was 79 mmHg respectively.

Respondents with condition of raised blood pressure were 42 percent. Forty nine percent of male and 35 percent of the female respondents were found to be hypertensive (Systolic > 140 and Diastolic >90). Percentage of both sexes with raised blood pressure (Systolic > 170 and Diastolic >100) was 10 percent with 12 percent of male and 9 percent of female. Only 4 percent of the participants were treated with drugs for the raised blood pressure during last year.

CONCLUSION(S) AND RECOMMENDATIONS

CONCLUSION(S)

This study was done with the view of establishing a continuous surveillance system of non communicable diseases in Nepal with reference to the major risk factors for non communicable diseases recognized world wide. This is a pilot study expanded in 3 districts after NCD risk factor study in 2003 which was carried out in urban setting considering one district.

The study found out the abundant evidences of prevalence of risk factor under study. Alarming facts of prevalence of secondary risk factors were detected. High percentages of hypertensive respondents were unknown about their blood pressure status and many of the respondents were physically inactive. Around 7 % of the respondents had the history of hypertension and almost 42% were identified to be hypertensive during our study. Consumption of tobacco and alcohol was common among the respondents and older people tend to drink more heavily than the younger people. Significant proportion of the respondents was either over weight or under weight. Similarly,

22% of the respondents who had visited physician in last 12 months were diagnosed as diabetic, which was almost 2% out of total sample.

It's clearly seen that the risk factors for non communicable and chronic diseases are common in the society. Regular Scrutiny of such factors in the general population is necessary to track out the extent of problems and achievement in control of non communicable diseases. Well planned, need based and effective programmes are needed to address the lifestyle changes in the general population.

RECOMMENDATIONS

Based on the study; followings are recommended

1. Extensive awareness and intervention programmes on behavioral change intervention addressing the issues
    - Related to both smoking and use of smokeless tobacco with special focus to female, youths and adults for quitting consumption as well as demand reduction,
    - Of harmful effects of alcohol consumption,
    - Importance of more vegetable and fruits in daily diet and to promote healthy habits like use of vegetable oil for cooking
    - To promote physical activities both in urban and rural settings.
2. Government should take strong hold in implementation of existing policy initiatives and take new initiatives in order to
    - Discourage the marketing and promotion of the manufactured cigarette and liquor
    - Restrict in buying/ selling tobacco products and liquor so that the young people (minors) would be discouraged for consuming tobacco and liquor in early age.
3. Since the study revealed a significant portion of those who were diagnosed with hypertension and diabetes visited traditional healers and were taking herbal medicine for treatment. So, all hypertensive and diabetics in the community level should get modern medical facilities as well as adequate awareness to utilize those facilities.
4. It's recommended that standardization of servings of fruits and vegetables and degree of physical activities at local context should be done for further surveys.
5. Regular blood pressure and blood sugar level monitoring services should be made available in community based settings and people of older age should be aware about the importance of regular blood pressure/ sugar monitoring and regularity of medication. Physicians and health workers should emphasize on the importance of life style changes together with the medicinal treatment for the hypertensive and diabetic condition and ensure that every client gets advices for life style change.

6. Government should prioritize the prevention of non communicable diseases by intervening against the risk factors and including them in essential health care service and provide them through primary health care settings.

7. As Survey has been conducted in three districts involving district and below district health workers, they are already sensitized to some extent about the risk factors for NCDs. It can be recommended that this sensitization programmes should be continued and reproduced.

8. District level capacity was overestimated during planning especially in selecting the interviewers and supervisors and data entry persons. As a result, survey team faced some difficulties in maintaining data quality. So in the days to come, standard selection criteria should be developed and utilized for better relation of the field staff to increase the data quality. It is also recommended that computer related exams should be taken with districts statistical assistant and medical recorders who could be chosen for the data management.

9. Training for interviewers and supervisors were conducted for 3 and 2 days respectively. This was quite insufficient to discuss and conceptualize the research matters. Therefore, it is recommended to extend the duration of the training for 5 days and 3 days respectively.

10. It is seen from the programme reviews that those health programmes like EPI TB/Leprosy, FP etc. which are conducted from different service outlet from government health institutions and have focal points up to district level have been effective. Keeping in mind the extent of non communicable disease load and prevalence of NCD risk factors in the community and the feasibility of control through behavioral initiatives, it is recommended that response of non communicable diseases should be extended and expanded at different level of service delivery appointing a focal point at district level.

CHAPTER ONE

INTRODUCTION

According to WHO, nearly 52 percent deaths and 38 percent of diseases burden in South East Asia Region (SEAR) are related to NCDs. Particularly, cardiovascular disorders, cancer, diabetes mellitus and conditions arising from injuries are prioritized top in the region, out of them; ischemic heart disease and cerebrovascular disease are two main conditions. Cancer, CVD, neuropsychiatry disorders, diabetes mellitus and hypertension are major NCDs reported in Nepal. [1]

WHO estimated that approximately half of the burden of diseases would be caused by chronic disease, 13% by injuries and 39% by non communicable diseases. Chronic diseases risk factor is the leading cause of the death and disease burden in all countries, regardless of their economic development status. The leading risk factor globally is raised blood pressure, followed by tobacco use, raised cholesterol and low fruits and vegetable consumption. The major risk factors together account for around 80% of the deaths from heart diseases and stroke[8]. Moreover, risk transition is causing an alarming increase in risk factors in middle and low-income countries because of marketing targets of tobacco, alcohol and preserved foods by multinational companies. As people with low income and education suffer the most from the greatest burden of diseases, focus of WHO, international organizations and governments is on trying to redress this imbalance - by directly tackling poverty, concentrating on risk to health among the disadvantaged and hence overall economic growth.[9]

IT was estimated that degenerative and non communicable diseases in Nepal accounted for 42 percent of the causes of all deaths and contribute 23 percent to the loss of all Disability Adjusted Life Years (DALYs). It has also been estimated that within 15 years degenerative and all other NCD would account for almost 30 percent of total DALYs lost. Nepal World Health Survey 2002 data revealed the Non-Communicable disease death toll was 41.96 percent of all deaths. Data in World Health Report 2003 estimated the NCDs deaths of 48.9 percent of the total deaths or 4.7/1000 population in Nepal as a country in South East Asia with high child and high adult mortality stratum. [2]According to the Government Hospital records in Annual report of DoHS 2002, 8.17percent of the total inpatient and 24.84 percent of all hospital deaths were NCD related deaths. Cardiovascular deaths were 44.38percent and COPD were 37.38percent of hospital NCD deaths[3].

WHO STEPwise NCD Survey, in Kathmandu Metropolitan city, 2003, carried out among 2030 individuals of 25-64 years population group, revealed that 33 percent of the total respondents consumed either form of tobacco (smoke and smokeless). In total, about half of the surveyed population (48 percent) had ever consumed alcohol in their life time. Out of total, 63 percent male and 33 percent female were alcohol consumers. Respondents had low fruit and vegetable intake. Only 0.4 percent of the male respondents had consumed five or more than five serving per day. Study shows that 74 percent of male respondents and 91 percent of female respondents were inactive physically. Similarly 27 percent of the male and 42 percent of female were overweight. Among the surveyed people, 20 percent male and 17 percent female were hypertensive.[4]

The causes of main chronic disease epidemics are well established and well-known. The most important modifiable risk factors are unhealthy diet and excessive energy intake; physical inactivity; alcohol consumption and tobacco use. The major modifiable risk factors, in conjunction with the non modifiable risk factor of age and heredity, explain the majority of new events of heart disecses, stroke, chronic respiratory disease and some important cancers. The relationship between

the major modifiable risk factors and the main chronic diseases is similar in all region of the world. [10] Though, annual report of MOH is the main source of NCD related mortality and morbidity information in Nepal, it is not free from bias caused by misreporting and under reporting of events due to poor accessibility of health services and difficulties in establishing diagnosis as classification of diseases is not based on ICD. [1]

Information on distribution and determinants of risk factors especially for NCDs in population provide basis for selecting strategies for effective prevention and control. Such strategies aim to promote healthy behaviors and lower risks in the entire population. Thus, it is essential to quantify and access distribution of risk factors.[9] So, WHO Country office had extended the STEP Survey to three additional districts namely Lalitpur, Ilam and Tanahu in 2004/5.

Main aim of this study was to identify and describe the level of selected NCD risk factors by age and sex among 15-64 aged populations, using recommended WHO definitions and to provide appropriate and sufficient information needed for design and implementation of NCD risk factors prevention and control interventions. The selected variables for this study were tobacco, alcohol, physical inactivity, diet, weight, height, waist girth and blood pressure. WHO Stepwise approach was used to collect the information related to risk behaviors by interviewing the respondents (STEP 1) and physical measurement was done by using standardized instruments (STEP 2).

OBJECTIVES

1. To estimate the distribution of NCD risk factors, as a first step in a sequential process that aims to establish and maintain a comprehensive, integrated, systematic and sustainable population-based data collection system as part of the National Action Plan for the Prevention and Control of Non-communicable diseases in Nepal.
2. To establish NCD surveillance sentinel network in Nepal
3. To establish baseline levels of population level of the risk factors for NCDs.

BACKGROUND AND METHODOLOGY

BACKGROUND

It is essential to establish a well functioning surveillance mechanism for systematic response to combat any health problems. Base line surveys are often the 1st steps to establish a surveillance mechanism for disease risk factors. It is necessary to conduct periodic surveys in order to find out the extent of problem, trend and see the progress made in the field of combating health problems once the programmes are launched in the community. It is desirable that periodic surveys are conducted in every 3-5 years interval in case of non communicable diseases.

This survey is a baseline survey done to find out the prevalence of modifiable risk factors found in the community for non communicable diseases. Major risk factors like tobacco consumption, vegetable and fruit intake, physical inactivity and high cholesterol containing diet were considered for the survey. NCD Surveillance has focused on these risk factors because these risk factors can be modified to avoid non communicable diseases.

A cross-sectional study was designed to cover three districts and a population of 8500; a sufficient sample size enough for generalization of findings in the respective districts. A total of 211 clusters in 19 VDCs and 2 two municipalities from Ilam, Lalitpur and Tanahun were selected as study area. To maintain the quality of information, the field staffs were trained, the instruments were pilot tested, the enumerators were supervised, and data were cross checked. Different show cards were used to quantify the diet and alcohol consumption.

METHODOLOGY

STUDY DESIGN

A descriptive cross sectional study design was followed. In order to detect the changes that occurred in the population regarding the risk factor distribution for NCDs, sufficient sample size was taken for the study. The WHO STEPwise approach was implemented in three districts namely Ilam, Lalitpur and Tanahu in order to study the risk factors. A total of 8,500 individuals had participated in the study from nineteen VDCs and two municipalities.

INCLUSION CRITERIA

- Males and females 15-64 years of age (inclusive), who were willing to participate
- The permanent residents of the study area were included in the study.

EXCLUSION CRITERIA

- Individuals in institutionalized settings e.g. in hotels, motels, hospitals, nursing homes and other institutions
- Temporary residents of the study area
- A burning conflict and emergency sites (the field team did not faced any difficulties to collect the data)

SAMPLING DESIGN

SAMPLING TECHNIQUE

Among the decentralized program districts, three districts were selected purposively. Those districts were Tanahu (West region), Lalitpur (Central region) and Ilam (East region). This was purposively selected taking into account the local condition, the local capacity and existing resources. The sampling frame was Probability Proportionate to Size for all wards in Lalitpur Municipality (Urban population of Lalitpur district), Byas municipality and other Village Development Committees (VDC) in Tanahu (both Urban and rural population of Tanahu district) and only rural VDCs in Ilam district. Rural population of 6 VDCs in Ilam, 13 VDCs in Tanahun and urban population in one municipality in Tanahun and one municipality lalitpur were selected so as to make generalization of the findings in urban and rural context.

SAMPLING FRAME

According to the 2001 census, three Districts (Ilam, Lalitpur and Tanahun) had a total population of 508,695. Of this, estimated 270,042 (53 percent) were the NCD surveillance target group population. The 19 VDCs and 2 Municipalities were selected considering wards as clusters. There were 211 clusters

SAMPLING METHOD

The sampling method for this survey was Multi-stage cluster sampling.

- The sample size was determined considering the data of Census 2001. Samples were selected considering various parameters namely geography (rural–urban), age group and sex. The sample size was determined in all three districts producing a ward's list in the VDC and municipalities from census data. Number of expected individuals to be interviewed by each age category were proportionate to the size of population of each age groups
- **At the district level:** Household information of the wards in the randomly selected VDCs and Municipalities in Ilam and Tanahu and lalitpur was tried collected by the local health workers. During the preparation phase, the management committee of each selected VDC was asked to provide the household listing and also the DHO had disseminated the information concerning the survey to get more cooperation from the health stakeholders. But, the household list of the wards could not obtain as there were no specific records that we need to fulfill our purpose.
- **VDC and Municipality level:** In the selected VDCs, all wards in the VDC had to be covered and initially it was purposed to obtain the household listing to implement the systematic sampling for the household selection but later when the list could not found, the samples were collected by using the cluster methods. The required sampled number from each ward was calculated using PPS method. The information was disseminated through out the VDC and municipality to participate in the study.
- **At the household Level:** The interviewers went to the centre of the ward and tossed a coin. If head came, they started from the first HH in front of the interviewer. If tail came, they started from the HH in the back (HH: One group of residents sharing a kitchen), they went in clockwise direction in the ward until reaching the required number of each age group.
- **At the HH:** Among the eligible participants only one member of the household was selected using simple random sampling. The information related to risk factors was collected from the selected person using STEP 1 and STEP 2 tools of the WHO STEPwise approach

SAMPLE SIZE ESTIMATION

Assuming the prevalence of NCDs ranging between 10% to 30% in Rural and Urban districts, with 95% confidence level, 3% precision, and design effect of 2.5 after allowance for incomplete responses and population distribution will need a minimum of 2500 to 3000 respondents in a district, or 8,500 individuals distributed proportionally in the nineteen VDCs and two municipalities were selected in which at least 250 individuals in each age groups were identified. All efforts were made to minimize non-response, and to interview as many people in the survey sample as possible.

