Ministry of Health & Family Welfare
Government of India

INTEGRATED DISEASE SURVEILLANCE PROJECT (IDSP)

NON-COMMUNICABLE DISEASE RISK FACTORS SURVEY

2007-08

Mizoram

Regional Institute of Medical Sciences
Imphal
(State Survey Agency)

Regional Medical Research Centre
Dibrugarh
(Regional Resource Centre)

National Institute of Medical Statistics
New Delhi
(National Nodal Agency)

National Institute of Communicable Diseases
New Delhi
(IDSP Central Surveillance Unit)

Indian Council of Medical Research
New Delhi
(National Implementing Agency)

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(स्वास्थ्य अनुसंधान विभाग)
स्वास्थ्य एवं परिवार कल्याण मंत्रालय एवं
महानिदेशक, आई सी एम आर
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(स्वास्थ्य अनुसंधान विभाग)
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Foreword

Globally, non-communicable diseases (NCDs) are the major cause of morbidity and mortality. According to WHO Report 2004, they account for almost 60% of deaths and 47% of the global burden of disease. In India, estimated deaths due to non-communicable diseases were double than those from communicable diseases. A progressive rise in the disease pattern of NCD foretells a serious public health issue. The major risk factors for non-communicable diseases are tobacco and alcohol abuse, a sedentary lifestyle, and an unhealthy diet. It is believed that about half of non-communicable disease-related premature deaths could be prevented through healthy diet, regular physical activity and by avoiding tobacco and alcohol.

Envisaging the magnitude of the public health problem of chronic diseases, the Government of India through National Institute of Communicable Disease, MoHFW and Indian Council of Medical Research initiated NCD risk factors survey, phase-I in seven states of India. It is a well planned large community based survey providing state wise estimates of major NCD risk factors in different strata of population. It is needless to mention that the estimated NCD risk factors are important input for targeted prevention of NCD and effective health care planning. The National Technical Advisory Committee (NTAC) and National Monitoring Committee constituted by MoHFW, provided valuable technical guidance and support to complete the study.

The Indian Council of Medical Research through its Division of Non-communicable Diseases has implemented the study with all the partners including the National Institute of Medical Statistics as a National Nodal Agency, Regional Resource Centers and State Survey Agencies.

I congratulate the Team for successfully completing the survey and bringing out Phase-I report of NCD Risk Factors which would be of immense use for prevention and control of non-communicable diseases.

(Dr. V.M. Katoch)

डॉ बेला शाह एम.डी.
वैज्ञानिक 'जी' एवं प्रमुख
असंचारी रोग प्रभाग

Dr. Bela Shah MD
Scientist 'G' & Head
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भारतीय आयुर्विज्ञान अनुसंधान परिषद
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Preface

Non-Communicable Diseases (NCD) account for a large proportion of morbidity and mortality amongst the adult population of our country. The high prevalence of major risk factors viz. tobacco and alcohol consumption, inappropriate diet, physical inactivity, high blood pressure, high blood glucose and dyslipidemias are driving the epidemic of NCDs. The Division of Non-Communicable Diseases at ICMR was identified as the nodal point for surveillance of NCDs and their risk factors by the World Health Organization, and multi-site studies helped us in developing a sound strategy for NCD risk factor surveys at the national level under IDSP. The survey methodology developed by ICMR was incorporated by IDSP into the overall survey protocol provided to ICMR for implementation.

The Indian Council of Medical Research signed a Memorandum of Understanding (MOU) with IDSP for the standardization and quality assurance of the NCD risk factor surveys under the World Bank funded IDSP on behalf of Ministry of Health, Govt. of India. As per IDSP plan, these surveys were to be carried out in three phases so as to cover all States and UTs of the country. In the present Phase I, the State based estimates of the risk factors in seven States (Andhra Pradesh, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Tamil Nadu and Uttarakhand) were arrived at through the IDSP identified seven State Survey Agencies, five Regional Research Centers and a National Nodal Agency under the overall guidance and supervision of ICMR Headquarters through the National Technical Advisory Committee. I am grateful to the Director General, ICMR for supporting the Division of Noncommunicable Diseases ICMR to implement the surveys. The untiring effort of our partner agencies is commendable and is duly acknowledged.

This report marks an important milestone in surveillance activities for NCDs in the country. The results would be useful for planning and monitoring an effective response in a coordinated manner by the Government. It should also stimulate further analysis and research in the area.

(Dr. Bela Shah)

Acknowledgements

The National Institute of Medical Statistics was identified as National Nodal Agency (NNA) to conduct the IDSP-NCD Risk Factors Survey Phase-I in India. The survey was carried out with the joint efforts of all partner organizations including Division of Non-Communicable Diseases of Indian Council of Medical Research as the implementing agency; and Center for Community Medicine, All India Institute of Medical Sciences, New Delhi; Regional Medical Research Centre for Tribal, Jabalpur; National Institute of Epidemiology, Chennai; Sri Chitra Tirunal Institute of Medical Sciences and Technology, Thiruvanathapuram; Regional Medical Research Centre, Dibrugarh as Regional Resource Centers; Department of Community Medicine of Chhatrapati Shahuji Maharaj Medical University, Lucknow; Government Medical College, Nagpur; Pune Health Care Management and Research Centre, Pune; Indian Institute of Health and Family Welfare, Hyderabad; Madras Diabetes Research Foundation, Chennai; Clinical Epidemiology Unit, Medical College, Thiruvanathapuram; Regional Institute of Medical Sciences, Imphal, Manipur as State Survey Agencies respectively.

We sincerely acknowledge the Ministry of Health and Family Welfare (MoHFW), Government of India for granting us responsibility of conducting the IDSP NCD Risk Factors Survey Phase-I in India. We acknowledge the World Bank for providing financial support to conduct the Phase-I survey in seven states. We gratefully acknowledge the technical support and valuable guidance provided by Dr. N.K. Ganguly, Chairman and all members of National Technical Advisory Committee (NTAC) and Dr. Shiv Lal, Special Director General Health Services, Director NICD and all the members of National Monitoring Committee. Thanks go to Dr. G. Ramana and J. Gowrinath Sastry from World Bank; Dr. Cherian Varghese, WHO; Dr. D. Bachani, Dr. R.L. Ichhpujani, Dr. A.C. Dhariwal, Dr. Shah Hossain and Dr. Pradeep Khasnobis from IDSP Central Surveillance Unit, NICD for their support in undertaking the survey. We are grateful to Dr. L.M. Nath and Dr. K. Anand, AIIMS, New Delhi and Dr. B.N. Bhattacharya, Indian Statistical Institute, Kolkatta for their technical guidance and review of the reports. We are extremely thankful to Dr. Bela Shah and her colleagues Dr. D.K. Shukla and Dr. Prashant Mathur at ICMR for providing leadership to implement the survey.

The team of NIMS including Dr. H.K. Chaturvedi, Dr. D. Sahu, Dr. Tulsi Adhikari, Dr. Atul Juneja, Mr. Jiten Kumar Singh and all other supporting staff involved in the study deserve appreciation and acknowledgement. We are grateful to Regional Medical Research Centre, Dibrugarh being the Regional Resource Center for Mizoram and Regional Institute of Medical Sciences, Imphal, Manipur involved as State Survey Agency for supervising, data collection and data entry of survey in Mizoram.

The hard work of all the field investigators, field supervisors and data entry operators are highly appreciable and acknowledged. Last but not the least, I express my heartiest thanks to all the respondents and other peoples including local health administrators of districts and state who helped in completing the survey.

National Institute of Medical Statistics
ICMR, New Delhi

(*Arvind Pandey*)
Director

Definitions

Current Smoker / Smokeless Tobacco User: Someone who at the time of the survey, smokes / uses tobacco in any form either daily or occasionally.

Current Daily Smoker / Smokeless Tobacco User: Someone who smokes / uses tobacco everyday with rare exceptions such as not on days of religious fasting or during acute illness.

Past- Daily Smokers / Smokeless Tobacco User: These are those individuals who were smoking daily in past, but have not smoked ever in one year preceding the survey.

Non-Smoker / Never Used Smokeless Tobacco: These are those individuals who have never smoked / used smokeless tobacco in the lifetime.

Current Drinker: Those who consumed one or more than one drink of any alcohol in the year preceding the survey.

Former Drinker: Those who have consumed alcohol but those who did not consume one or more drink during the year preceding the survey.

Lifetime Abstainer: Those who have never consumed one or more drink of any type of alcohol in lifetime.

High Risk Drinker (Binge Drinker): Those who drink more than 5 (for women 4) standard drinks on any single day.

Standard Drink: It is defined as any standard drink with net alcohol content of 10 gm ethanol.

Standard Serving: One standard serving of fruits and vegetables is equivalent to 80 grams, translated into different units of cups depending on type of vegetables and fruits.

Metabolic Equivalent (MET): MET is the ratio of a person's working metabolic rate relative to the resting metabolic rate. One MET is defined as the energy cost of sitting quietly, and is equivalent to a caloric consumption of 1 kcal/kg/hour. It is estimated that, compared to sitting quietly, a person's caloric consumption is four times as high when being moderately active, and eight times as high when being vigorously active.

Central Obesity: Central obesity (measured as waist circumference or waist to hip ratio) is more strongly associated with coronary heart disease than BMI. Waist measurement is taken at the level of mid point between the inferior margin of the rib and crest of the ileum in the mid-axillary plane, using a non-stretchable tape, without clothing, that is, directly over the skin (or over light clothing). A cut-off level of 102 cms in males and 88 cms in females have been recommended for developed countries (ATP 3 Guidelines), however, much lower cut-off levels are appropriate for Indians of 90 cms in males and 80 cms in females (South Asia Pacific Guidelines).

Hypertensive Stage I : The upper and lower limit of the systolic and diastolic blood pressure for hypertensive stage I is 140-159 mm Hg systolic or 90-99 mm Hg for diastolic.

Hypertensive Stage II : The upper and lower limit of the systolic and diastolic blood pressure for hypertensive stage II is $\geq$160 mm Hg systolic or $\geq$100 mm Hg for diastolic.

Under Weight: The person with BMI less than 18.5 kg/m^2 is categorised as under weight.

Normal Weight: The person whose BMI is between 18.5 to 24.9 kg/m^2 is categorized as normal weight

Over Weight: The person whose BMI is 25 kg/m^2 or more is categorized as over weight

Acronyms

AYUSH	Ayurveda Unani Shidha and Homeopathy
BMI	Body Mass Index
BP	Blood Pressure
CEB	Census Enumeration Block
DHO	District Health Officer
ICMR	Indian Council of Medical Research
IDSP	Integrated Disease Surveillance Project
IEC	Information Education Communication
LPG	Liquid Petroleum Gas
MET	Metabolic Equivalent
NCD	Non-communicable Diseases
NICD	National Institute of Communicable Diseases
NIMS	National Institute of Medical Statistics
NMC	National Monitoring Committee
NNA	National Nodal Agency
NTAC	National Technical Advisory Committee
PSU	Primary Sampling Unit
RIMS	Regional Institute of Medical Science
RMRC	Regional Medical Research Centre
RRC	Regional Resource Centre
SSA	State Survey Agency
WHO	World Health Organization

Tables

Figures

IDSP-NCD Risk Factor Survey

Fact Sheet - Mizoram

Population	
Household covered	4569
Individual covered	4495
Household Characteristics(%)	
Religion	
Christian	92
Buddhist	5
Access to piped drinking water	69
Urban	86
Rural	49
Sanitation	
Flush Toilet	64
Urban	87
Rural	36
Source of Lighting	
Electricity	94
Urban	99
Rural	88
Type of House	
Semi-Pucca house	59
Urban	63
Rural	55
Kachha House	24
Urban	9
Rural	42
Fuel Use for Cooking	
LPG/Gas	64
Urban	91
Rural	33
Wood	34
Urban	7
Rural	66
Separate Kitchen	
Urban	55
Rural	36
Own Agricultural land	
Urban	20
Rural	49
Individual Characteristics(%)	
Education- literate	91
Urban	97
Rural	85
Behavioural Information(%)	
Current Tobacco Users	
Smokers	44
Male	67
Female	19
Smokeless tobacco users	51
Male	47
Female	55
Any form of tobacco use	68
Male	76
Female	60
Mean age of Initiation (in years)	
Smoking	17
Male	17
Female	19
Smokeless tobacco	18
Male	17
Female	18
Alcohol Consumption	
Consumed Alcohol (last 30 days)	6
Male	11
Female	1
Consumed alcohol (last 12 Months)	11
Male	21
Female	1
Mean age of alcohol Initiation (in years)	
Male	21
Female	23
Fruits and Vegetables consumed	
Less than five servings per day	85
Urban	79
Rural	91
Physical Activity	
Low physical activity	71
Urban	79
Rural	63
Hypertension	
Pre hypertension	59
Urban	62
Rural	55
Stage I and II hypertension	19
Urban	20
Rural	19
Physical Measurement - BMI	
Under weight	14
Urban	13
Rural	16
Over weight (grade I,II,III)	*10*
Urban	12
Rural	9
Central obesity	12
Urban	16
Rural	6

Executive Summary

Introduction

The Government of India through the Ministry of Health & Family Welfare (MOHFW) initiated a decentralized, state based Integrated Disease Surveillance Project (IDSP) in the country with the assistance of the World Bank in the year 2004. The component of non communicable disease surveillance planned periodic community based surveys of population aged 15-64 to provide data on the risk factors. It is in line to help the state health administrators to plan strategies for the control of non communicable diseases by modifying the risk factors. All Indian states were proposed to be surveyed in a phased manner under the project. The first phase of the survey included seven states namely Andhra Pradesh, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Tamil Nadu and Uttarakhand.