Ilam

	Age-Group					Total sample
VDCs	15-24	25-34	35-44	45-54	55-64	
Jogmain	98	98	95	96	98	485
Maimajuwa	103	100	102	105	105	515
Pashupati	147	148	148	143	143	729
Shantipur	92	93	90	92	93	460
Gajurmukhi	62	62	63	65	64	316
Chulachuli	100	101	100	99	100	500
Total	602	602	598	600	603	3005

Tanahu

VDC/Municipality	Age-Group					Total sample
	15-24	25-34	35-44	45-54	55-64	
Byas Municipality	138	136	138	138	139	689
Dulegouda	50	50	50	51	51	252
Abukhaireni	63	62	63	63	63	314
Bandipur	56	55	55	55	57	278
Chokchisapani	23	21	22	22	21	111
Bhimad	30	29	30	29	32	152
Bhirkot	27	25	26	25	26	129
Devghat	36	36	35	38	39	190
Ghasikuwa	36	37	38	39	36	190
Giring Sundhara	37	37	35	37	36	186
Satiswara	23	23	24	23	23	120
Keshabtar	29	27	27	25	25	140
Kotdarbar	32	31	31	31	31	160
Raipur	25	24	22	24	23	119
Total	605	593	596	600	602	3030

Lalitpur Sub-Metropolitan City

Wards	Age-Group					Total sample
	15-24	25-34	35-44	45-54	55-64	
Ward 1	22	22	21	22	22	109
Ward 2	32	31	34	32	31	160
Ward 3	33	32	35	32	31	163
Ward 4	33	34	33	34	34	168
Ward 5	20	20	21	20	20	101
Ward 6	20	19	19	19	20	97
Ward 7	19	19	20	20	20	98
Ward 8	23	24	22	22	22	113
Ward 9	24	25	26	25	25	125
Ward 10	17	16	16	16	18	83
Ward 11	12	12	13	14	14	65
Ward 12	18	17	17	17	18	87
Ward 13	20	21	20	20	20	101
Ward 14	34	36	36	36	35	177
Ward 15	34	35	35	35	34	173
Ward 16	17	15	15	17	17	81
Ward 17	21	22	20	20	20	103
Ward 18	22	22	21	21	20	106
Ward 19	19	19	19	18	18	93
Ward 20	20	20	20	20	20	100
Ward 21	13	12	12	14	14	65
Ward 22	27	27	25	26	27	132
Total	500	500	500	500	500	2500

DATA COLLECTION

DATA COLLECTION AND QUESTIONNAIRE DESIGN

The WHO STEPwise approach to surveillance had been adopted to develop this surveillance structure, with a focus on the core behavioral risk factors as outlined within the framework of STEP 1and 2.

One person of age between 15-64 years age was randomly selected in each household and was interviewed, until the quota was fulfilled. Data was collected through face-to-face interviews with the help of a structured questionnaire. Informed consent was taken from the respondents before each interview. The questionnaire was translated into *Nepali* and was translated back in to English in order to ensure consistency in phrasing of questions so that the responses would not generate a bias. Respondents did not receive any incentives. It was decided that offering incentives might tend to generate a bias as respondents in poor urban and rural areas tend to respond in the affirmative, assuming that such replies would be linked to rewards. Our previous experience with community interviews was encouraging.

A series of consultations were done to develop and refine the tool of assessment. The questionnaire was piloted and modified as necessary. It was ensured that all questions were valid and reliable. The questions and instructions were clear, non-ambiguous and fair. Almost all questions had been

designed to fix alternative responses for greater uniformity and simplicity for the analysis. A few questions were open-ended so as not to loose valuable information. These were subsequently coded.

GETTING THE QUALITY DATA

In order to ensure quality information the data collectors trainers and supervisors were selected from sampled districts considering male: female ratio of 1:1 for interviewers. Eight supervisors of posts like District Health Officer, District Public Health Officer, Medical Officer and Seniors Nurse in each District were selected. Similarly, 16 data collectors of posts like staff Nurse, Health Assistant, Auxillary Health Worker and Auxillary Nursing Midwife from local health institution were selected as data collectors for data collection.

The data collectors, data managers and supervisors were trained for the task allocated for them. (For the details of training see annexes 4)

The respondents were general people of 15-64 years age group from randomly selected house holds. Only one member in a house hold was randomly selected from each household as respondents. Once the quota for 250 members for specific age group were fulfilled in one cluster, the member of household belonging to the particular age group was excluded for the selection. The Quota of 125 male and 125 female of the respective age group was obtained in similar manner.

There were Show cards of glasses to quantify the alcohol content and pictures of fruit to quantify the numbers of serving. Supervisor had to attend 25% sample of interviews and should check the questionnaire filled by the interviewers. Ten percent of the questionnaire had to be re-interviewed and the result checked and compared to the interviewer result. The data collectors were closely supervised during data collection. The result was discussed to improve the quality of the information.

Questionnaire then was submitted to the Statistical assistant and s/he had again checked the reliability of the data and gave feedback to the supervisor.

The District's DHOs were responsible to overcome technical problem and s/he was a field decision maker for the NCD surveillance activity.

QUALITY ASSURANCE PROCEDURES

Different approaches were used to ensure consistency of interviewing and good quality data (i.e. random checks by field supervisor, co investigator and re-interviewing the important questions from 10 percent of the respondents by supervisor). In addition to these all double data entry of the whole data was done. A verification check on 5% of the sample was conducted after double entry. Measures were taken to attain complete reliability and to reduce variation to reasonable limits. To this end, clearly defined standardized procedures were developed; questions were asked in a standard manner and the wording and the order of the questions were decided well in advance. Particular attention was paid to reproducibility of similar information, when the question was asked more than once, so as not to generate a bias and to minimize variability of responses. Questions were asked in a neutral manner without showing a preference for a particular response; it was made sure that the respondents understand them in the same way. WHO Regional NCD advisor had attended the pilot testing of the survey instruments. Necessary amendments on the instruments were done after the pilot test in Imadol VDC of Lalitpur district. The data collectors, data managers and supervisors were trained for the task allocated for them. Questionnaire, survey guidelines were pilot tested. In order to maintain the quality in implementation procedures frequent meetings were held among the technical and organizing committees and necessary correction were done if any deviation in the standard was traced.

team for specific data management in district level. Data was edited, coded and double entered in sample districts health office by statistical assistants and medical recorders. Later on the data was again managed by trained expertise from SOLID NEPAL with senior statistician technical input. Data verification, validation and reliability were tested on certain variable such as age group, gender. Confidentiality of data was ensured.

DATA ANALYSIS

SPSS Ver 10 was used for final data processing because SPSS 10 was more advance software for statistical package for sociological studies. Data was analyzed in terms of different aspects of statistics such as percentage, mean, median and confidence limits in terms of mean and median. Cross tabulation of the tables was done as per the TOR.

CONFIDENTIALITY

A commitment to confidentiality was ensured in the consent forms and training exercise. In addition, data entry was done on the same day; questionnaires were taken from the field staff and stowed away safely on a daily basis. Computer systems were password protected.

ETHICAL CONSIDERATION

The study followed NHRC research Guidelines, which emphasizes on respect to study subjects, their justice, informed consent and control of possible risks to the subjects in the study.[7] Informed consent was obtained from each perspective study subject. There was no risk to the subject as there was no intervention in the study. Supervisors and enumerators were trained on making informed consent, step in interview and physical measurement measurements. If the subject was found having non communicable diseases or problem such as hypertension during our survey, s/he was referred to near by health institution with referral slips. The cases of hypertension, identified during the survey were referred for the needful management of their hypertension as they had for the fist time noticed the conditions during physical measurement. (For ethical clearance letter, see annex 7)

CONSTRAINTS AND LIMITATIONS

Followings were the constraints and limitations of the study.

Since the survey was done with selection of 3 districts devolution district purposively, the results can not be fully generalized and thus is not nationally representative.

During the survey, the capacity of the supervisors, data operators and interviewers were over estimated. There was difficulty in standardization in quantification of the issues like physical activities, diet consumption in relation to local context.

DATA MANAGEMENT

As 3 day training to District Statistical assistants and medical recorders was done by SOLID NEPAL team for specific data management in district level, Data was edited, coded and double entered in sample districts health office by statistical assistants and medical recorders. Later on the data was again managed by trained expertise from SOLID NEPAL with senior statistician technical input. Data verification, validation and reliability were tested on certain variable such as age group, gender. Confidentiality of data was ensured.

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CHAPTER TWO

MAJOR FINDINGS

DEMOGRAPHIC INFORMATION

The health of the world is generally improving, with fewer people dying from infectious diseases and therefore in many cases living long enough to develop chronic diseases, including unhealthy diet, physical inactivity and tobacco use are leading to people developing chronic diseases at younger ages in the increasingly urban environments of low and middle income countries [2].

Three districts were selected among WHO decentralized districts. Assuming the prevalence of NCDs ranging in between 10% to 30% in Rural and Urban districts, [4] with 95% confidence level, 3% precision, and design effect of 2.5 after allowance for incomplete responses and population distribution will need a minimum of 2500 to 3000 respondents in a district, or 8,500 individuals distributed proportionally in the nineteen VDCs and two municipalities were selected in which at least 250 individuals in each age groups were identified. The total population consisted of 2331 respondents from Lalitpur, 3000 from Illam and 2461 from Tanahu. The male: female ratio of the respondent was (89 male per 100 female).

RESPONSE RATE OF THE RESPONDENTS

Table 1: Response rate of the respondent

		15 --- 24	25 --- 34	35 --- 44	45 --- 54	55 --- 64	Total Sample (%)
Lalitpur	Male	94.4	92.8	84.4	95.6	77.6	89.0
	Female	101.2	100.8	99.6	112.8	73.2	97.5
	Total	97.8	96.8	92.0	104.2	75.4	93.2
Ilam	Male	88.0	90.3	92.3	95.7	105.3	94.3
	Female	112.3	115.7	105.7	102.3	92.3	105.7
	Total	100.2	103.0	99.0	99.0	98.8	100.0
Tanahu	Male	78.0	71.0	78.7	78.0	76.7	76.5
	Female	88.0	89.0	87.7	88.0	85.3	87.6
	Total	83.0	80.0	83.2	83.0	81.0	82.0
Total	Male	86.4	84.2	85.2	89.4	87.1	86.4
	Female	100.5	101.9	97.5	100.4	84.2	96.9
	Total	93.4	93.1	91.4	94.9	85.6	91.7

Out of total sample, the mean response rate was almost ninety two percent (91.7%). The response rate was highest among the female of 25-34 years of age group (115.7%) in Ilam and least among the male of 25-34 years age group (71.0%) in Tanahu district.

Table 2: Summary results with response proportions by districts male (N= 3674) Female (N= 4118)

Districts	Age Group	15 --- 24	25 --- 34	35 --- 44	45 --- 54	55 --- 64	Total Sample	Percentage
Lalitpur	Male	236	232	211	239	194	1112	14.27
	Female	253	252	249	282	183	1219	15.64
	Total	489	484	460	521	377	2331	29.92
Ilam	Male	264	271	277	287	316	1415	18.16
	Female	337	347	317	307	277	1585	20.34
	Total	601	618	594	594	593	3000	38.50
Tanahu	Male	234	213	236	234	230	1147	14.72
	Female	264	267	263	264	256	1314	16.86
	Total	498	480	499	498	486	2461	31.58
Total	Male	734	716	724	760	740	3674	47.15
	Female	854	866	829	853	716	4118	52.85
	Total	1588	1582	1553	1613	1456	7792	100.00

Least proportion of the respondents was from Lalitpur (29.92%) and highest proportion of the respondents was the female in Ilam (20.34). The male: female proportion of the respondents was 1.12:1.

AGE AND SEX WISE DISTRIBUTION OF THE RESPONDENTS

Table 3: Age and sex distribution of the respondents

Districts	Age Group	15 --- 24	25 --- 34	35 --- 44	45 --- 54	55 --- 64	Total Sample (%)
Lalitpur	Male	21.2	20.9	19.0	21.5	17.4	47.7
	Female	20.8	20.7	20.4	23.1	15.0	52.3
	Total	21.0	20.8	19.7	22.4	16.2	100.0
ilam	Male	18.7	19.2	19.6	20.3	22.3	47.2
	Female	21.3	21.9	20.0	19.4	17.5	52.8
	Total	20.0	20.6	19.8	19.8	19.8	100.0
Tanahu	Male	20.4	18.6	20.6	20.4	20.1	46.6
	Female	20.1	20.3	20.0	20.1	19.5	53.4
	Total	20.2	19.5	20.3	20.2	19.7	100.0
Total	Male	20.0	19.5	19.7	20.7	20.1	47.2
	Female	20.7	21.0	20.1	20.7	17.4	52.8
	Total	20.4	20.3	19.9	20.7	18.7	100.0

Of total 7792 samples, 2331 were from Lalitpur, 3000 were from Ilam and 2461 were from Tanahu respectively. Almost forty-seven percent (47.2%) of the samples were male and female comprised of rest fifty three percentage. Tanahun had the highest proportion of female respondents (53.4%). The male: female ratio of the respondent was (89 male per 100 female). However, there was almost uniform age wise distribution of respondents on each age group.

Table 4: District wise number of samples and sample selection respondents

Districts	Total Sample	Sample Selection
Illam	3003	3000
Tanahun	3030	2461
Lalitpur	2500	2331
Total	8533	7792

Although the total sample size was 8533 only 7792 respondents were selected in the survey. The response rate was 92%.

Table 5: Mean number of adults over 15 years in each household

Age Group	Mean	N	Std. Deviation
15 --- 24	3.84	1562	1.84
25 --- 34	3.15	1558	1.74
35 --- 44	3.40	1528	1.91
45 --- 54	4.14	1596	1.70
55 --- 64	4.27	1438	1.97
Total	3.76	7682	1.88

Table 4 showed the number of people above the age of 15 years in the house of each respondent. On an average, four people in each household were of age above 15 years.

YEARS SPENT FOR EDUCATION

Table 6: Mean number of years of education in population of the literate respondents

Age Group	Male (N= 3647)		Female (N= 4060)		Total (N=7707)	
	Mean	n	Mean	n	Mean	n
15 --- 24	9.8	702	9.23	756	9.51	1458
25 --- 34	9.4	645	8.47	600	8.93	1245
35 --- 44	8.8	558	8.09	327	8.54	885
45 --- 54	8.1	493	8.35	205	8.18	698
55 --- 64	8.0	301	6.96	70	7.84	371
Total	9.0	2699	8.63	1958	8.84	4657

Among the respondents who had been to school, the average number of years spent for education was found to be 8.84 years. The male respondents of age group 25-34 had spent highest number of years in school (9.4years). The male respondents had spent 9 years in school and female spent 8.63 years. This indicates that female spent fewer years in education than male. In this context 38.9 %(n= 3032) have responded as no schooling where as 25.6 %(n=941) male and 50.8 %(n=2091) female exist in the no schooling issues.

HIGHEST LEVEL OF EDUCATION ACHIEVED BY THE RESPONDENTS

Table 7: Highest Level of Education Achieved by the Survey respondents

Gender	Age	No Schooling		Primary Level		Secondary Level		Ten + 2 Level		Bachelors Level		Masters Level		Total
		N	%	N	%	N	%	N	%	N	%	N	%	N
Male	15 --- 24	29	3.95	90	12.26	424	57.77	132	17.98	49	6.68	6	0.82	730
	25 --- 34	68	9.50	145	20.25	345	48.18	85	11.87	53	7.40	20	2.79	716
	35 --- 44	156	21.55	172	23.76	260	35.91	68	9.39	39	5.39	21	2.90	716
	45 --- 54	260	34.21	189	24.87	225	29.61	50	6.58	23	3.03	6	0.79	753
	55 --- 64	428	57.84	127	17.16	116	15.68	34	4.59	17	2.30	10	1.35	732
	TOTAL	941	25.61	723	19.68	1370	37.29	369	10.04	181	4.93	63	1.71	3647
Female	15 --- 24	94	11.01	126	14.75	463	54.22	136	15.93	30	3.51	4	0.47	853
	25 --- 34	262	30.25	176	20.32	319	36.84	72	8.31	24	2.77	9	1.04	862
	35 --- 44	489	58.99	123	14.84	147	17.73	37	4.46	13	1.57	9	1.09	818
	45 --- 54	630	73.86	88	10.32	83	9.73	17	1.99	10	1.17	9	1.06	837
	55 --- 64	616	86.03	41	5.73	22	3.07	9	1.26	1	0.14	1	0.14	690
	TOTAL	2091	50.78	554	13.45	1034	25.11	271	6.58	78	1.89	32	0.78	4060
Both Sexes	15 --- 24	123	7.75	216	13.60	887	55.86	268	16.88	79	4.97	10	0.63	1583
	25 --- 34	330	20.86	321	20.29	664	41.97	157	9.92	77	4.87	29	1.83	1578
	35 --- 44	645	41.53	295	19.00	407	26.21	105	6.76	52	3.35	30	1.93	1534
	45 --- 54	890	55.18	277	17.17	308	19.09	67	4.15	33	2.05	15	0.93	1590
	55 --- 64	1044	71.70	168	11.54	138	9.48	43	2.95	18	1.24	11	0.76	1422
	TOTAL	3032	38.91	1277	16.39	2404	30.85	640	8.21	259	3.32	95	1.22	7707

The education level of respondents showed that almost 39% of them did not go to school, of which 25.61% were male and 50.78% were female. The number of female who did not go to school was twice the number of male who did not go to school. Less than one percentage of the female and almost two (1.71%) of male had completed masters level of education. Ten percentages of male and almost seven (6.5%) female had completed intermediate level of education These cumulated data showed that only 1.54% of the female and 16.68% of the male respondents had completed higher education(10+2, Bachelor and Masters level) making a M:F ratio of 10.83:1. This showed that there are a much gender differences in education opportunity.

EMPLOYMENT STATUS

Table 8: Proportion of Participants in Paid Employment and Those who were Unpaid

		Government Servant		Non-Gov Employee		Self employed		Un-paid	
	Age Group	n	%	n	%	n	%	n	%
Male	15 --- 24	9	1.23	47	6.40	124	16.89	552	75.20
	25 --- 34	56	7.82	68	9.50	291	40.64	299	41.76
	35 --- 44	72	9.94	58	8.01	289	39.92	301	41.57
	45 --- 54	53	6.97	31	4.08	278	36.58	393	51.71
	55 --- 64	25	3.38	20	2.70	164	22.16	528	71.35
	Total	215	5.85	224	6.10	1146	31.19	2073	56.42
Female	15 --- 24	5	0.59	18	2.11	87	10.19	740	86.65
	25 --- 34	13	1.50	27	3.12	160	18.48	660	76.21
	35 --- 44	16	1.93	25	3.02	130	15.68	654	78.89
	45 --- 54	11	1.29	10	1.17	111	13.01	717	84.06
	55 --- 64	2	0.28	4	0.56	55	7.68	652	91.06
	Total	47	1.14	84	2.04	543	13.19	3423	83.12
Both Sexes	15 --- 24	14	0.88	65	4.09	211	13.29	1292	81.36
	25 --- 34	69	4.36	95	6.01	451	28.51	959	60.62
	35 --- 44	88	5.67	83	5.34	419	26.98	955	61.49
	45 --- 54	64	3.97	41	2.54	389	24.12	1110	68.82
	55 --- 64	27	1.85	24	1.65	219	15.04	1180	81.04
	Total	262	3.36	308	3.95	1689	21.68	5496	70.53

Vast majority of the respondents were engaged in unpaid works (70.87%). Higher proportion of the female respondents was unpaid employee (83.55%) than male (56.67%). Similarly, only 3.38% and 3.97% of them were government and NGOs employee respectively. Almost 22% of the respondents were self employed. The proportion of the male who were government employed was almost six times greater than the female respondents. Similarly, higher proportion of female involved in unpaid work (83.55%) than male respondents (56.67%). Gender difference was observed in the employment status of the participants.

TOBACCO USE

Use of tobacco is one of the major risk factors for non-communicable diseases. Tobacco is used for smoking, chewing or snuff. Smoking causes substantially increased risk of mortality from lung cancer, upper aero-digestive cancer, several other cancers, heart diseases, stroke, chronic respiratory diseases and a range of other medical causes.

Smoking also harms others - there are definite health risks from passive smoking. Smoking during pregnancy adversely affects foetal development. Worldwide attributable fractions for tobacco use are about 12 percent for vascular diseases, 66 percent for cancers of trachea, bronchi and lungs and 38 percent for chronic respiratory diseases.

Among industrialised countries smoking is estimated to cause 90 percent of lung cancer in men and 70 percent of lung cancer among women. In addition, in these countries the attributable fractions are 56- 80 percent for chronic respiratory diseases and 22 percent of cardiovascular diseases. Worldwide, it is estimated that tobacco causes 8.8 percent of deaths i.e. 4.9 million. [10]

It is estimated that over 10.5 million people in Bangladesh who are malnourished could have adequate diet if money spent on tobacco were spent on food instead, saving the lives of 350 children under the age of five years each day. The poorest house hold in Bangladesh spends almost 10 times a much on tobacco as on education. In countries such as Bulgaria, Egypt, Indonesia, Myanmar and Nepal, household expenditure surveys show that low income households spend 5-15% of their disposable income on tobacco. [11]

This study has attempted to find out the prevalence of tobacco use in terms of consumers by age, gender, and types of the tobacco.

SMOKING STATUS OF THE RESPONDENTS

Table 9: Smoking status among total male respondents (n=3647)

Age Group	Daily		Non-Daily		Daily and Non-daily		Does not Smoke	
	n	%	n	%	n	%	n	%
15 --- 24	76	10.4	16	2.2	92	12.5	642	87.5
25 --- 34	148	20.7	14	2.0	162	22.6	554	77.4
35 --- 44	193	26.7	17	2.3	210	29.0	514	71.0
45 --- 54	263	34.6	13	1.7	276	36.3	484	63.7
55 --- 64	263	35.5	8	1.1	271	36.6	469	63.4
Total	943	25.7	68	1.9	1011	27.5	2663	72.5

Out of 3647 male respondents, almost three out of four male (72.48%) were nonsmokers, almost one in four (25.67%) smoked daily and less than two percentage (1.85 %) of them were occasional smokers. The NCD risk factor study in 2003 revealed that 77% (n=2030) of respondents did not smoked (2.52%) of them were occasional smokers and 20 percent smoke tobacco products daily. Daily smokers here are those people who smoke any tobacco product at least once a day.[4]

Table 10: Smoking status among total female respondents (n=4118)

Age Group	Daily		Non-Daily		Daily and Non-daily		Does not Smoke	
	n	%	n	%	n	%	n	%
15 --- 24	15	1.76		0	15	1.76	839	98.2
25 --- 34	52	6.00	4	0.47	56	6.47	810	93.5
35 --- 44	119	14.35	6	0.70	125	15.08	704	84.9
45 --- 54	188	22.04	3	0.35	191	22.39	662	77.6
55 --- 64	221	30.87	10	1.17	231	32.26	485	67.7
Total	595	14.45	23	2.69	618	15.01	3500	85.0

Higher proportion of female (84.99%) than male did not smoked. Fourteen percentages of female smokers smoked daily. Almost 3 % of the female were occasional smokers. Smokers were highest among 55-64 age group and least among 15-24 years group.

Table 11: Smoking status among total population (Both sexes)

Age Group	Daily		Non-Daily		Daily and Non-daily		Does not Smoke	
	n	%	n	%	n	%	n	%
15 --- 24	91	5.7	16	1.01	107	6.7	1481	93.3
25 --- 34	200	12.6	18	1.14	218	13.8	1364	86.2
35 --- 44	312	20.1	23	1.48	335	21.6	1218	78.4
45 --- 54	451	28.0	16	0.99	467	29.0	1146	71.0
55 --- 64	484	33.2	18	1.24	502	34.5	954	65.5
Total	1538	19.7	91	1.17	1629	20.9	6163	79.1

Of total respondents, 79.09% of them did not smoke. Almost 21% of them had ever smoked. Those who smoked daily comprised of 19.74% of respondents and less than two percentages of them smoked occasionally. According to NCD surveillance, 2.52 percent were occasional smokers and 20 percent of respondents smoke tobacco products daily.[4] The data showed that older respondents smoked more than younger respondents. Perhaps the prevalence of smoking among the people of older generation was greater than the prevalence of the smoking among the younger generation. The trend of smoking among young people is decreasing.

TOBACCO CONSUMPTION (SMOKE AND SMOKELESS)

Table 12: Percentage of tobacco users (daily and non daily), includes smoking and smokeless products among the total population

		Current Daily Tobacco users		Current Tobacco Users	
Male	15 --- 24	166	22.6	192	26.2
	25 --- 34	396	55.3	422	58.9
	35 --- 44	456	63.0	481	66.4
	45 --- 54	513	67.5	543	71.4
	55 --- 64	476	64.3	489	66.1
	Total	2007	54.6	2127	57.9
Female	15 --- 24	61	7.14	64	7.49
	25 --- 34	161	18.59	169	19.52
	35 --- 44	225	27.14	235	28.35
	45 --- 54	293	34.35	301	35.29
	55 --- 64	280	39.11	290	40.50
	Total	1020	24.77	1059	25.72
Both Sexes	15 --- 24	227	14.29	256	16.12
	25 --- 34	557	35.21	591	37.36
	35 --- 44	681	43.85	716	46.10
	45 --- 54	806	49.97	844	52.32
	55 --- 64	756	51.92	779	53.50
	Total	3027	38.85	3186	40.89

Out of total respondents, current tobacco users were almost 41 % and current daily tobacco users were almost 39% of the total respondents. Among the current daily smokers in the youngest age group, male smoked almost three times more than female and in the oldest age group, male smokers were almost twice more than female smokers. The male: female ratio of current tobacco users was (2.25:1) which suggests that male smoked 2.25 time more than female.

Table 13: Percentage of distribution of different type of smoking products among consumers

Gender	Age group	Cigarette	%	Hand-Rolled	%	Pipes	%	Cigars	%	Others	%	Total
Male	15 --- 24	66	7.52	2	0.23		0		0			68
	25 --- 34	125	14.24	10	1.14		0	1	0.11			136
	35 --- 44	151	17.20	28	3.19	2	0.23	1	0.11			182
	45 --- 54	206	23.46	37	4.21	1	0.11		0.00			244
	55 --- 64	168	19.13	85	9.68		0	1	0.11			254
	Total	716	81.55	162	18.45		0.34		0.34			878
Female	15 --- 24	12	2.09	1	0.17							13
	25 --- 34	42	7.32	9	1.57							51
	35 --- 44	89	15.51	26	4.53							115
	45 --- 54	128	22.30	50	8.71	2	0.35					180
	55 --- 64	146	25.44	61	10.63		0.00	1	0.17	1	0.17	209
	Total	417	72.65	147	25.61	5	0.87	4	0.70	1	0.17	574
Both sexes	15 --- 24	78	5.37	3	0.21	0		0		0		81
	25 --- 34	167	11.50	19	1.31	0		1	0.07	0		187
	35 --- 44	240	16.53	54	3.72	2	0.14	1	0.07	0		297
	45 --- 54	334	23.00	87	5.99	3	0.21	0	0.00	0		424
	55 --- 64	314	21.63	146	10.06	0	0.00	2	0.14	1	0.07	463
	Total	1133	78.03	309	21.28	5	0.34	4	0.28	1	0.07	1452

Cigarette comprises of major share of tobacco used among the smokers. Seventy eight percent of the users used cigarette, twenty one percent used hand rolled cigarette and less than two percent used pipes, cigar and others. Almost eighty two percent (81.55%) of the male and almost seventy three percent (72.65%) of the female smokers used cigarette. One in four female (25.61%) used hand rolled cigarettes.

CONSUMPTION OF MANUFACTURED CIGARETTES

Table 14: Percentage of smokers who use manufactured cigarettes

Age Group	Male		Female		Both Sexes	
	n	%	n	%	n	%
15 --- 24	66	71.74	12	80.00	78	72.90
25 --- 34	125	77.16	42	75.00	167	76.61
35 --- 44	151	71.90	89	71.20	240	71.64
45 --- 54	206	74.64	128	67.02	334	71.52
55 --- 64	168	61.99	146	63.20	314	62.55
Total	716	70.82	417	67.48	1133	69.55

Respondents using manufactured cigarette were 69.55% of total tobacco consumers. Almost seventy one percentage of male (70.82%) and 67.48% of female respondent used manufactured cigarette. More male respondents used manufactured cigarette than female respondents.

Table 15: Average number of manufactured cigarettes consumed per day

Sex	Age Group	Manufactured Cigarettes		
		Mean	CI LIMITS	
Male	15 --- 24	5.45	4.196	6.713
	25 --- 34	6.01	5.209	6.807
	35 --- 44	8.77	7.604	9.933
	45 --- 54	9.78	8.929	10.634
	55 --- 64	10.18	9.038	11.331
	Total	8.60	8.117	9.093
Female	15 --- 24	5.25	2.305	8.195
	25 --- 34	4.83	3.557	6.110
	35 --- 44	8.09	6.917	9.263
	45 --- 54	7.71	6.898	8.524
	55 --- 64	7.64	6.709	8.565
	Total	7.41	6.900	7.910
Both Sexes	15 --- 24	5.42	4.291	6.555
	25 --- 34	5.71	5.036	6.389
	35 --- 44	8.52	7.669	9.364
	45 --- 54	8.99	8.370	9.606
	55 --- 64	9.00	8.241	9.759
	Total	8.16	7.802	8.525

On average, 8.16 sticks manufactured cigarettes were consumed. Male (8.60; CI 8.117-9.093) significantly used more manufactured cigarette than female (7.41; CI 6.900-7.910). The consumption was found to be highest among male of 55-64 years age group.

AMOUNT OF CIGARETTE USED/CONSUMED

Table 16: Mean amount of tobacco used by daily smokers by type

Sex	Age Group	Manufactured Cigarettes	Hand rolled cigarettes	Pipes of Tobacco	Cigars	Others
		Mean	Mean	Mean	Mean	Mean
Male	15 --- 24	5.45	3.50			
	25 --- 34	6.01	8.30		10	
	35 --- 44	8.77	7.39	3	3	
	45 --- 54	9.78	8.89	35		
	55 --- 64	10.18	9.88		7	
	Total	8.60	9.05	13.67	6.75	
Female	15 --- 24	5.25	6.00			
	25 --- 34	4.83	5.22			
	35 --- 44	8.09	7.96			
	45 --- 54	7.71	8.60	7.50		
	55 --- 64	7.64	8.23		7.00	9.00
	Total	7.41	8.11	7.50	7.00	9.00
Both Sexes	15 --- 24	5.42	4.33			
	25 --- 34	5.71	6.84		10.00	
	35 --- 44	8.52	7.67	3.00	3.00	
	45 --- 54	8.99	8.72	16.67		
	55 --- 64	9.00	9.19		7.00	
	Total	8.16	8.60	11.20	6.80	

Mean amount of tobacco consumed by the tobacco users was calculated. On an average, the respondents (both sexes) used 8.16 sticks of manufactured cigarette , 8.60 sticks of hand rolled cigarettes and 11.2 pipes of tobacco, 6.80 pipes of cigar and 9 others (*which include kankad*) daily. Highest amount of consumption was found among the male of 55-64 years age group. Consumption of tobacco pipe and cigar was found among middle age groups and was mostly found among the 35-44 and 45-54 age groups. The male of 45-54 age group had the highest episodes of pipe consumption. The amount of consumption of manufactured cigarette increased with increase in age group. The consumption of pipes of tobacco, cigar and kankad was observed only among female of 45-54 years age group and 55-64 age group respectively.