The overall objective of the NCD risk factor survey was to improve the information available to the Government health services and care providers on a set of high-priority risk factors, with a view to improve the quality health care and services. The survey also aimed to establish the baseline database of NCD risk factors needed to monitor trends in population health behavior and risk factors for chronic diseases over time. This would provide evidence for evolving strategies and interventions for identified risk factors in the community to reduce the burden of non-communicable diseases.

A National Technical Advisory Committee was constituted to provide the technical guidance to the survey including taking care of certain administrative and logistic difficulties and the National Monitoring Committee for monitoring the overall progress of the project. Indian Council of Medical Research through the division of non-communicable disease, was the implementing agency while the National Institute of Medical Statistics (NIMS) was appointed as the National Nodal Agency (NNA) for coordinating the survey; Regional Medical Research Centre, Dibhrughar as a Regional Resource Centre (RRC) for monitoring the quality of data collection and technical support to Regional Institute of Medical Sciences, Imphal, the State Survey Agency (SSA) for the state of Mizoram.

Survey Methodology

WHO STEPS methodology for NCD Risk Factor Surveillance has been adopted for the survey after carrying out suitable modifications, based on a multisite ICMR-WHO collaborative initiative for NCD risk factor surveillance[1]. The survey was designed to provide prevalence estimates of risk factors for each 10 years age group (15-24 through 55-64) by sex and place of residence (urban/rural). The survey used uniform sample design, bilingual schedules (English and Mizo in case of Mizoram), field protocol for data collection and physical measurements to facilitate comparability across states and also to ensure high quality data. For the present survey, appropriate sampling weights for households were used for urban and rural areas of the state. From each selected household, one member aged 15-54 was selected using the KISH Method and all members aged 55-64 were selected. Such post stratification was used for improvement of efficiency of the estimators. Post stratification weights for individuals were constructed using the state age distributions for both sex, which are available on the population level.

Two types of questionnaire - one at household level and another at individual level were used for the survey. At household level, information was elicited on religion, household facilities, ownership of agricultural land and livestock, and possession of durable goods for each selected household. The Individual questionnaire collected the information from all the selected eligible household individuals regarding demographic, behavioral and physical measurements. The individual questionnaire was divided into two segments based on WHO STEPS methodology. The first section (step 1) collected the demographic information of individuals including age, sex, marital status, education, and occupation. In the behavioural information section, information about tobacco use, alcohol consumption, diet, physical activity, history of raised blood pressure and history of diabetes were collected. In the second section (Step 2), physical measurements of individual such as height, weight, waist circumference (not measured for pregnant women), blood pressure, and pulse rate were recorded.

Characteristics of survey population

A total of 5000 households were contacted in urban

and rural area of Mizoram. Among them 431 households refused to participate in the survey. The overall individual response rate for the survey was 100 percent. Ninety two percent of the households were Christian and about 5 percent were Buddhist. Seventy percent of the households used drinking water from a piped or hand pump. Almost all households had flush or pit toilet facility. Ninety-four percent of households had electricity. LPG was a major source of cooking fuel in urban area and wood was main source of fuel in rural area. Almost half of the rural households possessed agricultural land, whereas it was only 20% in case of urban area.

About 91% of the respondents were literate whereas it was high (97%) among urban respondents compare to rural respondents (85%). More than half of the respondents were currently married. Majority of the female respondents were engaged in domestic work. More than 30% of females in urban area were looking after domestic work; the males were engaged in agriculture followed by manual work and services/sales.

BEHAVIOURAL RISK FACTORS FOR NCD

Tobacco Smoking

As per the WHO STEPS guidelines, the respondents are categorized into three categories *Current Smokers*, *Past Daily Smokers* and those who have never smoked in lifetime were classified as *Non-Smokers*. The *Current Daily Smokers* is the subset of *Current Smokers*. The survey finds that 44% of respondents (67 percent men and 19 percent women) in Mizoram were current smokers.

The urban and rural prevalence was 39% and 50% respectively for the current smokers. The mean number of smoking *bidis* and manufactured cigarette in a day

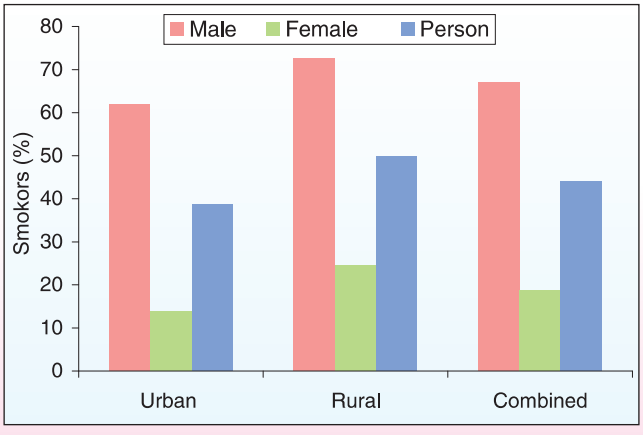

Figure 1. Current smokers (%) by sex and residence

was 14 and 11 respectively. The average age of onset of smoking was around 17 years among young urban and rural respondents aged 15-34 years. The mean age of cessation of smoking for all those who stopped smoking was 34 years. Among non-smokers about 53% of respondents were exposed to tobacco smoke at home or work place.

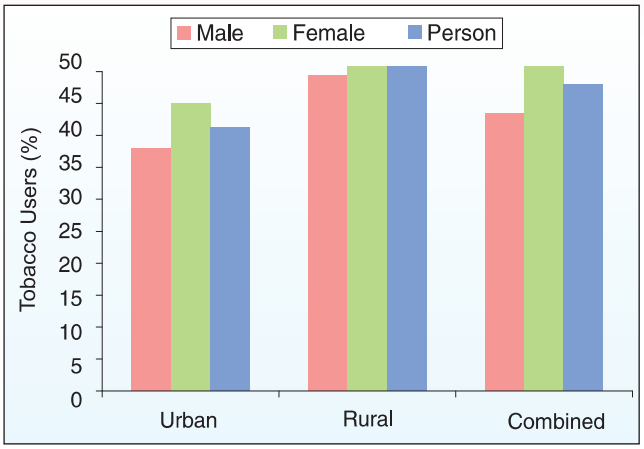

Figure 2. Current daily smokeless tobacco users (%) by sex and residence

More than half (51%) of respondents were current users of smokeless tobacco. The mean frequency of chewing tobacco in a day was around 10 for men and women tobacco chewer. The mean frequency of chewing pan with tobacco was 9. The mean age of initiation of smokeless tobacco use was 18 years for the young respondents aged 15-34 years and it was 19 years for the respondents in the age group of 35-64 years. The over all mean age of quitting smokeless tobacco was 24 years. About 68% of the respondents were using tobacco in any form (smoking or smokeless) whereas about 21% were using tobacco in both the forms.

Alcohol Consumption

In the survey, 21% of the male respondents report to have consumed alcohol in past 12 months and 11% consumed in last 30 days preceding the survey. Around 9% of male respondents were past drinkers. The habit of alcohol consumption was mainly among men and negligible among women. The average number of drinks consumed on a drinking day was 2 drinks. The mean age of initiation of alcohol consumption regularly was 21 years for the respondents in the age group 15-34 years and 35 years for the respondents in the age group of 35-64 years. The percentage of current drinkers was higher for respondents whose main occupation was manual work and agriculture.

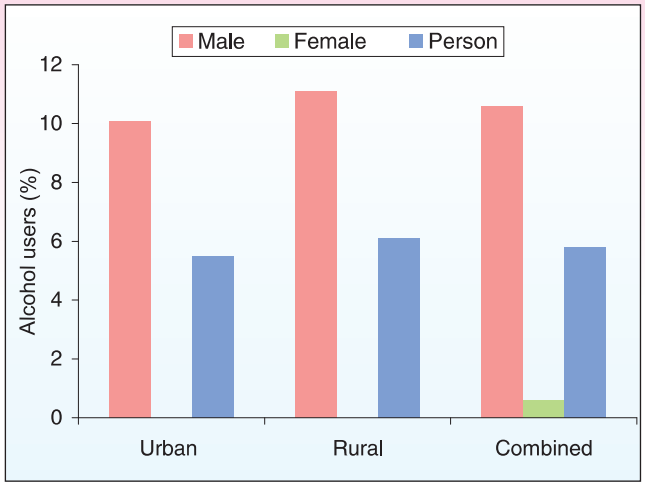

Figure 3. Alcohol consumplion (%) by sex and residence

Fruits and Vegetables Consumption

In a week, people consumed vegetables almost every day and fruits only 2 days. The mean number of days when fruits were consumed was almost same for urban and rural population. Only 15% of population consumed five or more servings of fruits and vegetables per day.

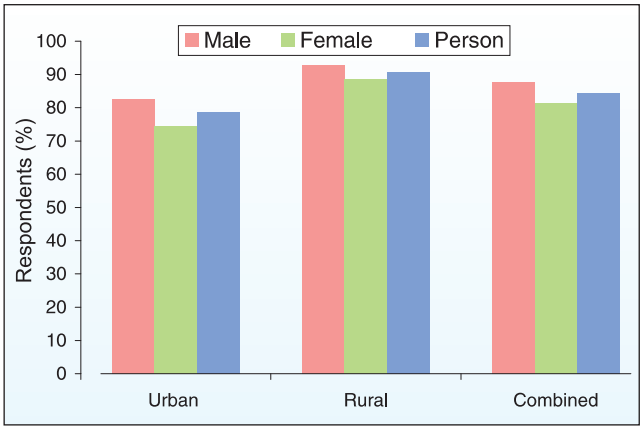

Figure 4. Less than 5 servings of fruits & vegetables consumption (%) by sex and residence

In respect of consumption of specific food habits, 49% consumed red meat, 45% population consumed eggs, and 15% consumed fish at least once a week. Sweetened drinks was consumed daily by 68% of the population. Cake pastries or other bakery items and fried local foods were consumed daily by 13% of population.

Most common edible oil used for cooking among households in Mizoram was mustard oil (53%), followed by soyabean oil (42%).