AVERAGE AGE OF INITIATION AND DURATION OF SMOKING

Table 17: Average age of initiation and duration (in years), of smoking among current daily smokers

Sex	Age Group	Age first started smoking (Mean Age)	CI LIMITS		Year of Smoking (Mean duration)	CI LIMITS	
Male	15 --- 24	16.58	15.818	17.332	4.25	3.431	5.062
	25 --- 34	18.87	18.019	19.726	10.70	9.715	11.675
	35 --- 44	20.90	19.800	22.008	18.81	17.685	19.940
	45 --- 54	18.71	17.751	19.660	31.14	30.036	32.246
	55 --- 64	19.77	18.432	21.103	39.65	38.257	41.038
	Total	19.31	18.782	19.841	25.36	24.388	26.339
Female	15 --- 24	15.54	13.732	17.345	6.38	4.579	8.190
	25 --- 34	18.17	16.447	19.886	11.94	10.123	13.752
	35 --- 44	18.28	16.987	19.566	21.63	20.138	23.112
	45 --- 54	18.45	17.250	19.646	30.93	29.609	32.253
	55 --- 64	19.74	18.079	21.404	39.71	37.982	41.439
	Total	18.79	18.012	19.561	29.93	28.780	31.084
Total	15 --- 24	16.42	15.730	17.107	4.57	3.821	5.319
	25 --- 34	18.69	17.928	19.458	11.01	10.152	11.870
	35 --- 44	19.92	19.069	20.770	19.87	18.959	20.773
	45 --- 54	18.60	17.852	19.343	31.05	30.209	31.897
	55 --- 64	19.76	18.712	20.800	39.68	38.589	40.762
	Total	19.11	18.671	19.552	27.11	26.351	27.859

Duration of smoking is a significant factor for non communicable diseases. On average, by the age of 24 years, the respondents had already smoked for almost 5 years. The mean age for initiation of smoking was almost 19 years (CI 18.67-19.55) for both sexes. The respondents of 55-64 age group had started smoking at the age of 19.76 years and the respondents of the age group 15-24 had started at the age of 16.24 years. This showed that the mean age of initiation of smoking was found to be decreasing among the lower age groups. The younger people started smoking relatively at younger age. The male respondents of 55-64 age group had smoked for almost 40 years. This showed that there are high chances that a person continues to consume tobacco for many years after one initiates smoking and further, there are chances that young people will continue smoking for longer duration. Mean years of smoking was about 27 years (CI 26.35-27.85) for both sexes, almost 25 (CI; 24.388-26.339) years for male and almost 30 (CI; 28.78- 31.08) years for female. Female smoked for significantly longer time than male. Similarly, female started smoking at younger age.

EX-DAILY SMOKERS AND THE MEAN DURATION, SINCE THEY QUIT SMOKING DAILY

Table 18: Percentage of ex-daily smokers and the mean duration, in years, since they quitted smoking daily

Sex	Age Group	Ex-Daily Smokers		Time Since Cessation (Mean duration in Years)	CI LIMITS	
		n	%			
Male	15 --- 24	42	5.7	6.7	1.15	12.24
	25 --- 34	83	11.6	5	3.68	6.32
	35 --- 44	117	16.2	7.74	6.36	9.10
	45 --- 54	195	25.7	11.51	9.80	13.19
	55 --- 64	222	30.0	15.51	13.70	17.31
	Total	659	17.9	11.33	10.35	12.30
Female	15 --- 24	8	0.9	1.20	5.90	8.30
	25 --- 34	26	3.0	4.85	3.32	6.37
	35 --- 44	56	6.8	10.28	5.99	14.57
	45 --- 54	108	12.7	11.87	8.81	14.90
	55 --- 64	143	20.0	11.31	9.22	13.38
	Total	341	8.3	10.60	9.00	12.06
Both Sexes	15 --- 24	50	3.1	5.91	1.10	10.70
	25 --- 34	109	6.9	4.96	3.93	5.98
	35 --- 44	173	11.1	8.52	6.91	10.10
	45 --- 54	303	18.8	11.63	10.10	13.13
	55 --- 64	365	25.1	13.92	12.53	15.30
	Total	1000	12.8	11.09	10.27	11.90

The highest numbers of ex-daily smokers were of the age group 55-64 years (25%). On average ex-smokers had quitted smoking for about 11 years. The proportion of those who quitted smoking at the 25-34 years age was 7%, twice the proportion of respondents of 15-24 years age group. There are higher chances of quitting smoking at 15-24 years than in 25-34 years. The data showed that the chances of quitting smoking become higher with age. The peak age of quitting smoking was seen once a person reaches around 50s. This suggests that people quit smoking once they have some clinical manifestation(s) related to NCDs due to consumption of tobacco.

USE OF SMOKELESS TOBACCO

Table 19: Percentage by current users of smokeless tobacco and the proportion of them using it daily

Gender	Age Group	Current smokeless tobacco Use		Current smokeless tobacco use daily		Ex-daily smokeless tobacco users	
		n	%	n	%	n	%
Male	15 --- 24	100	8.96	90	8.46	40	9.73
	25 --- 34	260	23.30	248	23.31	85	20.68
	35 --- 44	271	24.28	263	24.72	113	27.49
	45 --- 54	267	23.92	250	23.50	92	22.38
	55 --- 64	218	19.53	213	20.02	81	19.71
	Total	1116	100.00	1064	100.00	411	100.00
Female	15 --- 24	49	11.11	46	10.82	24	11.11
	25 --- 34	113	25.62	109	25.65	45	20.83
	35 --- 44	110	24.94	106	24.94	52	24.07
	45 --- 54	110	24.94	105	24.71	54	25.00
	55 --- 64	59	13.38	59	13.88	41	18.98
	Total	441	100	425	100	216	100
Both Sexes	15 --- 24	149	9.57	136	9.13	64	10.21
	25 --- 34	373	23.96	357	23.98	130	20.73
	35 --- 44	381	24.47	369	24.78	165	26.32
	45 --- 54	377	24.21	355	23.84	146	23.29
	55 --- 64	277	17.79	272	18.27	122	19.46
	Total	1557	100	1489	100	627	100

A total of 1557 (20.05%) respondents out of 7765 respondents used smokeless tobacco products. Use of smokeless tobacco products was found to be highest among 25-34 years age group. Almost 96% of the current smokeless tobacco users used smokeless tobacco daily. Almost one in four daily users (24.78%) belongs to 35-44years age group. The highest percent of ex-smokeless tobacco users were of the age group 35-44 years. Smokeless tobacco is considered to be carcinogenic.

Table 20: Mean frequency of smokeless tobacco use, by smokeless tobacco users by type

	Age Group	Oral snuff	Nasal snuff	Chew tobacco	Others
Male	15 --- 24	6.54	3.00		
	25 --- 34	7.86	1.00	3.00	1.00
	35 --- 44	8.55	3.00	3.33	
	45 --- 54	8.74	5.33	3.00	3.00
	55 --- 64	8.41	3.00	2.00	
	Total	8.24	3.71	2.88	2.00
Female	15 --- 24	7.37			
	25 --- 34	7.34	2.67	1.00	
	35 --- 44	7.27		3.00	
	45 --- 54	7.48			
	55 --- 64	8.54			
	Total	7.53	2.67	2.00	
Both Sexes	15 --- 24	6.82	3.00		
	25 --- 34	7.70	2.25	2.33	1.00
	35 --- 44	8.18	3.00	3.25	
	45 --- 54	8.36	5.33	3.00	3.00
	55 --- 64	8.44	3.00	2.00	
	Total	8.03	3.40	2.70	2.00

The respondents who used smokeless tobacco products on average used 8 episodes of oral snuff, 3.40 episodes of nasal snuff, chew tobacco almost three times(2.70) and used others products two times. (Others products include *Jarda Pan – mixture of beetle and tobacco and Guthkha- the mixture of and tobacco and nuts).* Male users used oral snuff more frequently than female users. Male of 45-54 years of age group used 5.33 episodes of nasal snuff. Female of only 25-34 years of age group used nasal snuff. Similarly, female did not use any type of smokeless tobacco products like *gutkha and pan.* Only the female of 25-34 and 35-44 year of age group used chewing tobacco.

ALCOHOL CONSUMPTION

The relationship between alcohol consumption and health and social outcomes is complex and multidimensional. Average volume of alcohol consumed was linked to more than 60 disease conditions in a series of recent meta-analyses including liver cirrhosis, several cancers (lever, laryngeal, oesophageal and oropharyngeal cancers), injuries and haemorrhagic strokes.[12]

There is increasing evidence that patterns of drinking are relevant to health as well as volume of alcohol consumed , binge drinking being hazardous. Worldwide, alcohol causes 3.2 percent of death (1.8 million) and 4 percent of DALYs (58.3 million). Besides the direct effects of intoxication and addiction resulting in alcohol use disorders, alcohol is estimated to cause about 20-30 percent of each of the disorders namely oesophageal cancer, liver cancer, cirrhosis of the liver, homicide, epilepsy and motor vehicle accidents.[13]

This study had attempted to find out the consumption patterns and amount of consumption of the different alcoholic products. There were a large number of respondents who had had home made alcohol namely *Raksi, Jaand, Chyang and Tongba.* The alcoholic contents of the home made alcohol were standardised by government authorised Food and Beverages Research Centre (*see Annexes for detail)*

ALCOHOL CONSUMPTION STATUS

Table 21: Alcohol consumption status of the population

		Ever Consumed		Current Consumers (last 12 months)		Don't consume	
		n	%	n	%	n	%
Male	15 --- 24	259	35.3	250	34.1	484	65.9
	25 --- 34	390	54.5	388	54.2	328	45.8
	35 --- 44	412	56.9	400	55.2	324	44.8
	45 --- 54	443	58.3	434	57.1	326	42.9
	55 --- 64	394	53.2	379	51.2	361	48.8
	Total	1898	51.7	1851	50.4	1823	49.6
Female	15 --- 24	116	13.6	112	13.1	742	86.9
	25 --- 34	197	22.7	192	22.2	674	77.8
	35 --- 44	252	30.4	243	29.3	586	70.7
	45 --- 54	298	34.9	291	34.1	562	65.9
	55 --- 64	235	32.8	223	31.1	493	68.9
	Total	1098	26.7	1061	25.8	3057	74.2
Both Sexes	15 --- 24	375	23.6	362	22.8	1226	77.2
	25 --- 34	587	37.1	580	36.7	1002	63.3
	35 --- 44	664	42.8	643	41.4	910	58.6
	45 --- 54	741	45.9	725	44.9	888	55.1
	55 --- 64	629	43.2	602	41.3	854	58.7
	Total	2996	38.4	2912	37.4	4880	62.6

More than half (51.7%) of male and 26.7 % of female had ever consumed alcohol in their life time. on an average, 38% of the respondents (of both sexes) had consumed alcohol in last 12 months.

Only 49.6% of male and 74.2 % of the female respondents did not consume alcohol. The NCD risk factor report 2003 found that male respondents (63 percent) had consumed alcohol in their life time where as only one third (33 percent) of the female respondents were ever alcohol consumers.[4]

Larger proportion of male of 45-54 years of age group (57.1%) currently consumed alcohol and least consumption was recorded among the female of 15-24 years of age group. The number of consumers increased up to certain age level (peak 45-54 years) and decrease beyond that age.

A study done by CWIN revealed that the overall alcohol prevalence rate is 39 percent with 47.8 percent for males and 39 percent for females. More females in rural areas than in urban areas drink alcohol.[9]

QUANTITY OF DRINKING

Table 22: Mean number of standard drinks consumed by current drinkers during the last 7 days

	Age Group	Mean
Male	15 --- 24	2.0
	25 --- 34	2.7
	35 --- 44	3.8
	45 --- 54	4.5
	55 --- 64	4.6
	Total	3.7
Female	15 --- 24	1.1
	25 --- 34	1.5
	35 --- 44	1.7
	45 --- 54	2.0
	55 --- 64	2.6
	Total	1.9
Both Sexes	15 --- 24	1.7
	25 --- 34	2.3
	35 --- 44	3.1
	45 --- 54	3.5
	55 --- 64	3.8
	Total	3.1

On average, the respondents consumed 3.1 standard drinks per day. Male respondents on average consumed 3.7 standard drinks almost twice higher compared to female respondents who consumed 1.9 standard drinks per day. One standard drink was equivalent to one standard bottle of regular beer (285 ml) one single measure of spirit (30ml), one medium size glass of wine (120ml) and one measure of aperitif (60ml) with net alcohol content of a standard drink is 8-13 g of ethanol depending on the country.[14]

Table 23: Frequency of drinking episode in terms of day/ week or months

Sex	Age Group	>5 days/week		1-4 days/week		1-3 days/month		< 1/month		Total
		n	%	n	%	n	%	n	%	
Male	15 --- 24	46	18.40	56	22.40	56	22.40	92	36.80	250
	25 --- 34	123	31.87	101	26.17	86	22.28	76	19.69	386
	35 --- 44	180	45.00	89	22.25	81	20.25	50	12.50	400
	45 --- 54	217	50.47	94	21.86	64	14.88	55	12.79	430
	55 --- 64	208	55.32	73	19.41	57	15.16	38	10.11	376
	Total	774	42.02	413	22.42	344	18.68	311	16.88	1842
Female	15 --- 24	17	15.45	15	13.64	24	21.82	54	49.09	110
	25 --- 34	43	22.16	50	25.77	47	24.23	54	27.84	194
	35 --- 44	68	27.87	50	20.49	45	18.44	81	33.20	244
	45 --- 54	103	36.01	50	17.48	51	17.83	82	28.67	286
	55 --- 64	90	40.91	52	23.64	26	11.82	52	23.64	220
	Total	321	30.46	217	20.59	193	18.31	323	30.65	1054

Frequency of consumption of drinks per day/week/month was asked to the respondents. Among the alcohol consumers, thirty percent of the female and forty two percent of the male drank more than 5 episodes in a week. Almost 17 % of male and 31% of the female had less than one episode of the drinks in one month.

Table 24: Number of standard drinks consumed per day

	Age Group	Up to 1		2 --- 3		4 --- 5		6 +		Mean Standard Drink
		n	%	n	%	n	%	n	%	
Male	15 --- 24	74	29.6	86	34.4	49	19.6	31	12.4	3.27
	25 --- 34	61	15.7	121	31.2	93	24.0	89	22.9	4.62
	35 --- 44	43	10.8	127	31.8	99	24.8	112	28.0	4.99
	45 --- 54	44	10.1	123	28.3	105	24.2	143	32.9	5.80
	55 --- 64	37	9.8	93	24.5	103	27.2	129	34.0	5.76
	Total	259	14.0	550	29.7	449	24.3	504	27.2	5.03
Female	15 --- 24	54	48.2	31	27.7	10	8.9	9	8.0	3.75
	25 --- 34	85	44.3	55	28.6	28	14.6	12	6.3	2.68
	35 --- 44	79	32.5	86	35.4	40	16.5	23	9.5	2.82
	45 --- 54	75	25.8	98	33.7	66	22.7	30	10.3	3.41
	55 --- 64	59	26.5	81	36.3	39	17.5	38	17.0	3.45
	Total	352	33.2	351	33.1	183	17.2	112	10.6	3.19
Both Sexes	15 --- 24	128	35.4	117	32.3	59	16.3	40	11.0	3.41
	25 --- 34	146	25.2	176	30.3	121	20.9	101	17.4	3.98
	35 --- 44	122	19.0	213	33.1	139	21.6	135	21.0	4.18
	45 --- 54	119	16.4	221	30.5	171	23.6	173	23.9	4.86
	55 --- 64	96	15.9	174	28.9	142	23.6	167	27.7	4.90
	Total	611	21.0	901	30.9	632	21.7	616	21.2	4.36

The respondents were asked about consumption behavior. Male consumed 5.03 standard drinks per day and female consumed 3.19 standard drinks per day making an average of 4.36 standard drinks per day among the respondents who consumed it. The NCD risk factor report 2003 revealed that male had 5.32 standard drinks in average and female had 2.52 standard drinks on a single occasion.[5] Almost thirty percentage (29.7%) of the male used 2-3 standard drinks per day and 27.2 % of the male respondents consumed 6 or more than 6 standard drinks per day while, 31 % of the female consumed 2-3 standard drinks per day and 21.2 % of the female consumed 6 or more than 6 drinks per day. The highest percentage of male (34.4%) of 15-24 years of age group consumed 2-3 standard drinks per day and of female, (36.3 %) of the 55-64 years age group had highest consumption of standard drinks.

Table 25: Largest number of drinks consumed during a single occasion in the last 12 months

Sex	Age Group	Mean	N	CI LIMITS	
Male	15 --- 24	5.75	221	4.837	6.657
	25 --- 34	8.15	352	7.332	8.973
	35 --- 44	9.43	382	8.503	10.347
	45 --- 54	9.90	403	8.936	10.865
	55 --- 64	8.98	365	8.232	9.724
	Total	8.71	1723	8.308	9.112
Female	15 --- 24	6.10	101	2.197	10.011
	25 --- 34	4.15	180	3.427	4.864
	35 --- 44	4.20	221	3.748	4.645
	45 --- 54	5.17	267	4.332	6.001
	55 --- 64	5.19	206	4.393	5.929
	Total	4.86	975	4.340	5.370
Both Sexes	15 --- 24	5.86	322	4.497	7.221
	25 --- 34	6.80	532	6.182	7.412
	35 --- 44	7.51	603	6.871	8.147
	45 --- 54	8.01	670	7.324	8.704
	55 --- 64	7.61	571	7.022	8.162
	Total	7.32	2698	6.990	7.640

Responses to question 'what was the largest number of drinks you had consumed during single occasion in last 12 months' showed that male respondents had drank almost nine (8.70; CI 8.308-9.112) standard drinks in single occasion while female had drank almost five (4.86; CI 4.340-) standard drinks. This showed that there was significant difference in drinking habit for male and female. On average, almost 7 (7.31; CI 6.99-7.64) standard drinks were consumed by the respondents on single occasion. The highest number of drinks was observed among the female of 15-24 years age group and male of 45-54 years age group.

Table 26: Mean number of occasions for > 5 drinks in single occasion (male) n = 1240

Age Group	Mean
15 --- 24	53.29
25 --- 34	62.58
35 --- 44	72.30
45 — 54	90.37
55 --- 64	98.88
Total	79.23

During last 12 months, the male respondents had drunk more than 5 standard drinks for about 80 days in average. The respondent of 15-24 years age group had drunk more than five standard drinks for 53 days during last year and respondents of 55-64 age group had drunk more than five standard drinks for 99 days. There was gradual increase in mean number of days the respondents drank more than five standard drinks with the increase in age.

Table 27: Mean number of occasions for > 4 drinks in single occasion (female) n = 579

Age Group	Mean
15 --- 24	54.16
25 --- 34	66.94
35 --- 44	48.54
45 --- 54	59.70
55 --- 64	92.00
Total	64.87

During last year, the female respondents had drunk more than 4 standard drinks for about 64 days in average. The respondent of 35-44 years age group had drunk more than four standard drinks for almost 48 days during last year and respondents of 55-64 age group had drunk more than four standard drinks for 92 days.

DIET (FRUITS AND VEGETABLES)

Fruit and vegetables are important components of healthy diet. Accumulating evidence suggests that they could help to prevent major diseases such as cardiovascular diseases and certain cancers principally of the digestive systems.

In this study, the participants were asked about the intake pattern and amount of green vegetables and fruits. All kinds of fruit (fresh, canned, dried and frozen) eaten at mealtimes or for snacks were included in the fruit intake. Fruit juice was excluded. One serving of fruit is defined as one medium piece or 2 small pieces of fruit or one cup of diced pieces. Likewise, vegetable intake means all kinds of vegetables (raw, cooked, canned and frozen) eaten both at mealtimes and for snacks have to be counted. A serving of the vegetables is defined as half cup cooked vegetables or one cup salad vegetables. Added vegetables (garniture) in mixtures, such as in sandwiches, omelets, casseroles, stews, soups etc were excluded. [12]

DAILY CONSUMPTION OF FRUITS AND VEGETABLES

Table 28: Daily consumption of fruit and vegetables (N=5417)

Sex	Age group	No daily consumption of fruit or vegetable		Less than five servings of fruit and vegetables per day		Five or more fruit and vegetables per day	
		n	%	n	%	n	%
Male	15 --- 24	9	0.2	498	9.2	7	0.1
	25 --- 34	15	0.3	476	8.8	9	0.2
	35 --- 44	18	0.3	454	8.4	7	0.1
	45 --- 54	13	0.2	486	9.0	5	0.1
	55 --- 64	10	0.2	456	8.4	5	0.1
	Total	65	1.2	2370	43.8	33	0.6
Female	15 --- 24	20	0.4	632	11.7	7	0.1
	25 --- 34	23	0.4	619	11.4	5	0.1
	35 --- 44	15	0.3	559	10.3	3	0.1
	45 --- 54	28	0.5	582	10.7	0	0.0
	55 --- 64	13	0.2	442	8.2	1	0.0
	Total	99	1.8	2834	52.3	16	0.3
Both Sexes	15 --- 24	29	0.5	1130	20.9	14	0.3
	25 --- 34	38	0.7	1095	20.2	14	0.3
	35 --- 44	33	0.6	1013	18.7	10	0.2
	45 --- 54	41	0.8	1068	19.7	5	0.1
	55 --- 64	23	0.4	898	16.6	6	0.1
	Total	164	3.0	5204	96.1	49	0.9

One serving of fruit was considered equivalent to one medium piece of fruit like banana, orange apple etc.; half a cup of cooked, chopped or canned fruit or half a cup of juice. Similarly, one servings of vegetable was considered equivalent to one cup of raw green leafy vegetables, half a cup of other vegetables cooked or chopped raw or half a cup of vegetable juice.

The majority of the respondents (96.1%) consumed less than five servings of fruits or vegetables per day. Almost one (0.9%) percent of the respondents had consumed more than five servings of the

fruits and vegetables in a day. Three percent of the respondents did not consume any vegetables or fruits servings daily. It clearly showed that fruits and vegetables consumption pattern of the study population was not enough to prevent NCDs.

DAILY SERVINGS OF FRUITS

Table 29: Daily number of servings of fruits

	Age Group	Mean	CI LIMITS	
Male	15 --- 24	2.68	2.55	2.82
	25 --- 34	2.57	2.42	2.71
	35 --- 44	2.63	2.49	2.78
	45 --- 54	2.38	2.25	2.51
	55 --- 64	2.35	2.22	2.48
	Total	2.53	2.47	2.59
Female	15 --- 24	2.32	2.23	2.43
	25 --- 34	2.22	2.12	2.32
	35 --- 44	2.14	2.04	2.24
	45 --- 54	1.94	1.86	2.03
	55 --- 64	2.02	1.91	2.13
	Total	2.14	2.10	2.19
Both Sexes	15 --- 24	2.49	2.41	2.58
	25 --- 34	2.38	2.29	2.46
	35 --- 44	2.37	2.28	2.46
	45 --- 54	2.15	2.07	2.22
	55 --- 64	2.19	2.11	2.28
	Total	2.32	2.29	2.36

Fruit consumption habit had been asked. The male respondents consumed 2.53 (CI 2.47-2.59) servings of fruits and female respondents consumed 2.14 (2.10-2.19) servings of fruits per day with average of 2.32 (CI 2.29-2.36) servings of fruits per day which means female consume less fruits than male. There was significant difference between the mean servings among male and female. Least number of serving was found among the female of 45-54 years age group.

Table30: Daily number of servings of vegetables

	Age Group	Mean	N	CI LIMITS	
Male	15 --- 24	2.57	727	2.46	2.69
	25 --- 34	2.55	708	2.43	2.67
	35 --- 44	2.62	720	2.48	2.74
	45 --- 54	2.59	752	2.48	2.71
	55 --- 64	2.54	731	2.41	2.64
	Total	2.57	3638	2.52	2.62
Female	15 --- 24	2.46	847	2.35	2.57
	25 --- 34	2.52	861	2.36	2.67
	35 --- 44	2.45	821	2.34	2.56
	45 --- 54	2.37	844	2.26	2.47
	55 --- 64	2.28	704	2.17	2.41
	Total	2.42	4077	2.37	2.49
Both Sexes	15 --- 24	2.51	1574	2.43	2.59
	25 --- 34	2.54	1569	2.43	2.63
	35 --- 44	2.53	1541	2.45	2.62
	45 --- 54	2.48	1596	2.39	2.55
	55 --- 64	2.41	1435	2.33	2.49
	Total	2.49	7715	2.47	2.53

Consumption of green vegetables is beneficial to patients with non communicable diseases as well as to prevent NCDs. It increases roughage and fibers in food and they have anti oxidant property. The numbers of daily servings of vegetable was found to be 2.49 (CI 2.45-2.53). The number of servings varied significantly between male and female which was 2.57 (CI 2.521-2.626) for male and 2.42 (CI 2.368-2.478) for female respectively. This showed that female consumed less vegetable than male. The NCD risk factor report 2003 showed that most of the respondents had consumed only one serving followed by 2 to 4 serving per day. Only a very few participants had responded that they had consumed five or more than five servings per day. [4]

TYPE OF OIL USED FOR FOOD PREPARATION

Table 31: Type of oil or fat most often used for meal preparation in households

Age Group	Vegetable oil		Lard or suet		Butter of ghee		Margarine		Other	
	n	%	n	%	n	%	n	%	n	%
15 --- 24	1542	97.10	3	0.19	26	1.64	2	0.13	2	0.13
25 --- 34	1544	97.60	6	0.38	11	0.70	1	0.06	1	0.06
35 --- 44	1509	97.17	1	0.06	24	1.55	0	0.00	1	0.06
45 --- 54	1569	97.27	0	0.00	18	1.12	1	0.06	1	0.06
55 --- 64	1410	96.84	0	0.00	24	1.65	2	0.14	2	0.14
Total	7574	97.20	10	0.13	103	1.32	6	0.08	7	0.09

Use of vegetable oil during meal preparation was found to be universal (97.20%). Use of lard or lust, butter or ghee, margarine and other comprise of less than 2 % of the oil like substances used during meal preparation. Use of margarine and lard or lust was found to be les than 0.4% in each age group. The NCD risk factor survey 2003 revealed simmlar findings. Of the total, 97 percent of male and 98.6 percent of female responded that they use vegetable oil while preparing meals.[4]

PHYSICAL ACTIVITY

There is no internationally agreed definition or measure of physical activity. Therefore, a number of direct and indirect data sources and a range of survey instruments and methodologies were used to estimate activity levels. There are four main domains of peoples' day to day lives: at work, for transport (e.g. walking or cycling to work), in domestic duties (Housework or gathering fuel) or in leisure time (e.g. sports or other recreational activities). Most data were available for leisure time activity, with fewer direct data available on occupational activity and activity relating to transport and domestic tasks. Almost all report estimates the physical inactivity among young people aged 15 year and above. The global estimates for physical inactivity among adults is 17 percent ranging from 11 to 24 percent across sub regions. Estimates for prevalence of some but insufficient activity (< 2.5 hours per week of moderate activity) ranged from 31 to 51 percent with a global average of 41 percent. [10]

In this study, WHO standard questionnaire were asked to cover all four domains of physical activity. Information were analysed and interpreted with the WHO definitions

TIME SPENT ON PHYSICAL ACTIVITIES

Table 32: Median time of total physical activity per day

	Age Group	N	Median
Male	15 --- 24	60	450
	25 --- 34	71	450
	35 --- 44	45	450
	45 --- 54	65	750
	55 --- 64	42	750
	Total	283	450
female	15 --- 24	54	450
	25 --- 34	54	450
	35 --- 44	51	510
	45 --- 54	70	450
	55 --- 64	50	450
	Total	279	450
Both sexes	Age Group	N	Median
	15 --- 24	114	450
	25 --- 34	125	450
	35 --- 44	96	450
	45 --- 54	135	450
	55 --- 64	92	450
	Total	562	450

People who worked mostly sitting or standing, with walking for no more than 10 minutes at a time were categorised as physically inactive. Participation of respondents in physical activities was asked. The median time spent on the physical activities was calculated. In average, the participants (of 562) who participate in physical activities out of all respondents had spent 450 minutes (7.5 hours) in the

physical activities. More male than female participated in physical activities. The highest number of male belonging to 25-34 years age group (71) had participated in physical activities.

Table 33: Median time spent per day in minutes, in work, transport and recreation-related physical activity

		Work		Transport		Recreation	
	Age Group	Median	n	Median	n	Median	n
Male	15 --- 24	475	20	450	40	397.5	8
	25 --- 34	481	21	450	52	450	6
	35 --- 44	735	7	450	39	420	1
	45 --- 54	750	17	465	53	2430	1
	55 --- 64	450	11	750	32		
	Total	491	76	450	216	435	16
Female	15 --- 24	600	14	450	42	450	1
	25 --- 34	390	14	450	43		
	35 --- 44	895	10	450	45	210	1
	45 --- 54	740	13	450	61		
	55 --- 64	390	5	450	45		
	Total	450	56	450	236	330	2
Both sexes	15 --- 24	475	34	450	82	405	9
	25 --- 34	450	35	450	95	450	6
	35 --- 44	750	17	450	84	315	2
	45 --- 54	750	30	450	114	2430	1
	55 --- 64	420	16	450	77		
	Total	480.5	132	450	452	435	18

It was observed that very few participants had participated in the physical activities regarding work, transport and recreational activities. Only 132 people had participated in work and 452 in transportation and 18 in recreational activities. It was found that half of the respondents who worked had spent less than 480 minutes (8 hours) per day in work. Similarly, half of the respondents spent 450 minutes (7.5 hours) per day in transportation and more than half of the 18 participants spent 435 minutes (7.25 hours) per day in recreation. This showed that the population who spent time on physical activities is found to be very limited in number. It could perhaps be because of many people did not prioritize and set time for separate physical activities and allocated time beyond the normal works they did. It was also observed in the field that most of the respondents did not care about the time they spent. Some of them did not have watch and they were following sunrise and sunset.