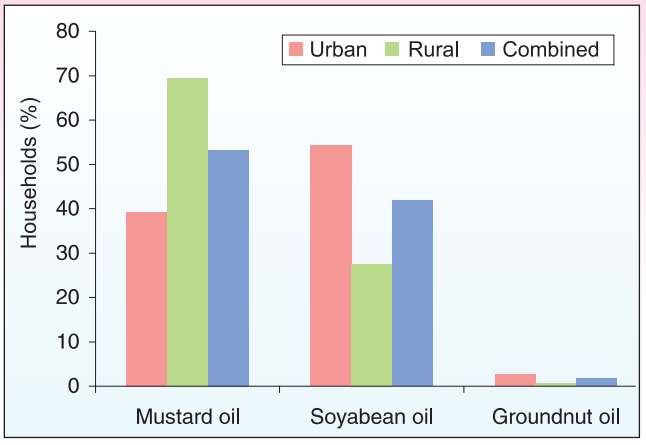

Figure 5. Major oil consumption among households (%) by residence

Physical Activity

The lack of physical activity leads to obesity, hyperlipidemia, diabetes mellitus, hypertension, and coronary heart disease. In this respect survey finds that in Mizoram, the mean time spent in different sub groups on work related physical activity range between 133 to 207 minutes per day. The mean duration of total physical activity was 1143 MET minutes per day. Around 35 minutes and 13 minutes per day were spent for travel and recreational activities respectively.

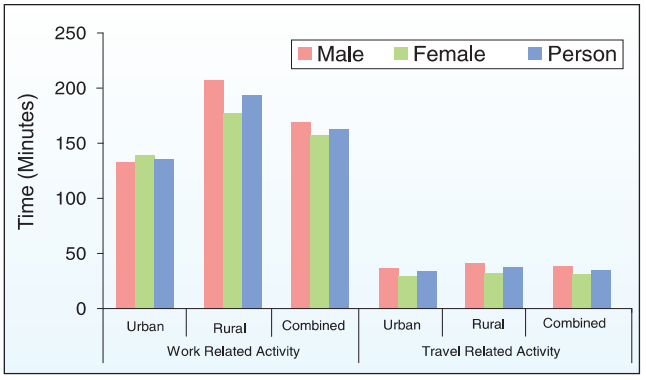

Figure 6. Mean time spent on physical activity per day (minutes) by sex and residence

As per the WHO guidelines, the total physical activity of the individual has been categorized as low, medium and high. About 71% of respondents recorded low level of physical activity, while 21% and 8% of respondents recorded medium and high level of activity, respectively. About 40% of respondents spent more than four hours followed by 26% spent 1-2 hours in sedentary activities.

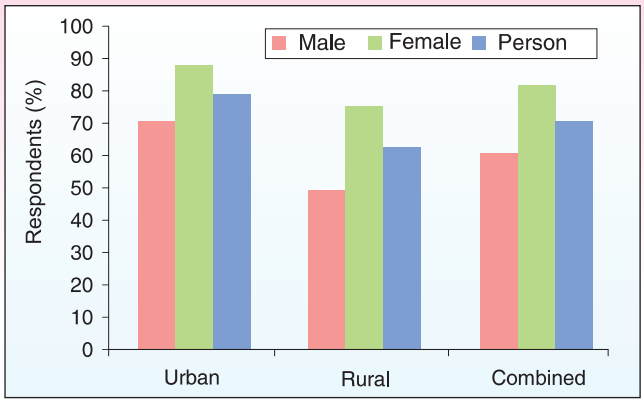

Figure 7. Low physical activity of respondents (%) by sex and residence

HYPERTENSION AND DIABETES

Hypertension

The blood pressure is an important determinant of risk of cardiovascular and ischemic heart diseases, congestive cardiac failure and renal failure. In the survey, 7% respondents report to have been diagnosed as hypertensive by health professionals (7% for males and 6% for females; 7% for urban and 6% for rural population). Among those who were diagnosed for hypertension, 46% were on prescribed drugs, 40% of diagnosed were advised dietary modification, and 6% consulted AYUSH practitioner of which 42% were taking treatment from the same. The survey also carried out measurement of blood pressure as a part of step two of individual questionnaire. The mean systolic blood pressure in the population was around 124 mm Hg and mean diastolic blood pressure was 81 mm Hg. By categories of hypertension, 22% report to be normal, 58% in pre hypertension, 15% in stage I hypertension and 5% in stage II hypertension. Stage I & II hypertension was more pronounced in men (23%) as compared to women (15%).

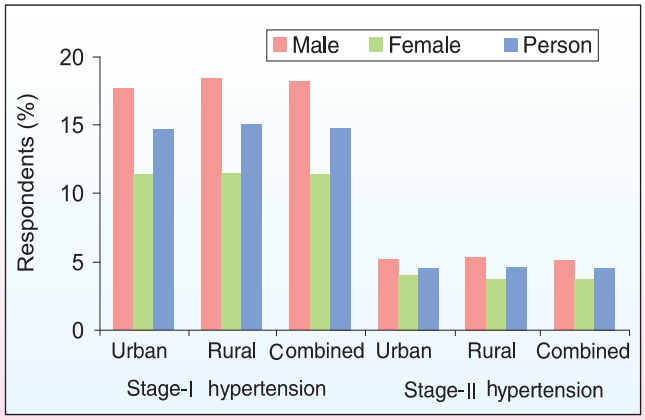

Figure 8. Stage I & II hypertension (%) by sex and residence

Diabetes

Diabetes mellitus is an important marker of risk for the arterial disease of the coronary, cerebral and peripheral arterial trees, and for micro vascular disease leading to blindness and renal failure. The survey also included information on history of diabetes. About 0.6% of respondents reported to have history of raised blood sugar of which 28% were taking insulin and 62% were on oral drugs. A large number of them were advised life style modification such as diet modification, reducing weight and increasing physical activity.

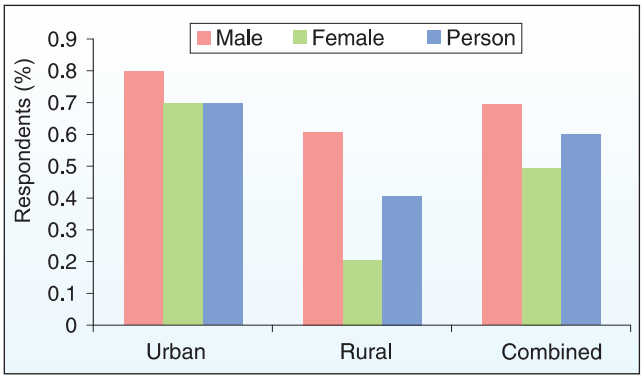

Figure 9. History of raised blood sugar (%) by sex and residence

PHYSICAL MEASUREMENTS

Body Mass Index (BMI)

World wide researches have shown that there is a strong association between BMI and health risk. On the other hand low BMI was an indicator of risk to health, often being associated with tobacco, alcohol use and drug addiction. The survey recorded on height, weight and waist circumference. The mean BMI was around 21 kg/m^2 with mean height 160 cm (164 cm for men, 156 cm for women) and mean weight 565 kg (59 kg for men

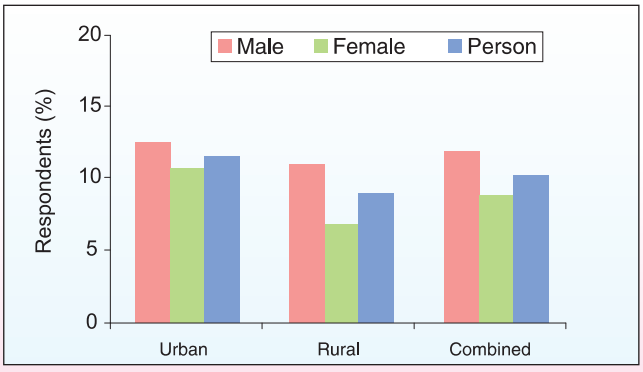

Figure 10. Overweight respondents (%) by sex and residence in Mizoram

and 51 kg for women). According to the survey, 14% of the respondents were under weight and about 10% were overweight which was 12% in urban and 9% in rural population. Overall 75% of the respondents were in the normal category of BMI.

SOCIO-DEMOGRAPHIC DIFFRENTIALS

Tobacco is mainly used either in the form smoking or smokeless (chewing tobacco with lime or *Pan*) in Mizoram. The prevalence of smoking was high among urban as well as rural population. Prevalence of smoking was low (14%) among females compare with males (62%) in urban population. Prevalence of smoking was high in all the age groups of male population. Pattern of smoking among females was increasing with age. But, prevalence by age in the urban male population was attaining high in the age group 25-35 than declining in the older age groups. Similarly, prevalence by education was found declining with increasing level of education among female respondents, but it was prevalent in all the education levels of males. Smoking among female respondents was low compare with males across all the socio-demographic categories, which shows gender differentials. Occupation is an important socioeconomic indicator. The differences in prevalence of smoking were higher form one category of occupation to another. Prevalence of smoking in the occupational categories of agriculture and manual work was high compare with other categories. The prevalence of smokeless tobacco users was high among females compare with males. Pattern of prevalence was increasing with age, but it was declining with level of education. The prevalence of current alcohol drinkers was also showing an increasing pattern with age groups up to 35-44 than declining over older age group. The pattern of prevalence by education was low among lower level of education, but it was prevalent in higher level. It shows low impact of education on drinking alcohol. Overall, prevalence of drinking alcohol was low which was possibly due to alcohol prohibition in Mizoram. The habit of tobacco use was very high among young age population which contributes to the high risk of NCD at productive stage of life.

The fruits and vegetable consumption and regular physical activity reduce the risk of non-communicable diseases. But, the study indicates high proportion of population taking inadequate amount of fruits and vegetables (less than five servings of fruits and vegetables per day). Prevalence of low consumption was high in all the age groups, level of education and occupation by sex and residence with marginal differences in between some of the groups. Besides that, two-third of the population was found in the category of doing low physical activity. The differences in the pattern of low physical activity by age, sex, education, occupation and residence were also observed. Among the older (55-64) and younger age groups (15-24), the people were doing less physical activity as compare with other age groups. Female respondents were more in low physical activity compare with males across all the age groups. However, rural people were doing more physical work than urban, but the pattern was similar across all age groups and sex. The physical activity by education was observed low among higher level education whereas it was comparatively high among the people of lower level education. Occupational difference in physical work activity was also observed across all the categories. The people whose occupation was agriculture or manual work were doing more physical work compare with other occupational categories. Low physical activity was high among the occupation of service, executive and business, and domestic work.

Hypertension is a major non-communicable disease risk factor especially related to cardiovascular disease. The increasing pattern of prevalence of hypertension (stage I & II) was recorded with increasing age group of people across all the subgroups of population (sex and urban-rural). It was prevalent in all the level of education with marginal differences with one another. Hypertension was prevalent in all the occupational categories across residence and sex with some differences between the subgroups.

Overweight (obesity) is a major risk factor of Non-communicable diseases. High prevalence of overweight was recorded in all the age groups except the younger age (15-24). Prevalence of overweight was higher among males compare with females across all the age groups. The prevalence of overweight among urban population was higher comparing with rural. However, prevalence of overweight was low among illiterate whereas it was high among higher level of education. Similarly, prevalence was also recorded low among the people whose occupation was agriculture whereas it was high in other categories of occupation.

Overall, NCD risk factors were prevalent across all the socioeconomic and demographic categories of population in Mizoram.

The results generated through this IDSP-NCD survey would certainly focus on major issues in bringing about change or initiate various programs related to control of non-communicable diseases.

Chapter 1

Introduction

1.1 BACKGROUND OF SURVEY

In response to a long felt need expressed by various expert committees, the Government of India through the Ministry of Health & Family Welfare initiated a decentralized, state based Integrated Disease Surveillance Project (IDSP) in the country with the assistance of the World Bank in the year 2004. The project envisaged detecting early warning signals of impending outbreaks; initiate an effective response in a timely manner. Unlike communicable diseases, most non-communicable diseases are latent type and they occur after a prolonged exposure to life style risk factors like smoking, raised blood sugar, raised blood pressure and hyper-cholestremia. Public health action would be primarily directed against preventive strategies for the disease and hence the priority was to monitor risk factors rather than non-communicable diseases themselves.