Table 34: Percentage of Participants classified as doing no work-transport or recreation-related physical activity (n=7792)

	Age Group	Work		Transport		Recreation	
		n	%				
Male	15 --- 24	408	55.6	70	9.5	560	76.3
	25 --- 34	285	39.8	92	12.8	596	83.2
	35 --- 44	292	40.3	81	11.2	614	84.8
	45 --- 54	312	41.1	81	10.7	658	86.6
	55 --- 64	386	52.2	99	13.4	659	89.1
	Total	1683	45.8	423	11.5	3087	84.0
Female	15 --- 24	494	57.8	159	18.6	727	85.1
	25 --- 34	446	51.5	200	23.1	755	87.2
	35 --- 44	422	50.9	218	26.3	733	88.4
	45 --- 54	497	58.3	227	26.6	760	89.1
	55 --- 64	470	65.6	258	36.0	638	89.1
	Total	2329	56.6	1062	25.8	3613	87.7
Both Sexes	15 --- 24	902	56.8	229	14.4	1287	81.0
	25 --- 34	731	46.2	292	18.5	1351	85.4
	35 --- 44	714	46.0	299	19.3	1347	86.7
	45 --- 54	809	50.2	308	19.1	1418	87.9
	55 --- 64	856	58.8	357	24.5	1297	89.1
	Total	4012	51.5	1485	19.1	6700	86.0

All respondents were asked if they had participated in the work, transport and recreation related activities. The data revealed that the most of the respondents did not participate in the physical activities. More than half of the respondents (51.5%) did not work, almost one in five respondents (19.1%) did not involve in transport related activities and 86% of them did not involve in recreation related activities. The higher prevalence of physical inactivity was observed among older age group. There are threats or risks of acquiring of non communicable diseases because of less involvement in physical activities.

HISTORY OF BLOOD PRESURE AND DIABETES

HISTORY OF RAISED BLOOD PRESSURE

Hypertension has been considered as secondary risk factor associated with many non communicable diseases especially with cardiovascular diseases and diabetes mellitus. It has been projected that DM accounted for 30% and 2% of total deaths and in all age respectively and 10% and 1% of DALYs lost respectively world wide in all age groups in the year 2005. [10]

The respondents were asked and investigated on the matters of hypertension and diabetes.

Table 35: Raised blood pressure diagnosed by doctor or health worker in last 12 months

Age Group	Male		Female		Total	
	N	Percent	N	Percent	N	Percent
15 --- 24	12	1.64	13	1.52	25	1.58
25 --- 34	27	3.78	26	3.00	53	3.35
35 --- 44	48	6.64	45	5.44	93	6.00
45 --- 54	67	8.83	120	14.13	187	11.63
55 --- 64	107	14.50	88	12.36	195	13.45
Total	261	7.12	292	7.11	553	7.11

Only 261 i.e. (7.1%) of the male and 292 (7.1 %) of the female were diagnosed to be hypertensive by doctor or health worker during last 12 months. More than fourteen percentage (14.5 %) of the male and 13.45 % of the female were found to be hypertensive among the 55-64 years age group while only 1.64% of male and 1.58% of female were found to be hypertensive among the 15-24 years age group. This clearly showed that the risk of getting hypertension increased with age.

CURRENT TREATMENT STATUS OF BLOOD PRESSURE

Table 36: Currently taking blood pressure drugs prescribed by doctor or health worker

Age Group	Male		Female		Total	
	N	Percent	N	Percent	N	Percent
15 --- 24	4	33.3	2	15.4	6	24.0
25 --- 34	4	14.8	11	42.3	15	28.3
35 --- 44	20	41.7	21	46.7	41	44.1
45 --- 54	36	53.7	55	45.8	91	48.7
55 --- 64	71	66.4	45	51.1	116	59.5
Total	135	51.7	134	45.9	269	48.6

Of total 269 hypertensive respondents currently under treatment prescribed by doctor or health worker, 51.7 % are male and 45.9% are female were currently taking drugs and 48.3% of the male and 54.1% of the female were not taking drugs currently.. This showed that almost half of the diagnosed the hypertensive persons were not taking drugs for hypertension prescribed by health worker and more male than female went for treatment of the condition to a doctor or health worker(see table 36 and 37).

Table 37: Percentage of population with raised blood pressure who received lifestyle advice

	Male		Female		Total	
	N	Percent	N	Percent	N	Percent
Advice to lose weight						
15 --- 24	4	33.3	3	23.1	7	28.0
25 --- 34	7	25.9	7	26.9	14	26.4
35 --- 44	26	54.2	18	40.0	44	47.3
45 --- 54	37	55.2	61	50.8	98	52.4
55 --- 64	67	62.6	40	45.5	107	54.9
Total	141	54.0	129	44.2	270	48.8
Advice or treatment to stop smoking						
15 --- 24	2	16.7		0.0	2	8.0
25 --- 34	3	11.1	5	19.2	8	15.1
35 --- 44	17	35.4	12	26.7	29	31.2
45 --- 54	37	55.2	37	30.8	74	39.6
55 --- 64	63	58.9	28	31.8	91	46.7
Total	122	46.7	82	28.1	204	36.9
Advice to start or do more exercise						
15 --- 24	4	33.3	3	23.1	7	28.0
25 --- 34	9	33.3	11	42.3	20	37.7
35 --- 44	31	64.6	23	51.1	54	58.1
45 --- 54	45	67.2	64	53.3	109	58.3
55 --- 64	68	63.6	46	52.3	114	58.5
Total	157	60.2	147	50.3	304	55.0

The respondents who were diagnosed to be hypertensive were further asked if they were advised for life style advice (to lose weight, to stop smoking and to start more exercise). Fifty five percentage of the respondents diagnosed to have hypertension had got the advice for doing more exercise, thirty six percentage of them were advice to quit smoking and forty nine percentage were advised to lose weight. This suggested that not all the people who develop hypertension get the appropriate life style advices from doctors or health worker.

Table 38: Seen traditional healer in the last 12 months

Age Group	Male				Female				Total			
	n	Percent	95% CI Limits		n	Percent	95% CI		n	Percent	95% CI	
15 --- 24					1	8.33	1.733	2.100	1	4.35	1.866	2.047
25 --- 34	1	4.55	1.860	2.049	3	12.50	1.732	2.018	4	8.70	1.828	1.998
35 --- 44	1	2.44	1.926	2.025	2	4.76	1.885	2.020	3	3.61	1.923	2.005
45 --- 54	4	7.02	1.861	1.998	11	10.09	1.842	1.957	15	9.04	1.866	1.954
55 --- 64	2	1.94	1.953	2.008	6	7.23	1.871	1.985	8	4.30	1.928	1.986
Total	8	3.42	1.942	1.989	23	8.52	1.881	1.948	31	6.15	1.917	1.960

Almost six percentages of the respondents who were diagnosed to be hypertensive in last 12 months had visited the traditional healer. The female (8.52%) with hypertensive condition visited traditional healers more than male (3.42%) with hypertensive condition. This showed that traditional healer still plays an important role for a physical sickness such as hypertension.

Table 39: Currently taking herbal or traditional remedy for high blood pressure

Age Group	Male		Female		Total	
	N	Percent	N	Percent	N	Percent
15 --- 24	1	8.3	2	15.4	3	12.0
25 --- 34	1	3.7	5	19.2	6	11.3
35 --- 44		0.0	1	2.2	1	1.1
45 --- 54	7	10.4	11	9.2	18	9.6
55 --- 64	6	5.6	7	8.0	13	6.7
Total	15	5.7	26	8.9	41	7.4

More female (8.9%) than male (5.7%) with hypertensive condition were using herbal treatment. On average, 5.7 % of the respondents were using herbal remedies for the hypertension. The highest proportion of female of 45-54 years age group were using the herbal treatment and observed to be least among the female of 35-44 years age group.

HISTORY OF DABETES DIAGNOSIS AND TREATMENT

History of diabetes and its treatment was asked to respondents and the urine sugar investigation was done to find out diabetes status of the respondents. Following results were obtained.

Table 40: Percentage of Persons with elevated blood sugar as told by professional within last 12 months (n= 700), on insulin or oral drug treatment

Age Group	Male		Female		Total	
	N	Percent	N	Percent	N	Percent
15 --- 24		0.0		0.0	0	0.0
25 --- 34	1	3.0	1	1.9	2	2.3
35 --- 44	7	12.5	8	9.6	15	10.8
45 --- 54	29	29.0	42	32.6	71	31.0
55 --- 64	41	35.3	26	29.9	67	33.0
Total	78	24.3	77	20.3	155	22.1
On insulin						
15 --- 24						
25 --- 34						
35 --- 44		0	3	37.5	3	20.0
45 --- 54	3	10.3	3	7.1	6	8.5
55 --- 64	9	22.0	4	15.4	13	19.4
Total	12	15.4	10	13.0	22	14.2
On oral drugs						
15 --- 24						
25 --- 34						
35 --- 44	2	28.6	6	75.0	8	53.33
45 --- 54	20	69.0	32	76.2	52	73.24
55 --- 64	33	80.5	21	80.8	54	80.60
Total	55	70.5	59	76.6	114	73.55

Respondents were asked if they had seen the health professionals and have been diagnosed as having elevated blood sugar in the last 12 months. Out of the 700 respondents who had seen health workers for last 12 months, 155 respondents had elevated sugar level.(24.3%) male and 20.3% female and (22%) of both sexes were found to have elevated sugar level. The NCD risk factor report 2003 study revealed that 16 percent of men and 21.6 percent of women had history of blood sugar measurement in the last 12 months. Of them, 4.3 percent men and 3.5 percent of women were diagnosed cases of diabetes. In total, there were 3.8 percent diabetic cases among the respondents. [4]

Thirty five percent of the male respondents and thirty percent of the female respondents of the 55-64 year of age group had developed elevated sugar level in last 12 months. The risk of appearance of elevated sugar level among the respondents increased with the age. Out of those who were diagnosed having elevated sugar level, 14.2% were taking insulin and 73.55% of them were on oral drugs. Rests (12.25%) of them were neither using oral drugs nor insulin. Almost 81 % of the diabetics of 55-64 years of age were on oral drug.

TYPE OF TREATMENT

Table 41: Advice to lose weight, to stop smoking and to start or to do more exercise

Age Group	Male		Female		Total	
	N	Percent	N	Percent	N	Percent
Advice to start or do more exercise						
15 --- 24						
25 --- 34						
35 --- 44	6	75.0	4	50.0	10	66.7
45 --- 54	22	75.9	33	78.6	55	76.4
55 --- 64	32	80.0	17	65.4	49	74.2
Total	60	77.9	54	70.1	114	74.0
Advice or treatment to stop smoking						
15 --- 24						
25 --- 34						
35 --- 44	6	85.7	3	37.5	9	60.0
45 --- 54	18	62.1	14	33.3	32	45.1
55 --- 64	27	65.9	17	65.4	44	65.7
Total	51	65.4	34	44.2	85	54.8
Advice or treatment to lose weight						
15 --- 24						
25 --- 34						
35 --- 44	6	85.7	4	50.0	10	66.7
45 --- 54	22	75.9	33	78.6	55	77.5
55 --- 64	32	78.0	17	65.4	49	73.1
Total	60	76.9	54	70.1	114	73.5

The study found out that almost 74 % of the respondents were advice to lose weight, 54 % to quit smoking and for 74 % to start more exercises. More male than female got advices to have changed the life style behaviors. The advice given by physician to male to quit smoking was found to be significantly different from female. Less number of female gets advices than male.

Table 42: Percentage of population with diabetes who went to tradiiional healers and for traditional treatment

Age Group	Male		Female		Total	
	N	Percent	N	Percent	N	Percent
Seen traditional healer for diabetes						
15 --- 24						
25 --- 34						
35 --- 44			2	28.6	2	13.33
45 --- 54			4	9.3	4	5.63
55 --- 64	3	7.3	2	7.7	5	7.69
Total	3	3.8	8	10.4	11	7.19
Currently taking herbal/traditional remedies for diabetes						
15 --- 24						
25 --- 34						
35 --- 44	2	25.0	1	14.29	3.0	20.00
45 --- 54	3	10.3	9	21.43	12.0	16.90
55 --- 64	5	12.8	3	11.54	8.0	12.31
Total	10	13.0	13	17.11	23.0	15.03

It was found that more number of female went to traditional healers for treatment than male did. On average, 7.19 % of the diabetic respondents went to traditional healer. Similarly, more numbers of female were on herbal and traditional remedies for treatment than male. Female of 45-55 years of age had used traditional remedies for diabetes.

STEP 2: PHYSICAL MEASUREMENTS

According to WHO STEP wise approach, physical measurements of the respondents were taken. In this study, height, weight, BMI, blood pressure and waist circumference were measured using the WHO standardised machines sent by WHO, SEARO Office. Physical measurement is one of the major variables to identify the risk factors for non-communicable diseases like diabetes mellitus, stroke and ischemic heart diseases. According to the WHO world health report 2002, approximately 58 percent of diabetes mellitus, 21 percent of ischemic heart diseases and 8-42 percent of certain cancers were attributable to BMI above 21kg/m^2. The study had also calculated the body mass index (BMI) using the formula of weight in kg divided by square of height in metre. According to the calculation of BMI globally, adult mean BMI levels of 20-23 Kg/m^2 are found in Africa and Asia, while levels are 25-27 Kg/m^2 across North America and Europe. [10]. According to WHO definitions, respondents were classified in to underweight (< 18.5), normal weight (18.5-24.9), Grade 1 overweight(25-29.9), Grade 2 overweight(30-39.9), Grade 3 overweight (≥ 40.0).