Periodic community based surveys covering representative adult population were planned under the IDSP to provide data on NCD risk factors at state level enabling states to develop strategies and activities to prevent and control the non-communicable diseases. It was taken up as a collaborative project of the Ministry of Health & Family Welfare, Govt. of India's National Institute of Communicable Diseases and the Indian Council of Medical Research with National Institute of Medical Statistics (NIMS) as the National Nodal Agency (NNA) and Regional Resource Centres (RRCs). The State Survey Agencies (SSAs) were identified based on their experience and knowledge about the local conditions. The division of non communicable diseases at ICMR coordinated the overall activities and guided in the project development, implementation, monitoring and evaluation.

The NIMS provided the technical assistance at all stages of the survey including development of survey protocol, sampling methodology, survey questionnaire etc. with the approval of the National Technical Advisory Committee (NTAC). The survey was supervised and monitored by the RRCs for quality assurance. The RRCs were identified in order to provide training to the field investigators, monitoring of data collection and technical support to the field agencies particularly for the anthropometrical and blood pressure measurements. All states were proposed to be covered in a phased manner. The first phase states included Andhra Pradesh, Kerala, Madhya Pradesh, Uttarakhand, Mizoram, Tamil Nadu and Uttarakhand. The present treatise is the survey report of the state of Mizoram. Regional Institute of Medical Sciences, Imphal was the SSA in the state, while Regional Medical Research Centre, Dibrugarh was the RRC.

1.2 OBJECTIVES

The overall objective of the NCD-risk factors survey was to improve the information available to the Government health services and care providers on a set of high-priority risk factors, with a view to improve on-the-ground responses to such risk factors. It also aimed to provide essential data to monitor progress of on going disease control programs and reallocate health resources more optimally. The specific objectives of the survey were to:

1. Assess the prevalence of NCD risk factors in different strata of population in the states;
2. Establish a baseline database of NCD risk factors needed to monitor trends in population health behavior and risk factors for chronic diseases over a period of time in the states ; and
3. Provide evidence for evolving strategies and interventions for identified risk factors in the community to reduce the burden of Non-Communicable Diseases in the population

1.3 NON-COMMUNICABLE DISEASE (NCD) RISK FACTORS

A "risk factor" refers to any attribute, characteristic, or exposure of an individual, which increases the likelihood of developing a non-

communicable disease. The major (modifiable) behavioural risk factors identified in the World Health Report 2002[2] are tobacco use, harmful alcohol use, unhealthy diet (low fruit and vegetable consumption) and physical inactivity. On the other hand, the major biological risk factors identified are overweight and obesity, raised blood pressure, raised blood glucose and raised total cholesterol. These major behavioural and biological risk factors were included in non-communicable disease risk factors survey except raised blood sugar and total cholesterol, because they have the greatest impact on non-communicable disease and vegetables are associated with several health benefits, including a decreased risk for some types of cancer. Low consumption of fruit and vegetables has been identified as a risk factor in the development of a range of chronic diseases, including coronary heart disease, stroke and many forms of cancer. Research has indicated that the required intake of fruit for optimal health benefits is five daily servings of fruit and vegetable.

Lack of physical activity leads to obesity, dyslipidemia (lower high-density lipoprotein levels), insulin resistance, diabetes mellitus and high

RISK FACTORS COMMON TO MAJOR NCD'S

Risk factor	Non-communicable Disease			
	CVD	Diabetes	Cancer	Respiratory
Smoking/tobacco	+	+	+	+
Alcohol	+		+	
Nutrition	+	+	+	+
Physical Inactivity	+	+	+	+
Raised BP	+	+	+	
Raised blood Sugar	+	+		
Obesity	+	+	+	+
Blood lipids*	+	+	+	

+ Corresponds to Risk Factor;
* Not being included in Phase I; CVD – Cardiovascular Disease

mortality and morbidity, and modification is possible through effective prevention

Tobacco use is a known or probable cause of about 25 diseases including heart disease; cancer, stroke, chronic obstructive pulmonary disease and digestive tract disease, as well as, has significant adverse effects on pregnancy. Smokeless tobacco use causes oral cancer in the lip, tongue, mouth, and throat areas and digestive system cancers. The relationship between alcohol consumption and health and social outcomes is complex and multi-dimensional. Alcohol consumption is linked to more than 60 disease conditions including liver cirrhosis, several cancers (liver, laryngeal, esophageal and oropharyngeal cancers), injuries and hemorrhagic strokes.

Consumption of fruits and vegetables reduces the risk of NCDs, like cancers and cardiovascular diseases. Dietary patterns that include higher intakes of fruits blood pressure levels. Physical inactivity is a well-established risk factor for coronary heart disease (CHD) and is associated with about a twofold increase in risk of CHD.

1.4 HEALTH PROFILE OF THE STATE

Mizoram, predominantly a Christian populated state, is located towards the southern-most tip of the North-Eastern states, sharing borders with Manipur, Assam, Tripura and then jutting between Myanmar and Bangladesh. It has an area of 21087 Sq. Kms. and a population of 958 people (in thousands)[3]. There are 8 districts, 16 subdivisions, and 802 villages in the state. The State has population density of 45 per sq. km. (as against the national average of 325). The population of the state continues to grow at a higher rate than the national rate. The key population and health indicators for Mizoram are presented in Table 1.1 and Table 1.2.

Table 1.1. Demographic and Socioeconomic profile of Mizoram as compared to India

S. No	Indicator	Mizoram	India
1	Total Population(in thousands)*	958	1128521
2	Decadal Growth Rate*	28.82	21.52
3	Population ratio (Urban/1000 Rural)*	985	385
4	Crude Birth Rate (Per 1000 Population)**	17.8	23.5
5	Crude Death Rate (Per 1000 Population)**	5.5	7.5
6	Infant Mortality Rate (Per 1000 Live Births)**	25	57
7	Sex Ratio (Females/1000 Males)*	935	933
8	Population Below Poverty Line (in %)†††	12.6	27.5
9	Literacy Rate#	88.8	64.8

Source: National Health Profile 2007, Central Bureau of Health Intelligence[4] (*Registrar General, India; **SRS Bulletin, October 2007; †Statistical Report, RGI 2004; ††Statistical Report RGI, 2005; RGI; PCA; †††Planning Commission of India).

Table 1.2. Health Infrastructure, Human Resource available and Health Expenditure

S. No	Indicator	Mizoram	India
1	Number of Government Allopathic Doctors***	247	76542
2	Average Population served/Doctor***	3879	-
3	Total Number of Registered Nurses††	3152	1509196
4	Number of Doctors at the PHCs†††	35	22273
5	Total CHCs Specialists at CHCs†††	0	3979
6	Health Assistant (Male & Female)†††	114	35330
7	Health Worker (Male & Female)†††	726	215206

Source: National Health Profile 2007, Central Bureau of Health Intelligence, MOHFW
(* Medical Council of India; ** Dental Council of India; *** Directorate of state health services; † Department of AYUSH, MOH&FW/ GOI; †† Indian Nursing Council, Pharmacy Council of India; ††† Bulletin on Rural Health Statistics in India, 2006 – Special Revised Edition, MOHFW)

1.5 SURVEY DESIGN AND IMPLEMENTATION

Sample Size

In order to achieve the aforesaid objectives, it was assumed that we should be able to estimate a parameter that has a level of 15% in a subgroup of population, with a relative precision of 30%, design effect as 1.25 and we would be able to achieve a response rate of 90%. Assuming that NCD risk factors are concentrated in 15-64 years for both males and females, the required sample size for each sex in 10-years age groups was estimated to be about 280. It is a known fact that the proportion of population in the 10 year age groups decrease with increase in age. In any population, the proportion of population in the age-group 55-64 is lowest and varies in the range of 5-7 percent depending upon the fertility level (it is at the lower end, i.e., 5% in high fertility states, e.g. Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan, in the middle, i.e. 6% in moderate fertility states and at the upper end, i.e. 7% in low fertility states). Keeping such scenario of population composition in view and in order to have targeted 280 females and 280 males in age group 55-64, a sample of 5000 households was considered to be adequate for the survey.

Sample Design

A uniform sample design with equal allocation in urban and rural area was adopted in all states. In each state, the rural sample was selected in two stages: the selection of Primary Sampling Units (PSUs), which are villages with probability proportional to population size (PPS) at the first stage, followed by the random selection of households within each PSUs at second stage using systematic random sampling. In urban areas, a three-stage procedure was followed. In the first stage, wards were selected with PPS sampling. In the second stage, one Census Enumeration Block (CEB) was randomly selected from each sample ward. In the final stage households were randomly selected within each CEB using the systematic random sampling procedure. From each selected PSU in rural area and from each selected Census Enumeration Block (CEB) in urban area, 50 households were selected. From each selected household, one individual was selected from those who fall in the 15-54

age range by using KISH method[5] whereas all who fall in the age group 55-64 were included in the sample.

Sample Selection in Rural Areas

In rural area, the 2001 Census list of villages served as the sampling frame[3]. The list was stratified by a number of variables. The first level of stratification was geographic with villages classified into five contiguous regions. In each region, villages were further stratified by village size and the percentage of the population belonging to scheduled castes or scheduled tribes. The final level of stratification was implicit for all strata consisting of an ordering of villages within each stratum in ascending and descending order alternatively by the level of female literacy. From the list of villages so arranged, villages were selected systematically with probability proportional to the population of the village. Small villages with <75 households were linked with one or more adjoining villages to form PSUs. Villages with fewer than 5 households were excluded from the sampling frame.

In each selected sample PSU, a mapping and household listing was carried out prior to the data collection that provided the necessary frame for selecting households at the second stage. The household listing operation involved preparing up-to-date location map and layout sketch maps of each selected PSU, assigning numbers to structures, recording addresses or the location of these structures, identifying residential structures, and listing the names of the heads of all the households in residential structures in selected PSUs. The household listing operation was carried out by independent teams.

A complete listing of households was carried out in the villages with household up to 400 households. In case of villages with more than 400 households were divided into at least three segments of 150-300 households as average size of each segment and two segments were selected for households listing using the systematic random sampling method. In each selected PSU, 50 households were selected from the household list using systematic random sampling.

Sample Selection in Urban Areas

The 2001 Census list of wards was used as the sampling frame. All wards were stratified by geographic regions, size of ward and percentage of SC/ST population. Female literacy was used for implicit stratification. A sample of wards was selected systematically with probability proportional of ward. One Census Enumeration Block (CEB), consisting of approximately 150-200 households, was selected from each selected ward using the PPS sampling method. The household listing operation was carried out in each selected census enumeration block similarly as in the village in rural area, which provided the necessary frame for selecting 50 households from the CEB.

Sample Weights

Appropriate sampling weights for households were used for urban and rural areas of the state. In urban sector it consisted of factors reflecting ward selection probabilities, census enumeration block (CEB) selection probabilities within wards; and household selection probabilities within CEB; and household non-response adjustments. In rural sector, the element of weight consisted of factors reflecting probability of selection of PSU, household selection probability within the PSU, and household non-response adjustments.

From each selected household one member aged 15-54 was selected using the KISH method and all members aged 55-64 were selected. Since objective of the study was to obtain estimates for each age group (15-24 through 55-64) and by sex, post stratification was used for improvement of efficiency of the estimators. Post stratification weights for individuals are constructed using the state age distributions for both sexes of the urban and rural sector, which are available on the population level (Appendix-A)[6].

Sample Implementation

During the survey, information collected from a random sample of 4569 households covering 2341 households from rural and 2228 from urban areas. From these households, a total of 4495 respondents were contacted, interviewed and completed the Step-1 and Step-2 survey. The overall individual response rate for the survey was 100% (Table 1.3)

Against the target sample size of 280, there is low turnout in certain age groups and high turn out in other (it may be seen in the subsequent table 2.2). It might be due to either misreporting of age or replacement of the individual who was selected but not available at the time of interview affecting the use of Kish method to give the required sample size. In fact, the Kish method was used in each selected household to select one respondent amongst those who were aged 15-54. It was done by the field investigator after listing of members of the household and arranging them according to age, sex and then selecting one respondent for the interview.