MEASUREMENTS OF HEIGHT, WEIGHT AND BODY MASS INDEX

Table 43: Physical Measurements: Heights in meters, weight, and body mass index (excluding pregnant women)

Age Group	Male				Female				Total			
	N	Mean	95% CI		N	Mean	95% CI		N	Mean	95% CI	
Physical Measurements: Heights in meters												
15 --- 24	730	1.609	1.603	1.615	850	1.50	1.497	1.506	1580	1.55	1.547	1.555
25 --- 34	714	1.634	1.595	1.673	862	1.52	1.488	1.554	1576	1.57	1.547	1.598
35 --- 44	723	1.603	1.597	1.609	822	1.50	1.499	1.508	1545	1.55	1.546	1.555
45 --- 54	756	1.591	1.586	1.597	850	1.49	1.488	1.496	1606	1.54	1.535	1.543
55 --- 64	737	1.580	1.576	1.586	711	1.48	1.471	1.481	1448	1.53	1.525	1.534
Total	3660	1.603	1.596	1.612	4095	1.50	1.493	1.507	7755	1.55	1.543	1.554
Physical Measurements: Weight in Kgs												
15 --- 24	730	56.7	55.6	57.1	849	49.3	48.2	50.3	1579	52.7	51.8	53.2
25 --- 34	714	59.4	58.6	60.2	862	52.5	50.3	54.7	1576	55.6	54.4	56.9
35 --- 44	724	59.2	58.5	60.0	822	51.4	50.7	52.0	1546	55.0	54.5	55.6
45 --- 54	757	58.1	57.3	58.8	848	51.1	50.0	52.3	1605	54.4	53.7	55.1
55 --- 64	735	56.8	56.0	57.5	706	47.8	46.7	49.0	1441	52.4	51.6	53.1
Total	3660	58.0	57.6	58.3	4087	50.5	49.9	51.1	7747	54.1	53.6	54.4
Physical Measurements: BMI (Kg/m^2)												
15 --- 24	727	21.7	21.5	21.9	849	21.8	21.4	22.3	1576	21.8	21.5	22.0
25 --- 34	714	22.7	22.5	22.9	861	22.7	22.1	23.4	1575	22.7	22.4	23.1
35 --- 44	723	23.0	22.8	23.2	820	22.7	22.4	22.9	1543	22.8	22.7	23.0
45 --- 54	754	22.9	22.6	23.1	848	22.9	22.4	23.5	1602	22.9	22.6	23.2
55 --- 64	732	22.6	22.4	22.8	706	21.9	21.4	22.5	1438	22.3	22.0	22.6
Total	3650	22.6	22.5	22.7	4084	22.4	22.2	22.7	7734	22.5	22.4	22.6

The height, weight and BMI of 7792 respondents were measured and calculated. Mean height for male (n=3660) was 1.603 meters and 1.50 meters for female (n=4095). The respondents of older age groups were found to have less height than the younger age groups. Mean weight for the respondent (n=7747) was calculated to be 54 Kgs (CI 53.6-54.4 Kgs) and 58 Kgs for male and 50.5 Kgs for female. Significant difference was observed in between the weight of male and female. A total of 7734 respondents were considered for calculation of BMI. The mean BMI ranged from 21.7 -23 Kg/m² among male and 21.8-22.9 Kg/m² among female with mean BMI of 22.6 Kg/m² among male and 22.4 Kg/m² among female.

Table 44: Percentage with abnormal BMI (under weight and over weight)

Age Group	Male					Female					Both Sexes				
	N	Percent	Mean	95% CI		N	Percent	Mean	95% CI		N	Percent	Mean	95% CI	
Physical Measurements: BMI (Distribution under weight(Less than 18.5 Kg/m2)															
15 --- 24	120	16.5	0.17	0.14	0.19	103	12.1	0.12	0.10	0.14	223	14.1	0.14	0.12	0.16
25 --- 34	58	8.1	0.08	0.06	0.10	66	7.7	0.08	0.06	0.09	124	7.9	0.08	0.07	0.09
35 --- 44	48	6.6	0.07	0.05	0.09	73	8.9	0.09	0.07	0.11	121	7.8	0.08	0.07	0.09
45 --- 54	67	8.9	0.09	0.07	0.11	72	8.5	0.09	0.07	0.10	139	8.7	0.09	0.07	0.10
55 --- 64	81	11.1	0.11	0.09	0.13	115	16.3	0.16	0.14	0.19	196	13.6	0.14	0.12	0.15
Total	374	10.2	0.10	0.09	0.11	429	10.5	0.11	0.10	0.11	803	10.4	0.10	0.10	0.11
Physical Measurements: BMI Distribution Over weight (25.0--- 29.9 Kg/m2)															
15 --- 24	130	17.9	0.179	0.151	0.207	41	4.8	0.05	0.03	0.06	171	10.9	0.11	0.09	0.12
25 --- 34	155	21.7	0.217	0.187	0.247	101	11.7	0.12	0.10	0.14	256	16.3	0.16	0.14	0.18
35 --- 44	154	21.3	0.213	0.183	0.243	112	13.7	0.14	0.11	0.16	266	17.2	0.17	0.15	0.19
45 --- 54	157	20.8	0.208	0.179	0.237	102	12.0	0.12	0.10	0.14	259	16.2	0.16	0.14	0.18
55 --- 64	144	19.7	0.197	0.168	0.226	80	11.3	0.11	0.09	0.14	224	15.6	0.16	0.14	0.18
Total	740	20.3	0.203	0.19	0.216	436	10.7	0.11	0.10	0.12	1176	15.2	0.15	0.14	0.16

The under weight (BMI< 18.5 Kg/m²) male and female respondents comprise the 10.2 % and 10.5% of the total male respondents and female respondents. The population of under weight male was highest among 15-24 year age group and underweight female were highest among 55-64 year age group.

Respondents who were over weight (BMI> 18.5 Kg/m²) were fifteen percent of total respondents among the total respondents, twenty one percent of male of 25-34 years of age group and 13.75 % of female of 35-44 years of age were over weight . The respondents having normal BMI was calculated to be 72% of all respondents. According to the NCD risk factor report 2003, (26.73 % of men and 41.86% of women) were found overweight with 24.75 percent of men and 31.22 percent of women in grade 1 overweight.[4] We can make the inference that population in the urban like metropolitan city are more obese than those of outside valley.

MEAN WAIST CIRCUMFERENCE (EXCLUDING PREGNANT WOMEN)

Table 45: Mean waist circumference (in centimeters)

Age Group	Male				Female				Total			
	N	Mean	95% CI		N	Mean	95% CI		N	Mean	95% CI	
15 --- 24	731	71.6	70.88	72.24	824	71.3	68.60	74.04	1555	71.4	69.96	72.91
25 --- 34	712	76.7	75.89	77.43	836	73.6	72.84	74.27	1548	75.0	74.45	75.51
35 --- 44	716	79.1	78.28	79.98	816	75.9	75.03	76.83	1532	77.4	76.80	78.05
45 --- 54	752	79.4	78.59	80.23	844	76.2	75.43	77.07	1596	77.7	77.15	78.32
55 --- 64	733	79.7	78.84	80.59	703	75.5	72.66	78.32	1436	77.6	76.19	79.11
Total	3644	77.3	76.93	77.68	4023	74.5	73.68	75.28	7667	75.8	75.37	76.28

The waist circumference of the respondents was measured. The mean waist circumference was calculated to be 75.8 Cm (CI; 75.37-76.28) with average waist circumference of male being 77.3 Cm (CI; 76.93-77.68) and of female being 74.5 Cm (CI; 73.68-75.28) . A significant difference was observed in between the waist circumference of the male and female respondents. A narrow range was observed in the waist circumference among different age group.

MEAN BLOOD PRESSURE RESULTS

Table 46: Mean blood pressure (average of three readings)

Age Group	Systolic (mmHg)						Diastolic(mmHg)					
	Male		Female		Both Sexes		Men		Female		Both Sexes	
	n	Mean	n	Mean	n	Mean	n	Mean	n	Mean	n	Mean
15 --- 24	734	124	854	117	1588	120	734	74	854	74	1588	74
25 --- 34	716	128	866	119	1582	123	716	79	866	76	1582	78
35 --- 44	724	132	829	126	1553	129	724	83	829	80	1553	81
45 --- 54	760	135	853	132	1613	134	760	84	853	83	1613	83
55 --- 64	740	144	716	137	1456	140	740	87	716	83	1456	85
Total	3674	133	4118	126	7792	129	3674	82	4118	79	7792	80

Blood pressure is one of the vital indicators. A range of 90-140 mmHg of Systolic blood pressure and 60-90 mmHg of diastolic blood pressure is considered to be normal range for adults . Mean blood pressure of the respondents were recorded taking three readings. The average reading was calculated. The mean Systolic blood pressure was 133 mmHg among male and 126 mmHg among the female with a mean of 129 mmHg among both sexes. The Diastolic pressure was recorded to be 82 mmHg among male, 79 mmHg among female and a mean of 80 mmHg among both sexes. There was considerable difference in both systolic and diastolic blood pressure between male and female respondents.

Table 47: Percentage of patients with raised blood pressure

Age Group	SBP ≥ 140 and or DBP ≥ 90 mmHg						SBP ≥ 170 and or DBP ≥ 100 mmHg					
	Male		Female		Both Sexes		Men		Female		Both Sexes	
	n	%	n	%	n	%	n	%	n	%	n	%
15 --- 24	112	15.26	92	10.77	204	12.8	9	1.23	12	1.41	21	1.32
25 --- 34	222	31.01	122	14.09	344	21.7	31	4.33	21	2.42	52	3.29
35 --- 44	376	51.93	291	35.10	667	42.9	89	12.29	67	8.08	156	10.05
45 --- 54	467	61.45	468	54.87	935	58.0	119	15.66	101	11.84	220	13.64
55 --- 64	639	86.35	465	64.94	1104	75.8	205	27.70	151	21.09	356	24.45
Total	1816	49.43	1438	34.92	3254	41.8	453	12.33	352	8.55	805	10.33

The study found out that almost half of the respondents had developed condition of raised blood pressure among male population and it was found to be 41.8% among the both sexes. There was a considerable difference in the systolic and diastolic blood pressure of range (140/90 mm of Hg and above among male and female. Of those who had developed condition of raised blood pressure of range (170/100 mmHg and above) were 10.33% of the respondents. Almost 9 in 10 male (86%) of 55-64 years age group had developed condition of raised blood pressure of range (140/90 mm of Hg and above) and was seen least (10.77) among the female of 15-24 years age group. Almost 3 in 10 male (27.70%) of 55-64 years age group had developed condition of raised blood pressure of range (170/100 mm of Hg and above) and was seen least (1.23%) among the male of 15-24 years age group. The risk of developing hypertension increases with age.

PARTICIPANTS TREATED WITH DRUGS FOR RAISED BLOOD PRESSURE DURING LAST YEAR

Table 48: Percentage of participants treated with drugs for raised blood pressure during the last one year

Age group	Male		Female		Both sexes	
	n	%	n	%	n	%
15 --- 24	4	0.54	2	0.23	6	0.38
25 --- 34	4	0.56	11	1.27	15	0.95
35 --- 44	20	2.76	21	2.53	41	2.64
45 --- 54	36	4.74	55	6.45	91	5.64
55 --- 64	71	9.59	45	6.28	116	7.97
Total	135	3.67	134	3.25	269	3.45

The respondents were asked if they had been treated for condition of raised blood pressure. Out of 7193 respondents, 3.67% of male and 3.25% of female were treated for the condition making an average of 3.45 for both sexes but 10.33% of them were having the condition of raised blood pressure of range 170/100. The highest numbers of male of 55-64 years of age (9.59) have had the treatment during last year.

CHAPTER THREE

CONCLUSIONS AND RECOMMENDATIONS

NCD surveillance Study was carried out in 3 decentralized districts. Major risk factors namely tobacco use, alcohol consumption, diet and physical activities associated with non communicable diseases were assed. A total of respondents took part in the study. Based on the findings, following were concluded and accordingly recommendations were made.

CONCLUSION(S)

This study was done with the view of establishing a continuous surveillance system of non communicable diseases in Nepal with reference to the major risk factors for non communicable diseases recognized world wide. This is a pilot study expanded in 3 districts after NCD risk factor study in 2003 which was carried out in urban setting considering one district.

The study found out the abundant evidences of prevalence of risk factor under study. Alarming facts of prevalence of secondary risk factors were detected. High percentages of hypertensive respondents were unknown about their blood pressure status and many of the respondents were physically inactive. Around 7 % of the respondents had the history of hypertension and almost 42% were identified to be hypertensive during our study. Consumption of tobacco and alcohol was common among the respondents and older people tend to drink more heavily than the younger people. Significant proportion of the respondents was either over weight or under weight. Similarly, 22% of the respondents who had visited physician in last 12 months were diagnosed as diabetic, which was almost 2% out of total sample.

It's clearly seen that the risk factors for non communicable and chronic diseases are common in the society. Regular Scrutiny of such factors in the general population is necessary to track out the extent of problems and achievement in control of non communicable diseases. Well planned, need based and effective programmes are needed to address the lifestyle changes in the general population.

RECOMMENDATIONS

Based on the study; followings are recommended

1. Extensive awareness and intervention programmes on behavioral change intervention addressing the issues

    - Related to both smoking and use of smokeless tobacco with special focus to female, youths and adults for quitting consumption as well as demand reduction,
    - Of harmful effects of alcohol consumption,
    - Importance of more vegetable and fruits in daily diet and to promote healthy habits like use of vegetable oil for cooking

- To promote physical activities both in urban and rural settings.

2. Government should take strong hold in implementation of existing policy initiatives and take new initiatives in order to

   - Discourage the marketing and promotion of the manufactured cigarette and liquor

   - Restrict in buying/ selling tobacco products and liquor so that the young people (minors) would be discouraged for consuming tobacco and liquor in early age.

3. Since the study revealed a significant portion of those who were diagnosed with hypertension and diabetes visited traditional healers and were taking herbal medicine for treatment. So, all hypertensive and diabetics in the community level should get modern medical facilities as well as adequate awareness to utilize those facilities.

4. It's recommended that standardization of servings of fruits and vegetables and degree of physical activities at local context should be done for further surveys.

5. Regular blood pressure and blood sugar level monitoring services should be made available in community based settings and people of older age should be aware about the importance of regular blood pressure/ sugar monitoring and regularity of medication. Physicians and health workers should emphasize on the importance of life style changes together with the medicinal treatment for the hypertensive and diabetic condition and ensure that every client gets advices for life style change.

6. Government should prioritize the prevention of non communicable diseases by intervening against the risk factors and including them in essential health care service and provide them through primary health care settings.

7. As Survey has been conducted in three districts involving district and below district health workers, they are already sensitized to some extent about the risk factors for NCDs. It can be recommended that this sensitization programmes should be continued and reproduced.

8. District level capacity was overestimated during planning especially in selecting the interviewers and supervisors and data entry persons. As a result, survey team faced some difficulties in maintaining data quality. So in the days to come, standard selection criteria should be developed and utilized for better relation of the field staff to increase the data quality.

9. Training for interviewers and supervisors were conducted for 3 and 2 days respectively. This was quite insufficient to discuss and conceptualize the research matters. Therefore, it is recommended to extend the duration of the training for 5 days and 3 days respectively.

10. Some of the Data entry persons, who were trained, had a very little computer knowledge. That's why, survey team faced difficulties in data entry as well as in processing. Therefore, it is recommended to take computer related exams with districts statistical assistant and medical recorders.

REFERENCES

1. WHO. *Surveillance of major Non-communicable diseases in South Asia Region.* WHO/SERO, New Delhi, 2001.

2. WHO. *The World Health Report 2003- Shaping the future.* Geneva, World Health Organization, 2003.

3. MOH/DOHS. *Annual Report 2002.* Kathmandu, 2003.

4. Shrestha RP. *Surveillance of risk factor for non- communicable diseases in Nepal in 2003.* SOLID Nepal, 2003.

5. WHO. *STEPS instrument for NCD risk factors (Core and Expanded Version 1.4) The WHO Stepwise approach, surveillance of risk factors for Non Communicable diseases, NCD and mental Health.* Geneva, World Health Organization, 2003.

6. Central Bureau of Statistics. *Population Census 2001 National Report.* Kathmandu, Reprint 2003.

7. Acharya GP, Gawali K, Adhikari RK, Thaler JI. Editors. *Monitoring Universal Salt Iodization Programmes,* UNICEF/WHO 1995.

8. WHO. *Preventing Chronic Diseases a vital investment.* Geneva, World Health Organization, 2005.

9. WHO. *World Health Report 2002.* Geneva, World Health Organization, 2002.

10. WHO. *World Health Report 2002 Reducing Risks, Promoting Health life.* p 64-65, Geneva, World Health Organization 2002

11. WHO. *Tobacco and poverty: a vicious circle.* Geneva, world Health Organization, 2004.

12. WHO. *Non-communicable Diseases and Mental Health Framework, Surveillance of risk factors for non communicable diseases.* World Health Organization, 2002.

13. Dhital R, et al. *Alcohol and Drug Use in Nepal.* Child Workers in Nepal Concerned Centre, 2001.

14. NCD Focal Point, MOHP/WHO. *Guideline for Interviewers: The WHO STEP wise approach to Surveillance of non communicable diseases (STEPS).* NCD Focal Point, Ministry of Health and Population, Government of Nepal / World Health Organization, Kathmandu, 2005.

15. NCD Focal Point, MOHP/WHO. *Steps Field Resource: The WHO STEP wise approach to Surveillance of non communicable diseases (STEPS).* NCD Focal Point, Ministry of Health and Population, Government of Nepal/ World Health Organization, Kathmandu, 2005.

16. NCD Focal Point, MOHP/WHO. *Guidelines for Supervisors: The WHO STEP wise approach to Surveillance of non communicable diseases (STEPS).* NCD Focal Point, Ministry of Health and Population Government of Nepal / World Health Organization, Kathmandu, 2005.

ANNEXES

ANNEX 1 MAP OF THE AREA

MAP OF THE SURVEYED AREA

SELECTED VDCS

Table: Places of Data collection at various districts

SN			
	Ilam	Tanahun	lalitpur
	Jogmai	Vyas Municipality	Jhamsikhel
	Maimajhuwa	Dulegauda	Pulchok
	Pashupatinagar	Abukhairaeni	Bagdol
	Shantipur	Bandipur	Thasikhel
	Gagurmukhi	Chock chisapani	Gusingal
	Chulachuli	Bhimad	Kobahal
		Bhirkot	Hanumansthan
		Devghat	Balkhu
		Ghansikuwa	Lagankhel/Prayagpokhari
		Rhisingh sundhara	Kusunti
		Satiswara	Tikhedewal
		Keshavtar	Khumaltar/Satdobato
		Kot durbar	Nakkhu Chock
		Raipur	Lukhusi
			Kanyagaun/Wanal
			Gabahal
			Tatole
			Sanepa/Jhamsikhel
			Alko/Chakupat

ANNEX 2 SUPERVISORS AND ENUMERATORS

Ilam District	Tanahun District	Lalitpur District
Supervisors		
Dipak Adhikari	Mr Bashanta Adhikari	Mr Biswa Raj Shrestha
Hema Devi	Mr Ajaya Sriwastav	Mr Ananta Pd. Sharma
Dil Nath Shrestha	Mr Mukti Prashad Pandit	Mrs Ambika K.C
Gita Pd. Niraula	Mr Chandramani Adhikari	Mr.Sarat Pd Acharya
	Mr Shankar Bahadur	
Bharat Mani Dahal	Adhikari	Dr .Rajendra Pd Shah
Narendra Siwakoti	Dr Krishna Prashad Paudyal	Dr Ruby Shrestha
Raghu Nath Yadav	Mr Aishwarya Bhattrai	Ms Komal Paudel
		Ms Sun maya Ghishing
Enumerators		
Mr. Hari Narayan Chaudhary	Yashodha Pokhrel	Mr Raju K.C
Miss .Devi Gurung	Prem subedi	Ms Maya Bhandari
Mr. Deepak Paudyal	Annapurna Ghemire	Mr Min Bsr Shrestha
Ms. Chandra Rai	Santosh Gurung	Ms Mina Pathak
Mr Tika Raj Bardewa	Tila Aale	Mr Mahendra Giri
Miss Sita Tamang	Lalita Shahi	Ms Sona Futi Shrestha
Mr Krishna Chaudahary	Agam Raj Upadhayay	Mr Purusotaam Raj Bhandari
Ms. Nirpa Rajbansi	Rama Kayastha	Ms Nirmala Nepal
Mr Umesh pd.shah	Krishna Ghemire	Mr Ridhi Shyam
Ms Nirmala Sigdel	Sharmila Thapa	Ms Parbati Sharma
Mr Kiran Kumar Kharel	Purna Bahadur Bote	Mr Jag Mohan Shrestha
Ms. Bindu Tamang	Samita Lohani	Ms Bimala Pahar
Mr. Raj Kumar Shah	Megh Bahadur Thada	Mr Pushkar Patel
Ms Ramanta Paudyal	Tara Devi Bhujel	Ms Indira Bhandari
Md Abdul man Rain	Ram Naresh Thakur	Mr Madhu Ram K.C
Ms.Milan Sherpa		Ms Hira Kafle

ANNEX 3 SCHEDULE OF MEETINGS

NCD SURVEILLANCE STEERING COMMITTEE MEETINGS

Date	Activities	Remarks
20th July 2005	surveillance tools approved for Nepal	

NCD SURVEILLANCE TECHNICAL COMMITTEE MEETINGS

Date	Activities	Remarks
8th Dec 2004	NCD surveillance activities plan	
30th Jan 2006	Tracking progress	
22nd February	Tracking progress	

ANNEX 4 SCHEDULE FOR TRAINING PROGRAMME

PRETEST WORKSHOP AT HOTEL GREENWICH VILLAGE FROM FEBRUARY 1ST TO 3RD 2005

Date	Activities	Remarks
February 1, 2005	participants were oriented on the pretest questionnaires and the data collection at clusters areas in the field	Dr. J. Leowski, Regional advisor for NCD SEARO, WHO, attended the workshop
February 2, 2005	participants went to the field clusters for simulation data collection	
February 3, 2005	feedback was received from the participants and necessary modification	

TRAINING AND DATA COLLECTION

Districts	Date of Training for supervisor (TOT)	Date of Training for Interviewers	Date of Data Collection
Ilam	September 19th – 23rd 2005	21st -23rd September	25th September to October 7th 2005
Tanahun		October 24th – 28th 2005	November 10th – 24th 2005
Lalitpur	Aug14-15, 2005		August 28 to Sept 18th 2005

TRAINING SCHEDULE OF PILOTING ACTIVITIES IN LALITPUR DISTRICT

Time	Activities	handout	Resource person	Product
Day 1				
9-9.30	Opening and Welcome	-	Dr. Baburam Marasini	NCD Objective(s)
9.30-9.45	Coffee Break			
9.45-10.30	NCD Surveillance Protocol	+	Dr. Ilsa Nelwan & Dr. BR Dahal	Guideline input
10.45-12	Supervisor Training Module	+	Dr Khem Karki	
12-13	Lunch			
13.15-15	Interviewer Training module	+	Supervisors+ NCD OC	Plan of field activities: Where, Who, How to monitor
15-165.30	Selection of Pilot site		Supervisors+ NCD OC	Site Selected in Imadol Lalitpur
Day 2				
9-9.30	Field Preparation Questionnaire, Equipments	Plan		
9.45-15.00	Interview at the community Level		2 interviewers+ supervisor	Questionnaire inputs Interviewers training module inputs

15.30-16.30	Discussion of the results	Dr. Ilsa Nelwan & Dr BR Dahal	Observation sheets
Day 3			
9-12	Group discussion Supervisor Interviewer Data Management	Dr.BR Marasini Dr. Ilsa Nelwan & Dr BR Dahal	Inputs for guidelines and questionnaire Inputs for survey implementation
12-13	Launch		
13-14	Panel Discussion		Final Draft of Guidelines and Questionnaire

TRAINING SCHEDULE FOR TRAINERS TRAINING

Time	Activities	Responsible Person
Day 1		
9.30-10.00	Opening and Introduction and Pre-test	Pitamber L Shrestha & Silpi Thapa and organising committee
10.00-10.15	Coffee Break	
10.15-11.15	NCD Surveillance, objective and sampling	Dr. Ilsa Nelwan & Dr BR Dahal & supervisors
11.15-12.15	Introduction of Survey instruments and guidelines	Dr. Khem karki
12.15-13.00	Tea and Snacks	
13.00-14.30	Discussion on Step 1 Questionnaire	Dr. Khem karki
14.30-13.45	Tea	
14.45-16.30	Group work and Presentation	Dr. Khem karki
Day 2		
9.30-10.00	Review	All
10.00-10.15	Coffee break	
10.15-11.15	Discussion on Step 2 instruments	Dr. Khem karki
11.15-12.15	Practical session on measuring BP, weight and height	Dr. Khem karki & Dr BR Dahal
12.15-13.00	Tea and snacks	
13.00-14.00	Continued Practical session on measuring BP, weight and height and waist	Dr. Khem karki & Dr BR Dahal
14.00-14.15	Tea	
14.15-15.15	Simulation exercise and group presentation and post test	Dr. Khem karki & Dr BR Dahal
15.15-16.00	Planning for interviewers training	Dr.Ilsa Nelwan

TRAINING SCHEDULE FOR TRAINERS TRAINING

Time	Activities	Responsible Person
Day 1		
9.30-10.00	Opening and Introduction and Pre-test	Pitamber L Shrestha & Silpi Thapa and organising

		committee
10.00-10.15	Coffee Break	
10.15-11.15	NCD Surveillance, objective and sampling	Dr. Ilsa Nelwan & Dr BR Dahal & supervisors
11.15-12.15	Introduction of Survey instruments and guidelines	Dr. Khem karki
12.15-13.00	Tea and Snacks	
13.00-14.30	Discussion on Step 1 Questionnaire	Dr. Khem karki
14.30-13.45	Tea	
14.45-16.30	Group work and Presentation	Dr. Khem karki
Day 2		
9.30-10.00	Review	All
10.00-10.15	Coffee break	
10.15-11.15	Discussion on Step 2 instruments	Dr. Khem karki
11.15-12.15	Practical session on measuring BP, weight and height	Dr. Khem karki & Dr BR Dahal
12.15-13.00	Tea and snacks	
13.00-14.00	Continued Practical session on measuring BP, weight and height and waist	Dr. Khem karki & Dr BR Dahal
14.00-14.15	Tea	
14.15-15.15	Simulation exercise and group presentation and post test	Dr. Khem karki & Dr BR Dahal
15.15-16.00	Planning for interviewers training	Dr.Ilsa Nelwan

TRAINING FOR DATA MANAGEMENT DATE: 5TH – 7TH SEPTEMBER

Name of the participants

1. Prabha Adhikari
2. Dil Bahadur Siris
3. Basant Adhikari
4. Narendra Shivakoti
5. Sagar Prasai
6. Deepak Adhikari
7. Krishna Sapkota
8. Sahan Tamrakar
9. Jhalak Sharma Poudel

TRAINING SCHEDULE FOR DATA MANAGEMENT

DAY 1			
	Time	Activity	RPs
1	9:30 – 10:00	Opening, Introduction to each other Pre-test	All
	10:00- 10:15	Tea Break	all
2	10:15 – 10:45	Introduction to NCD Surveillance including	ILSA

		objectives and STEPS strategy	
3	10:45 – 11:30	Introduction to survey instruments	Khem
4	11:30 – 12:15	Introduction to Data management Guidelines	Sugam
5	12:15- 13:15	Heavy Snacks/ Lunch	
6	13:15- 14:15	Introduction to Data Software , Installation of the program	Sugam/Khem
7	14:15 – 14:45	Tea Break	
8	14:45 – 15: 45	Contd... Introduction to Data Software , Installation of the program	Sugam and Khem
9	15:45- 17:00	Introduction to Coding of STEP 1 and STEP 2	Khem /Sugam

DAY 2

	Time	Activity	RPs
1	9:30 – 10:00	Review of the day	All
	10:00- 10:15	Tea Break	all
2	10:15 – 10:45	Data Entry	all
3	10:45 – 11:30	Data entry	all
4	11:30 – 12:15	Data entry	all
5	12:15- 13:15	Heavy Snacks/ Lunch	
6	13:15- 14:15	Data cleaning	Sugam/Khem
7	14:15 – 14:45	Tea Break	
8	14:45 – 15: 45	Data cleaning	Sugam and Khem
9	15:45- 17:00	Introduction to NCD data analysis	Khem

DAY 3

	Time	Activity	RPs
1	9:30 – 10:00	Review of the day	All
	10:00- 10:15	Tea Break	all
2	10:15 – 10:45	Data Analysis	all
3	10:45 – 11:30	Data Analysis	all
4	11:30 – 12:15	Data Analysis	all
5	12:15- 13:15	Heavy Snacks/ Lunch	
6	13:15- 14:15	Introduction to report templates	Sugam/Khem
7	14:15 – 14:45	Tea Break	
8	14:45 – 15: 45	Table generation	Sugam and Khem
9	15:45- 17:00	Planning for Data Entry in Districts and Post test, wrap up	All

ANNEX 5 SURVEY INSTRUMENTS

QUESTIONAIRE . USED VERSION WAS 1.4

METHOD OF CALCULATING STANDARD DRINK AND SERVINGS

Alcohol show card

Section A; Q A1a to A6b Alcohol Consumption

1 standard drink =




1 standard bottle of **beer** (285ml) 1 single measure of **spirits** (30ml) 1 medium size glass of **wine** (120ml) 1 measure of **regular aperitif**(60ml)

(Note: net alcohol content of a *standard drink is* 8-13 g. of ethanol DEPENDING ON THE COUNTRY)

ALCOHOL EQUIVALENTS:

Wine:

1 GLASS OF WINE	1 Drink
1 BOTTLE OF WINE	6 Drinks
1 "WINE COOLER"	1 Drink

Beer:

1 BOTTLE OF BEER	1 Drink
1 CASE OF BEER	24 Drinks

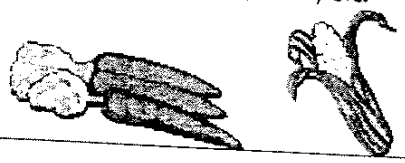
Hard Liquor:

1 HIGHBALL OR SHORT GLASSES	1 Drink
1/2 PINT OF LIQUOR	6 Drinks
1 PINT OF LIQUOR	12 Drinks
1 FIFTH OF LIQUOR	20 Drinks
1 QUART OF LIQUOR	24 Drinks

**Add photos and illustrations as appropriate*

FRUIT AND VEGETABLE CHART

Diet show card
Section D; Q D1a to D4

VEGETABLES are considered to be:	**1 serving**	**Examples**
Raw green leafy vegetables	1 cup	Spinach, salad, etc.
Other vegetables, cooked or chopped raw	½ cup	Tomatoes, carrots, pumpkin, corn, Chinese cabbage, fresh beans, onion, etc. 
Vegetable juice	½ cup	

FRUIT

Is considered to be:	**1 serving**	**Examples**
Apple, banana, orange	1 medium size piece	
Chopped, cooked, canned fruit	½ cup	
Fruit juice	½ cup Juice	from fruit, not artificially flavoured

Physical activities show card
Section P; P1 to P14

MODERATE Physical Activities	**VIGOROUS Physical Activities**
Involve moderate physical effort	Involve hard physical effort
This make you breathe somewhat harder than normal	This makes you breathe much harder than normal
Examples: • Cleaning • Farming • Painting/plastering • Gardening  • Swimming • Climbing stairs	**Examples:** • Carrying heavy loads • Heavy construction • Digging  • Shovelling • Sawing wood • Running • Strenuous sports