Table 1.3 Sample coverage and response rate of household, step-1 and step-2 individual response rate by place of residence, Mizoram, 2007- 08

Response	Residence		
	Urban	Rural	Combined
Households interview			
Households contacted	2500	2500	5000
Households interviewed	2228	2341	4569
Households response rate (%)	89.1	93.8	91.4
Eligible participants Step-1			
Individual contacted	2174	2321	4495
Individual interviewed	2174	2321	4495
Response rate (%)	100.0	100.0	100.0
Eligible Participants Step-2			
Step-2 completed	2174	2321	4495
Overall individual response rate (%)	100.0	100.0	100.0

There is possibility that some respondents in the age group15-54 particularly males were not available at home during the survey (10AM to 5 PM) and thereby might have been replaced by those household members who were present at the time of survey.

1.6 SURVEY INSTRUMENTS

The survey used two types of questionnaire, the Household Questionnaire and the Individual Questionnaire (Appendix-B). The overall content and format of the questionnaires were determined through a series of workshops and meetings held in 2006-07. The questionnaires for each state were bilingual with questions in both the English and principal language of the state which was Mizo in the present case. It first listed all usual residents age 12 years and above, in each sample household. For each listed members, survey collected basic information on age, sex and relationship to the head of the household. The residential status (whether present in the household or temporary away from household) was gathered. The above information was used to identify the eligible individual for the survey in the age group 15-64 years, for administering individual questionnaire. The Household Questionnaire also collected information on religion, ownership of a house, type of house with number of rooms, main source of drinking water, type of toilet facility, main source of lighting, types of cooking fuel, type of oil/cooking medium, ownership of agricultural land, ownership of livestock and possession of durable goods.

The Individual Questionnaire included questions seeking information from all the selected individuals (men and women) in the age group 15-64. The Individual Questionnaire covered information on demographic, behavioural and physical measurements under Step-1 and Step-2 with a number of sections into them. The first section of Step-1 included questions regarding the demographic information of individual, i.e., age, sex, marital status, education, and occupation. The behavioural information section included questions on tobacco use, alcohol consumption, diet, physical activity, history of raised blood pressure and history of diabetes.

Tobacco Use (Smoking & Smokeless): Questionnaire was used to elicit information on current and past use of tobacco (smoking & smokeless), age when used tobacco for first time, past history of tobacco use, and age when stopped using tobacco.

Alcohol use: Questionnaire collected information on whether the individual was currently consuming alcohol, use of alcohol in past 12 months, frequency of drinks in past 12 months, average number of drinks consumed in one day, alcohol consumed within past 30 days, number of standard alcoholic drink consumed per day in past 7 days, past history of alcohol consumption, and age when started consuming alcohol regularly.

The contents and format of these questionnaires were though largely governed by the WHO STEPS guidelines but they were finalized through a series of consultative meetings held at the Indian Council of Medical Research.

Diet: Questions were asked to collect information on number of days in a week when fruits were consumed, number of serving of fruits consumed in a day, number of days in a week when vegetables were consumed, number of serving of vegetables consumed in a day, frequency of consumption of cheese and butter, fried local food, red meat, eggs, chicken, fish, aerated soda,

sweetened drinks, pizza/burger/French fries, cakes/ pastries or other bakery items, chips/*namkeen*.

Physical Activity: Questions were asked about the intensity of physical activity in the daily work, frequency of doing physical activity of varying intensity, time spent in doing physical activity of varying intensity per day, mode of travel to and from places, time spent walking or bicycling, type of vigorous/moderate intensity sports for recreation being practiced, frequency of doing such vigorous/moderate intensity sports in a week, time spent doing vigorous/moderate intensity sports per day, practice of yoga, frequency of practicing yoga, duration of time spent per day in yoga, time spent sitting or reclining etc.

History of Raised Blood Pressure: Questions were asked on history of hypertension, medicines prescribed by a doctor and the advice given regarding diet, weight loss, smoking and nature of physical activity undertaken.

History of Diabetes: Questions covering history of diabetes, medicines prescribed by a doctor and advice given regarding diet, weight lose, smoking and physical activities were asked.

Individual questionnaire included several biomarker measurements in Step-2. The height of the eligible individual participant was taken in centimeter by using a portable height measuring board and also measured weight in kilogram using a portable electronic weighting scale. Waist circumference (not measured for pregnant women) was taken two times to provide additional information on overweight and obesity. Constant tension tape (Figure finder tape) measure was used for waist circumference measurements. The measurement was taken without clothing, that is, directly over the skin or over light clothing. The privacy area was maintained for this measurement.

Blood pressure of the individual participants was taken three times using automated blood pressure measuring instrument (OMRON®) and pulse rate was also measured three times using an automated blood pressure device.

1.7 TRAINING

In order to maintain uniform survey procedure across the country, a manual dealing with various aspects of the survey were prepared by NIMS, ICMR. There are five sections: (1) Project Protocol, (2) Survey Methodology, (3) Coordinator's Guide, (4) Trainers Guide and (5) Interviewer's Guide. The Interviewer's Guide consists of guidelines to the interviewers regarding interviewing procedure, field procedures and method on asking each question and recording answers. The Coordinator's Guide contains a detail description of the role and responsibilities of the state coordinators. The Trainer's Guide include training guidelines for the training of the field staff including survey methodology, survey instruments, mapping and list of households, preparation and collection of data.

The representatives of State Survey Agencies (SSAs) and Regional Resource Centres (RRCs) were trained in the Training of Trainers workshop and Data Entry & Management Workshop organized by NIMS at the beginning of the data collection (18-20 July 2007). The purpose of the former workshop was to explain the objective of the NCD Risk Factors Survey and ensure uniform application of survey material to collect good quality of data. The survey documents such as training manuals, survey instruments, list of selected rural and urban PSUs etc. was provided to them for conducting the survey. The equipments required for survey was procured centrally by ICMR and distributed to the SSAs and RRCs. The personnel trained in these workshops subsequently trained the field staff in their respective states.

Training of Field Staff

As mentioned, the field staff recruited for the survey in Mizoram was trained by Regional Institute of Medical Science, Imphal and Regional Medical Research Centre, Dibhrughar, and the officials of NIMS, New Delhi, supervised the training process. The training was conducted from 15th - 18th Ausgust, 2007 at Directorate of Health Service, Aizawl. The training consisted of lectures, classroom training, demonstration, practice interviews and field based training. A total of 21 participants were trained, 7 were supervisors and 14 were interviewers.

Each trainee was given a training kit at the beginning of training, the training kit comprised of an interviewers guide, household and individual schedules, consent form, IEC message, set of show cards (e.g. diet chart, alcohol chart) and reference forms (e.g. Kish table, table of random numbers), flow chart of activities in field, identity card and supporting letters from Government mentioning purpose of visit. A field visit to Sairang village of Aizawl district was also arranged as part of practical training of investigators in field activities and procedure for conducting a survey and as

part of pre-test. After the completion of training, letters were issued through Directorate of Health Services to DHOs, and Deputy Director of Health Services requesting their cooperation in smooth conduction of the survey.

Data Entry Training

Data entry software in Epi-info with its manual was developed by the NIMS, ICMR. A two-days data entry workshop cum hands on training was organized by NIMS, ICMR during 10-11 December 2007 for the statisticians and date entry personnel of the state survey agencies (SSAs). The purpose of the workshop was to familiarize the participants with the software. Emphasis was made on double data entry in order to ensure high accuracy in data entry and to minimize data entry errors. All the participants were provided with the Data Entry Software and it's Manual.

1.8 DATA PROCESSING AND ANALYSIS

Following the data entry by the state survey agency (SSA), the validity and consistency check was carried out by the NIMS, ICMR for final analysis. Analysis plan in terms of dummy tables was finalized in consultation with ICMR Review Group.

Prevalence of current smokers, current daily smokers and past daily smokers was calculated among the respondents by sex and place of residence. Those who smoke tobacco daily, the mean number of tobacco products (*bidis, cigarettes, pipes, cigars,* etc.,) used daily was calculated taking denominator as all daily smokers. Though the age of initiation of smoking was collected from all daily smokers in completed years but for the past smokers it was calculated by imputation because it was not recorded. Finally average age of initiation of smoking was calculated in two age groups of smokers, 15-34 years and 35-64 years. The same procedure was followed for the calculation of average age of initiation of smokeless tobacco. Prevalence of alcohol consumption was calculated for last twelve month, last thirty days and last seven days and presented as percentage. The mean age of initiation of alcohol consumption was also calculated. Mean number of servings fruit, vegetables, and combined (fruit and vegetables) consumed per day was computed.

Mean physical activity per day was computed by combining all types of physical activity (vigorous, moderate-intensity, travel and recreational) using METs (Metabolic Equivalent) score. Prevalence of reported cases of blood pressure and diabetes were also calculated. Measurement of height, weight and waist circumference of individual respondent was used to compute BMI (body mass index) and central obesity.

1.9 QUALITY CONTROL MEASURES

A uniform project protocol, survey methodology, training manuals, survey instruments and data-management modules were developed and adopted across all the states including Mizoram. It was executed by the Regional Institute of Medical Science, Imphal (SSA) and was monitored by the Regional Medical Research Centre, Dibrugarh (RRC). The Division of Non-Communicable Diseases, Indian Council of Medical Research and the National Institute of Medical Statistics coordinated and supervised the survey in the state along with other states. In addition, an independent check by collecting data in randomly drawn sample of 10% of PSUs was carried out by RRC. High concordance was recorded between the survey by SSA and independent checked by RRC on some key indicators like smoking, alcohol consumption and physical activity with an overlapping of 95% confidence intervals. Various activities hitherto were to maintain the highest level of the quality of data.

CHAPTER 2

Background Characteristics of the Households and Respondents

This chapter presents the demographic and socio-economic characteristics of the sample households and the respondents from these households in the survey population of Mizoram. It also describes facilities in the households.

2.1 HOUSEHOLD CHARACTERISTICS

Table 2.1 provides the percentage distribution of households in rural and urban areas by various characteristics of the surveyed households. Majority of the households (92%) were Christian followed by Buddhist (5%). Christians constitutes 98% of urban households and 85% of rural households. Ten percent of the rural households were Buddhist. Sixty-nine percent of sample households had piped drinking water supply followed by 14% well water and 13% surface water. It was found that 86% of urban households and 49% of rural households had piped drinking water supply. Regarding the sanitation facility, 64% of the households had flush toilets and 36% had pit toilets. The urban households were more likely to have access to the flush toilets (87%) as compared to rural households (36%) in Mizoram.

Ninety four percent of households used electricity as main source of lighting, which was higher in urban area (99%) than that in the rural area (88%). In the state, only 17% households had *pucca* house, 59% households had *semi-pucca* house and 24% households had *kaccha* house. About 28% of urban households and 4% of rural households had *pucca* houses. The type of fuel used for cooking in Mizoram was wood as the most common type (66%) among rural households and L.P.G. was most common (91%) among urban households. In the state as whole, 64% households used L.P.G. followed by wood (34%) and others (2%).

Table 2.1 Percentage distribution of households in rural and urban area according to the background characteristics, Mizoram, 2007- 08

Characteristics	Residence		Combined
	Urban	Rural	
Religion of household head			
Hindu	1.0	3.2	2.1
Muslim	0.3	0.5	0.4
Christian	98.3	85.0	92.1
Buddhist	0.1	10.3	4.8
Others	0.3	1.0	0.6
Total	100.0	100.0	100.0
Source of drinking water			
Piped	86.4	48.5	68.8
Hand pump	1.1	0.9	1.0
Well water	1.9	26.8	13.5
Surface	6.7	19.3	12.5
Others	3.9	.5	4.2
Total	100.0	100.0	100.0
Sanitation facility			
Flush toilet	87.2	36.2	63.6
Pit toilet	12.4	62.9	35.8
No facility	0.4	0.9	0.6
Total	100.0	100.0	100.0

Main source of lighting			
Electricity	99.3	87.5	93.9
Kerosene	0.7	10.4	5.0
Gas/Oil	0.0	0.3	0.1
Other	0.4	1.8	1.0
Total	100.0	100.0	100.0
Type of house			
Pucca	27.6	4.0	16.7
Semi-Pucca	63.4	54.5	59.3
Kachha	9.0	41.5	24.0
Total	100.0	100.0	100.0
Cooking fuel			
LPG	90.5	32.5	63.6
Wood	6.9	65.5	34.0
Kerosene	0.4	0.3	0.4
Others	2.2	1.7	2.0
Total	100.0	100.0	100.0
Separate kitchen room			
Yes	54.5	36.0	45.9
No	45.5	64.0	54.1
Total	100.0	100.0	100.0
Agriculture land			
Own agriculture land (%)	20.2	49.1	33.6
Number	2228	2341	4569

Four in every ten households in Mizoram had own agricultural land. Half of the rural households had no own agricultural land compared to 80% in urban area. The proportion of households having separate kitchen was 46%. This percentage was 55 for urban households against 36 for rural households.

2.2 AGE AND SEX COMPOSITION

A total of 4495 with 2297 males and 2198 females from urban and rural areas were contacted and interviewed in the survey. They are presented in 10 years age groups 15-24, 25-34, 35-44, 45-54 and 55-64. The distribution of the number of respondents across the five age groups is depicted for both males and females as well as for both sex together, separately for urban and rural areas and combined in Table 2.2. It may be seen that the number of respondents was least, i.e. 274, in the age group 55-64 and maximum, i.e., 1319 in age group 25-34 years.

2.3 EDUCATION LEVEL

Table 2.3 presents the percentage of the respondents according to their literacy levels by sex and place of residence. The literacy rate in Mizoram was recorded high. About 91% of the total respondents were literate (97% among urban and 85% among rural respondents).

Table 2.2 Age and sex-wise distribution of respondents by type of residence (unweighted), Mizoram 2007- 08

	Residence						Combined		
	Urban			Rural					
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
15 - 24	252	292	544	279	308	587	531	600	1131
25 - 34	300	365	665	322	332	654	622	697	1319
35 - 44	271	244	515	305	198	503	576	442	1018
45 - 54	183	166	349	226	178	404	409	344	753
55 - 64	57	44	101	102	71	173	159	115	274
15 - 64	1063	1111	2174	1234	1087	2321	2297	2198	4495

2.4 MARITAL STATUS

The second panel of Table 2.3 shows the percentage of respondents according to the three marital categories by sex and place of residence. About half of the respondents were currently married, 39% were never married and 8% were widowed, divorced or separated. The proportion of respondents who were currently married does not vary much by urban and rural residents.

2.5 OCCUPATION

Table 2.3 provides information on the current occupation of the respondents. In the sample, about 37% of female respondents were currently engaged in domestic work. Individuals involved in agricultural activities were about 27% in case of males and 16% in case of females. Females in both rural and urban were mostly engaged in domestic work. Male respondents were mostly engaged in agriculture (27%) and manual work (25%).

Table 2.3 Percentage of respondents according to background characteristics, sex and place of residence, Mizoram, 2007- 08

Characteristic	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Education									
Illiterate	2.3	3.4	2.8	11.0	19.5	15.0	6.5	11.0	8.7
Primary	8.8	12.5	10.6	20.1	20.5	20.2	14.3	16.2	15.2
Middle	20.5	21.7	21.1	32.7	30.8	31.8	26.4	26.0	26.2
Secondary	23.8	29.0	26.3	22.9	20.9	22.0	23.4	25.2	24.3
Higher Secondary	21.5	16.8	19.2	6.8	4.3	5.7	14.4	10.9	12.7
College & above	23.1	16.6	20.0	6.5	4.0	5.3	15.0	10.7	12.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Marital status									
Never married	46.6	39.5	43.2	38.4	30.4	34.6	42.7	35.2	39.0
Married	49.4	49.8	49.6	55.7	56.8	56.2	52.4	53.1	52.8
Widowed/Divorced / Separated	4.0	10.7	7.2	5.9	12.8	9.2	4.9	11.7	8.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Occupation									
Executive/Business	9.6	9.0	9.3	3.6	6.0	4.6	6.7	7.6	7.1
Agriculture	10.2	8.0	9.1	44.6	24.3	35.0	26.8	15.7	21.5
Domestic work	1.4	31.6	16.0	3.0	42.3	21.6	2.3	36.6	18.6
Services/Sales	15.6	9.7	12.8	7.8	3.7	5.9	11.8	6.9	9.5
Manual worker	32.0	12.7	22.7	18.0	4.0	11.4	25.2	8.6	17.3
Other (Specify)	31.2	29.0	30.1	23.0	19.7	21.5	27.2	24.6	26.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	1063	1111	2174	1234	1087	2321	2297	2198	4495

CHAPTER 3

Behavioural Risk Factors

This chapter presents the prevalence of certain behavioural risk factors for the non-communicable diseases in the survey population. The survey questionnaire asked questions about certain life style of respondents which could be considered as the behavioural risk factors for non-communicable diseases.

3.1 TOBACCO SMOKING AND CHEWING

As per the WHO STEPS guidelines to measure the prevalence of smoking habit among the respondents, the smokers are categorized as *current smokers*, *current daily smokers*, *past daily smokers* and those who have never smoked in lifetime were classified as *non-smokers*.

Table 3.1.1 presents the percentage of respondents, both males and females as well as combined in various categories of smokers and non-smokers according to the place of residence (rural or urban). About 44% of the respondents in the survey were current smokers. They were mostly current daily smokers. The prevalence of smoking was 67% among men and 19% among women. By place of residence, 36% of urban respondents and 48% of rural respondents were current daily smokers. Only 3% of respondente were past daily smokers.

Table 3.1.2 presents the mean number tobacco products smoked daily among those respondents who were current daily smoker of any form of tobacco.

Among those who were current daily smokers of different products of tobacco, the mean number of smoking per day was 14 in case of *bidis*, 11 for manufactured cigarettes, 12 for hand-rolled cigarettes and 10 for other tobacco products. There was no much difference between male and female respondents in the mean frequency of smoking bidi or manufactured cigarette or hand-rolled cigarettes. The mean number of smoking manufactured cigarettes was marginally higher among male respondents (11 per day) as compared to female respondents (10 per day). In case of hand-rolled cigarettes, however, the mean number of smoking was slightly higher among urban respondents (13 per day) as compared to rural respondents (12 per day).

Table 3.1.3 presents the mean age of initiation, age at stopped smoking and the percentage of non-smoker respondents exposed to tobacco smoke by sex

Table 3.1.1 Percentage of respondents classified by smoking status across sex and place of residence, Mizoram, 2007-08

Residence/ Sex	Smoking Status							
	Current smokers		Current daily smokers		Past daily smokers		Never smoked	
	P (%)	95% CI	P (%)	95% CI	P (%)	95% CI	P (%)	95% CI
Urban								
Male	61.8	(58.3,65.3)	59.0	(55.3,62.7)	3.2	(2.0,5.0)	35.0	(31.4,38.8)
Female	13.8	(10.5,17.3)	11.2	(8.5,14.5)	2.4	(1.3,4.5)	83.8	(79.8,87.2)
Total	38.7	(35.7,41.5)	35.9	(33.2,38.7)	2.8	(1.8,4.4)	58.5	(55.2,61.8)
Rural								
Male	72.7	(67.8,76.8)	70.1	(65.6,74.2)	3.7	(2.2,6.0)	23.6	(19.7,28.0)
Female	24.6	(19.9,30.1)	23.8	(18.6,28.3)	2.9	(1.7,4.9)	72.5	(66.5,76.6)
Total	49.9	(45.5,54.3)	47.8	(43.6,52.1)	3.7	(2.1,5.3)	46.4	(42.1,50.8)
Combined								
Male	67.0	(64.0,69.9)	64.3	(61.3,67.3)	3.4	(2.4,4.8)	29.6	(26.6,32.5)
Female	18.8	(16.0,22.0)	16.8	(14.1,19.9)	2.7	(1.8,4.0)	78.5	(74.8,81.1)
Total	44.0	(41.4,46.6)	41.6	(39.1,44.2)	3.1	(2.2,4.2)	52.9	(50.0,55.5)

Table 3.1.2 Mean number of tobacco products smoked (per day) by daily smokers according to sex and place of residence, Mizoram, 2007- 08

Residence/ Sex	Type of smoking							
	Bidi		Manufactured Cigarettes		Hand-rolled Cigarettes		Other	
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Urban								
Male	*	*	11.1	(10.6,11.7)	13.1	(11.9,14.4)	10.6	(9.7,11.5)
Female	*	*	9.6	(7.9,11.4)	10.7	(8.9,12.5)	8.1	(6.8,9.4)
Total	*	*	11.0	(10.5,11.0)	12.7	(11.6,13.8)	10.0	(9.2,10.8)
Rural								
Male	14.6	(12.9,16.3)	11.2	(10.5,11.9)	12.6	(12.0,13.1)	11.6	(11.0,12.1)
Female	12.3	(8.8,15.8)	9.3	(5.9,12.7)	9.1	(8.2,10.0)	8.5	(7.9,9.2)
Total	13.8	(12.1,15.5)	11.0	(10.3,11.8)	11.8	(11.3,12.3)	10.7	(10.2,11.1)
Combined								
Male	14.6	(12.8,16.4)	11.2	(10.7,11.6)	12.7	(12.2,13.3)	11.2	(10.7,11.7)
Female	12.3	(8.8,15.8)	9.5	(7.9,11.1)	9.6	(8.7,10.4)	8.4	(7.8,9.0)
Total	13.9	(12.2,15.6)	11.0	(10.6,11.5)	12.1	(11.6,12.6)	10.4	(10.0,10.8)

*Figure not shown, based on fewer than 5 unweighted cases

Table 3.1.3 Mean age of initiation, age at stopped smoking and percentage of respondents (non-smokers) exposed to tobacco smoke by sex and place of residence, Mizoram, 2007- 08

Residence/ Sex	Smokers						Non-smokers	
	Age of Initiation (15-34 years)		Age of Initiation (35-64 years)		Age at Stopped		Exposed to tobacco smoke at Home or Work	
	Mean	95% CI	Mean	95% CI	Mean	95% CI	P (%)	95% CI
Urban								
Male	18	(17.5,18.5)	19	(18.5,20.5)	33	(28.0,39.1)	41	(32.2,51.6)
Female	19	(18.5,20.5)	20	(19.5,21.5)	33	(29.4,38.5)	50	(41.3,60.0)
Total	18	(17.5,18.5)	19	(18.5,20.5)	33	(29.7,37.7)	47	(39.3,56.2)
Rural								
Male	17	(16.5,17.5)	18	(17.5,18.5)	34	(29.7,40.2)	51	(42.9,60.5)
Female	19	(18.5,20.5)	20	(19.5,21.5)	34	(25.8,44.0)	64	(56.0,72.7)
Total	17	(16.5,17.5)	18	(17.5,18.5)	34	(30.4,39.4)	60	(52.9,68.5)
Combined								
Male	17	(16.5,17.5)	18	(17.5,18.5)	34	(30.5,38.0)	45	(39.0,52.3)
Female	19	(18.5,20.5)	20	(19.5,20.5)	34	(29.9,38.9)	56	(50.6,62.9)
Total	17	(16.5,18.5)	18	(17.5,19.5)	34	(31.3,37.2)	53	(47.7,58.9)

and the place of residence. The mean age for initiation of smoking among young respondents aged 15-34 years was 17 years and among respondents aged 35-64 years was 18 years. The mean age of cessation of smoking for all those who stopped smoking was 34 years. On an average, for urban respondents in Mizoram, age at initiation of smoking was 19 years for all those respondents whose current age was 35-64 years and for the rural respondents in the same age group it was 18 years. The mean age of initiating smoking for an urban respondent in the age group 15-34 years was 18 years whereas it was 17 years for rural respondents. The mean age of cessation of smoking for rural male and female was 34 years and for urban male and female it was 33 years.

About 53% respondents of those who never smoked were exposed to tobacco smoke at home or work place. It was 45% in case of men and 56% in case of women. Over 47% of the urban respondents and 60% of the rural respondents were exposed to tobacco smoke at home or work place.

Table 3.1.4 provides percentage of smokeless tobacco users by sex and place of residence of the

Table 3.1.4 Percentage of smokeless tobacco users by sex and place of residence, Mizoram, 2007- 08

Residence/ Sex	Smokeless tobacco user							
	Current user		Current daily user		Past daily user		Never used	
	P (%)	95% CI	P (%)	95% CI	P (%)	95% CI	P (%)	95% CI
Urban								
Male	41.1	(33.7,49.0)	37.9	(31.0,45.3)	2.9	(1.8,4.5)	56.0	(51.8,66.2)
Female	48.0	(40.2,55.9)	45.0	(38.0,52.3)	1.7	(0.9,3.2)	50.3	(46.2,60.4)
Total	44.4	(37.9,51.1)	41.3	(35.6,47.3)	2.3	(1.4,3.7)	53.3	(50.4,62.1)
Rural								
Male	52.2	(45.8,58.6)	49.4	(43.2,55.7)	3.1	(2.2,4.4)	44.7	(32.8,49.0)
Female	63.7	(58.5,68.6)	61.2	(55.9,66.3)	4.3	(2.8,6.5)	32.0	(24.1,36.5)
Total	57.7	(53.1,62.2)	55.0	(50.5,59.5)	3.6	(2.7,4.9)	38.7	(29.7,41.9)
Combined								
Male	46.5	(41.4,51.6)	43.5	(38.6,48.4)	3.0	(2.2,4.0)	50.5	(44.5,55.9)
Female	55.4	(50.6,60.2)	52.7	(48.1,57.2)	2.3	(2.0,4.2)	42.3	(37.4,47.3)
Total	50.8	(46.6,54.9)	47.9	(44.1,51.7)	3.0	(2.3,3.9)	46.2	(41.9,50.9)

respondents. Above 50% of the respondents were current users of smokeless tobacco with 47% among men and 55% among women. A small percentage of men and women (3%) were past daily users. The prevalence of smokeless tobacco use was higher in rural area (58%) as compared to that of the urban area (44%). More females (64% of rural and 48% of urban) than males (52% of rural and 41% of urban) were current users of smokeless tobacco.

The mean number of times per day various smokeless tobacco products used such as tobacco chewing and pan with tobacco are provided in Table 3.1.5. The mean number of times chewing tobacco per day in Mizoram was about 10 for men and women each. There was no urban-rural differential in frequency of chewing tobacco. The mean frequency of chewing pan with tobacco was 10 per day for men and 8 per day for women. The mean number of times chewing pan with tobacco was 8 for urban female, 11 per day for urban male, 8 for rural male and for rural female it was 7 per dayper day.

The mean age of initiation and age at stopped smokeless tobacco use by sex and place of residence of respondents are provided in Table 3.1.6. The mean age of initiation of smokeless tobacco use among those who use smokeless tobacco and were aged 15-34 years, was 17 years for males and 18 for females. Urban males and females appeared to initiate smokeless tobacco at the same age (18 years). Rural males started smokeless tobacco little earlier than rural females. For respondents

Table 3.1.5 Mean frequency of smokeless tobacco use (per day) by the daily smokeless tobacco users according to sex and place of residence, Mizoram, 2007- 08

Residence/ Sex	Type of smokless tobacco			
	Chewing tobacco		*Pan* with tobacco	
	Mean	95% CI	Mean	95% CI
Urban				
Male	9.8	(8.7,10.8)	11.3	(9.6,13.0)
Female	9.5	(7.8,11.3)	8.3	(6.8,9.7)
Total	9.6	(8.2,11.0)	10.2	(8.6,11.7)
Rural				
Male	9.4	(8.5,10.3)	7.6	(5.6,9.5)
Female	10.3	(9.0,11.5)	7.2	(4.0,10.4)
Total	9.9	(9.0,10.6)	7.4	(5.0,9.8)
Combined				
Male	9.5	(8.8,10.3)	9.8	(8.5,11.1)
Female	10.0	(9.0,11.0)	7.6	(6.1,9.5)
Total	9.8	(9.0,10.6)	9.0	(7.6,10.4)

Table 3.1.6 Mean age of initiation, age at stopped smokeless tobacco use by daily smokeless tobacco user according to sex and place of residence, Mizoram, 2007- 08

Residence/ Sex	Smokeless tobacco users					
	Age of Initiation (15-34 years)		Age of Initiation (35-64 years)		Age at Stopped	
	Mean	95% CI	Mean	95% CI	Mean	95% CI
Urban						
Male	18	(17.5,18.5)	20	(19.5,20.5)	22	(13.1,31.1)
Female	18	(17.5,19.5)	20	(19.5,20.5)	31	(19.6,42.1)
Total	18	(17.5,18.5)	20	(19.5,20.5)	25	(16.7,33.2)
Rural						
Male	16	(15.5,17.5)	19	(18.5,20.5)	21	(15.1,26.7)
Female	17	(16.5,17.5)	19	(18.5,20.5)	27	(17.1,36.9)
Total	17	(16.5,17.5)	19	(18.5,20.5)	24	(18.0,30.3)
Combined						
Male	17	(16.5,18.5)	19	(18.5,20.5)	22	(16.3,26.7)
Female	18	(17.5,18.5)	19	(18.5,20.5)	28	(20.5,35.7)
Total	18	(17.5,18.5)	19	(18.5,20.5)	24	(19.7,29.3)

aged 35-64 years, the mean age of initiation of smokeless tobacco use was 19 years (for both males and females). The mean age of quitting smokeless tobacco use for those who did so was 24 years; it was 22 years in case of urban men and 31 years in case of urban women. The mean age of quitting smokeless tobacco use for urban respondents was 25 years against 24 years for rural respondents.

Table 3.1.7 presents the percentage of smokers and smokeless tobacco users by sex and the place of residence. It shows that 68% of respondents were either smoking or using smokeless tobacco whereas 21% of the respondents were using both forms of tobacco, i.e. smoking and also smokeless tobacco. The use of either smoking or smokeless tobacco was 60% for urban and 77% for rural respondents. The use of both the forms of tobacco (smoking as well as smokeless tobacco) was 17% for urban and 26% for rural respondents. The percentage of respondents either smoking or using smokeless tobacco was 76% among men and 60% among women.

Overall, sixty eight percent of population in Mizoram used tobacco in any form (i.e. smoking or smokeless). This prevalence was 76% among males and 60% among females. Six in every 10 men and 2 in 10 women smoked tobacco daily. Half of the population was smokeless tobacco users whereas 44% of men and 53% of women were smokeless tobacco users daily. Use of smokeless tobacco was high among rural population compare to urban. The mean age of initiation of tobacco use among

Table 3.1.7 Percentage of tobacco users by sex and place of residence, Mizoram, 2007- 08

Residence/ Sex	Tobacco Use							
	Smokeless tobacco users only		Smokers only		Both (Smoking and smokeless)		Any form (Smoking or smokeless)	
	P (%)	95% CI	P(%)	95% CI	P (%)	95% CI	P (%)	95% CI
Urban								
Male	10.1	(7.4,13.7)	31.3	(25.5,37.7)	27.8	(21.7,34.7)	69.1	(64.8,73.2)
Female	39.0	(33.2,45.0)	5.1	(3.5,7.3)	6.1	(3.9,9.4)	50.1	(43.6,56.6)
Total	24.0	(20.1,28.5)	18.6	(14.9,23.0)	17.3	(13.9,21.4)	60.0	(55.3,64.5)
Rural								
Male	13.3	(10.8,16.3)	33.9	(27.3,41.2)	36.1	(30.7,42.0)	83.3	(79.4,86.6)
Female	47.2	(43.0,51.5)	9.1	(6.7,12.3)	14.0	(10.6,18.2)	70.3	(64.6,75.4)
Total	29.3	(26.5,32.3)	22.2	(18.0,26.9)	25.7	(22.0,29.7)	77.2	(72.9,80.9)
Combined								
Male	11.7	(9.8,13.8)	32.5	(28.2,37.2)	31.8	(27.5, 35.4)	76.0	(73.0,78.8)
Female	42.9	(39.2,46.6)	7.0	(5.5,8.8)	9.8	(7.7,12.4)	59.7	(55.2,64.0)
Total	26.6	(24.1,29.2)	20.3	(17.6,23.4)	21.3	(18.7,24.2)	68.2	(64.9,71.3)

*Percentage not shown, based on fewer than 10 observation.

young age people was 17 years for smokers and 18 years for smokeless tobacco users. These findings emphasize the need of implementing the tobacco control programme for prevention of NCD.

3.2 ALCOHOL CONSUMPTION

Table 3.2.1 presents the percentage of respondents who consumed alcohol in past 30 days and 12 months by sex and place of residence. About 6% respondents have consumed alcohol in past 30 days and 11% consumed in past 12 months. Only 5% respondents were past drinker. About 11% men consumed alcohol in past 30 days and about one fifth (21%) men consumed alcohol in past 12 months. Women were not involved much in consumption

Table 3.2.1 Percentage of Alcohol consumption by sex and place of residence, Mizoram, 2007- 08

Residence/ Sex	Alcohol Consumption							
	Consumed alcohol (Last 30 days)		Consumed alcohol (Last 12 months)		Past drinker		Life time abstainer	
	P (%)	95% CI	P (%)	95% CI	P (%)	95% CI	P (%)	95% CI
Urban								
Male	10.1	(7.1,14.2)	19.1	(15.2,23.7)	7.0	(4.3,11.2)	73.9	(67.5,80.0)
Female	*		0.8	(0.4,1.6)	1.1	(0.5,2.2)	98.1	(96.1,98.5)
Total	5.5	(4.0,7.7)	10.3	(8.2,12.9)	4.1	(2.6,6.6)	85.6	(81.5,88.7)
Rural								
Male	11.1	(8.2,15.0)	22.1	(17.1,28.1)	11.0	(7.6,15.6)	66.9	(59.8,74.6)
Female	*		*		1.0	(0.5,2.3)	98.8	(95.7,98.9)
Total	6.1	(4.6,8.0)	11.9	(9.3,15.1)	6.3	(4.4,8.9)	81.8	(77.5,85.6)
Combined								
Male	10.6	(8.4,13.2)	20.6	(17.3,24.2)	8.9	(6.6,11.9)	70.5	(66.0,75.6)
Female	0.6	(0.3,1.0)	0.6	(0.4,1.1)	1.1	(0.6,1.8)	98.3	(96.6,98.4)
Total	5.8	(4.7,7.2)	11.0	(9.3,13.0)	5.2	(3.9,6.8)	83.8	(80.9,86.3)

*Percentage not shown; based on fewer than 10 unweighted cases.

Table 3.2.2 Percentage of drinkers (past 12 months) according to the frequency of drinking, mean number of standard drinks per day and pattern of drinking in the last seven days by sex and place of residence, Mizoram, 2007- 08

Alcohol consumption	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Frequency of drinking in past 12 months (%)									
5-7 days per week	9.2	*	9.3	6.8	*	7.3	8.0	*	8.3
1-4 days per week	25.6	*	25.5	23.1	*	22.9	24.3	*	24.2
1-3 days per month	41.9	*	40.8	33.1	*	33.5	37.4	*	37.1
Less than once per month	23.4	*	24.4	36.9	*	36.2	30.3	*	30.4
Mean number of drinks on a drinking day	2.7	2.6	2.7	1.8	3.9	1.8	2.3	3.1	2.3
Drinks during last 7 days									
Alcohol consumed on 4+days (%)	43.8	*	43.0	35.1	*	35.9	39.4	*	39.4
**Binge drinking on any day (%)	6.5	*	8.5	9.0	*	9.4	7.8	*	8.9
20+ drinks in 7 days (%)	9.8	*	9.3	4.2	*	4.1	7.0	*	6.7
Avgerage standard drinks per day	1.7	0.6	1.4	0.9	1.0	0.9	1.2	0.8	1.2

*Percentage not shown; based on fewer than 10 unweighted cases. **5+ Drinks on any day for male; and 4+ drinks on any day for female

of alcohol. Rural men were more likely to consume alcohol (11% in past 30 days and 22% in past 12 months) than urban men (10% in past 30 days and 19% in past 12 months). Percentage of lifetime abstainer to alcohol was higher among urban men 74% as compared to that among rural men (67%).

Table 3.2.2 presents the percentage of those who consumed alcohol according to frequency of consuming alcohol in past 12 months, mean number of standard drinks consumed on a drinking day, frequency of consuming alcohol in past one week and the average standard drink per days.

Of the current male drinkers, 23% of urban, 37% of rural and 30% in the combined sample consumed alcohol on less than one occasion in a month. Further, 42% male current drinkers of urban and 33% of rural consumed alcohol 1-3 days per month in past one year. About 26% of the male current drinkers of urban and 23% of rural consumed alcohol 1-4 days every week and about 9% male current drinkers of urban and 7% of the rural consumed alcohol 5-7 days per week in the past one year. The average numbers of drinks consumed on a drinking day was 2 drinks. There were very few cases of alcohol consumption among the female respondents.

The respondents who were current drinker were also asked about their behaviour in terms of the number of days and number of drinks per day they took in the past 7 days preceding the survey. The survey fuond that 44% male respondents of urban, 35% male respondents of rural and 39% of males in combined sample consumed alcohol at least 4 days a week. About 8% of current drinkers of urban and 9% of rural were in high risk drinking zone (binge drinking). The average number of standard drink consumed per day was calculated using the data collected for alcohol consumption by current drinkers in the week preceding the survey. It was about one standard drinks per day.

Table 3.2.3 presents the mean age of initation alcohol use by sex and the place of residence for current and past drinkers in the age group 15-34 year and 35-64 years. The mean age of initiation of alcohol consumption regularly in the age group of 15-34 years was 21 years with 23 years for urban and 20 years for rural respondents. They were mostly men. The mean age of initiation in the age group 35-64 years was 35 years.

Table 3.2.4 presents the percentage of current daily smokers and smokeless tobacco users and current drinkers by age, education and occupation. The percentage of daily smokers was high in the age group 25-34 years (28%), among middle educated (28%) and agriculturist (33%). Similarly, percentage of smokeless tobacco users was high in the age group 25-34 years (29%), among middle educated (29%) and agriculturist (25%). The percentage of current drinkers was high (41%) in the age group 25-34, among middle educated (27%) and those who report their occupation as manual work (38%).

Interesting observations of alcohol consumption exhibited that two in every ten men consumed alcohol at least once in last one year whereas one in every ten men in last one month. The alcohol consumption among females was very low. The mean age of initiation of alcohol consumption by young age

Table 3.2.3 Mean age of initiation of alcohol use by sex and place of residence, Mizoram, 2007-08

Residence/ Sex	Alcohol users			
	Age of Initiation (15-34 years)		Age of Initiation (35-64 years)	
	Mean	95% CI	Mean	95% CI
Urban				
Male	24	(21.5, 25.5)	30	(25.5, 36.5)
Female	23	(17.5, 28.5)	40	(35.5, 44.5)
Total	23	(22.5, 25.5)	35	(28.5, 37.5)
Rural				
Male	20	(19.5, 21.5)	36	(35.5, 37.5)
Female	*	*	42	(25.5, 52.5)
Total	20	(19.5, 21.5)	36	(35.5, 37.5)
Combined				
Male	21	(20.5, 23.5)	35	(30.5, 36.5)
Female	23	(17.5, 28.5)	42	(40.5, 45.5)
Total	21	(20.5, 23.5)	35	(32.5, 37.5)

*Figure not shown: based on fewer than 5 unweighted cases

Table 3.2.4 Percentage of current daily smokers, daily smokeless tobacco user and current drinkers across age, education and occupation, Mizoram, 2007- 08

Characteristic	Smoker	Smokeless tobacco user	Current drinkers
Age group			
15-24	25.9	26.0	18.5
25-34	27.8	29.4	41.0
35-44	22.5	22.6	27.9
45-54	14.9	14.5	9.7
55-64	8.9	7.5	2.9
Total	100.0	100.0	100.0
Education			
Illiterate	10.1	10.7	14.6
Primary	19.7	17.8	9.7
Middle	27.6	29.1	26.5
Secondary	19.9	24.4	25.1
Higher Secondary	11.0	9.4	13.0
College & above	11.7	8.6	11.1
Total	100.0	100.0	100.0
Occupation			
Executive/Business	7.1	8.2	8.7
Agriculture	32.5	25.0	27.4
Domestic work	8.6	24.7	4.1
Services/Sales	10.3	9.2	11.5
Manual worker	24.5	16.8	38.1
Other	17.0	16.1	10.2
Total	100.0	100.0	100.0
Number	1932	2324	272

men was 21 years. Low prevalence of alcohol use in Mizoram was possibly due to Govt. prohibition on alcohol consumptions in the state.

3.3 FRUITS AND VEGETABLES CONSUMPTION

Survey asked questions about the number of days in a typical week on which fruits and vegetables were consumed by the respondents and the number of servings of fruits and vegetables consumed on one of those days. Table 3.3.1 presents mean number of days of such consumptions by sex and place of residence.

In Mizoram, people consumed vegetables about 7 days and fruits for 2 days in a week. There were no rural-urban and male-female differentials. About 85% of respondents report that they had less than five servings of fruits and vegetables per day on those days when they consumed it. It was 79% for urban respondents and 91% for rural.

From Table 3.3.2, it can be seen that the mean number of servings of, fruits was less than one and vegetables was two servings in one particular day.

Table 3.3.1 Mean number of days in a week fruit and vegetable consumed by the respondents according to sex and place of residence, Mizoram, 2007- 08

Fruits and vegetables consmption per week	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Mean number of days fruits consumed	2.1	2.7	2.4	1.9	2.4	2.1	2.0	2.6	2.3
Mean number of days vegetables consumed	6.8	6.8	6.8	6.8	6.9	6.8	6.8	6.8	6.8
Less than five servings of fruits & vegetables consumed per day (%)	82.7	74.5	78.8	92.7	88.5	90.7	87.6	81.2	84.5

Table 3.3.2 Mean number of servings of fruits, vegetables consumed in on a typical day by sex and place of residence, Mizoram, 2007- 08

Number of servings of fruits/vegetables/both per day	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Servings of fruit	0.5	0.7	0.6	0.4	0.5	0.5	0.5	0.6	0.5
Servings of vegetable	2.3	2.4	2.3	1.9	1.9	1.9	2.1	2.1	2.1
Servings of fruit and vegetable	2.7	3.0	2.9	2.3	2.4	2.3	2.5	2.8	2.6

Nutritional inadequacy is the major risk factor of many non-communicable diseases. Overall, 85% of population in Mizoram consumed less than five servings of fruits and vegetables per day, which was inadequate as per WHO recommended standards. On an average only two days in a week people consumed fruits against vegetables consumed on 7 days. This is an important health issues and needs to be address with more emphatically.

Food and Oil Consumption

The percentage of respondents according to the intake of specific food items at least once a week by place of residence is provided in Table 3.3.3. The specific food items included cheese/butter, fried local foods, red meat, eggs, chicken, aerated soda, sweetened drinks, pizza/burger/French fries, cakes/ pastries or other bakery items, chips/*namkeen* etc in the survey. About 49% population consumed red meat, 45% consumed eggs, 15% consumed fish,13% consumed chicken at least once in a week. Sweetened drinks and fried local foods were consumed daily by 14% and 4% of the population respectively.

Table 3.3.4 presents the type of edible oil used for

Table 3.3.3 Percentage of respondents according to the intake of specific food items by sex and place of residence, Mizoram, 2007- 08

Specific Food Items	Residence				Combined	
	Urban		Rural			
	Daily	At least once in a week	Daily	At least once in a week	Daily	At least once in a week
Cheese/ Butter	1.4	5.6	0.3	1.0	0.9	3.4
Fried local foods	15.7	9.9	11.3	7.7	13.6	8.9
Red Meat	1.6	66.3	0.5	29.2	1.0	48.5
Eggs	5.5	54.3	1.8	35.5	3.7	45.3
Chicken	0.1	16.7	0.1	7.9	0.1	12.5
Fish	0.3	13.5	0.2	16.8	0.2	15.1
Aerated Soda	1.2	4.7	0.2	0.9	0.7	2.9
Sweetened drinks	58.1	4.3	78.9	6.2	68.0	5.2
Pizza/ burgers/ French fries etc.	1.4	4.3	0.3	1.5	0.8	3.0
Cakes, Pastries or other bakery items	21.4	30.3	4.2	13.3	13.2	22.2
Chips, Namkeen etc.	1.1	9.7	0.7	4.4	0.9	7.2

Table 3.3.4 Percentage of households according to type of oil consumption, Mizoram, 2007- 08

Type of oil	Residence		Combined
	Urban	Rural	
Mustard oil	39.3	69.5	53.3
Coconut oil	1.1	0.6	0.9
Groundnut oil	2.7	0.6	1.7
Sunflower oil	1.9	1.1	1.5
Soyabean oil	54.2	27.6	41.9
Palm oil	0.5	0.1	0.3
Vanaspati oil	0.2	0.0	0.1
Pure Ghee	0.0	0.1	0.1
Others	0.1	0.4	0.2
Total	100.0	100.0	100.0

cooking by the sample households in rural and urban residence. It shows that the use of mustard oil for cooking was highest (53% households with 39% of urban and 70% of rural households) followed by soyabean oil (42% households with 54% of urban and 28% of rural households) and groundnut oil (1.7% household with 3% of urban and 0.6% of rural households).

3.4 PHYSICAL ACTIVITY

It is well known that lack of physical activity leads to obesity, hyperlipidemia, diabetes mellitus, hypertension and coronary heart disease. An account of physical activities of respondents in terms mean time spent (in minutes) in doing physical activity at work, while traveling for work and recreation by sex and the place of residence, is provided in Table 3.4.1. On an average, people in Mizoram, were doing some physical activity for duration of 1143 MET minutes per day (945 MET minutes per day for urban and 1360 MET minutes per day for rural respondents). Men, on an average, spent 1347 MET minutes a day while women spent 920 MET minutes a day on physical activity. The mean time spent in work related physical activity was 163 minutes per day which was 136 minutes per day for urban and 193 minutes per day for rural respondents. The time spent in work related physical activity was more among men (169 minutes per day) than women (157 minutes per day).

The mean time spent in travel related activity (cycling/walking) was found to be 35 minutes per day, it was higher in rural (37 minutes per day) than urban area (34 minutes per day). It was more among men (39 minutes per day) as compared to women (31 minutes per day). The survey also reports that the mean time spent in recreational activities was 13 minutes per day with 16 minutes per day in urban and 9 minutes per day in rural area. Men spent more time (20 minutes per day) than women (5 minutes per day) in recreational activities.

According to Who Global Physical Activity Questionnaire Analysis Guidelines[7], the respondents were classified under three categories low, medium and high on the basis of duration for which they perform physical activities of varying intensity. The percentage of respondents according to three categories of physical activity by sex and place residence is presented in Table 3.4.2. Majority of the respondents (71% overall, 79% of urban and 63% of rural respondents) reported low physical activity, 21% of respondents (16% of urban and 27% of rural respondents) reported medium physical activity and only 8% of respondents (5% of urban and 11% in rural respondents) reported a high level of physical activity. Table 3.4.3 presents the percentage of respondents according to their category of time spent in physical activity by age and sex. About 6% of old age (55-64) respondents was recorded in high level of

Table 3.4.1 Mean time spent (in minutes) on physical activity per day by sex and residence, Mizoram, 2007- 08

Physical Activity	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total Physical Activity(MET)									
Mean	1085.3	793.1	944.5	1627.8	1061.9	1360.0	1347.0	920.4	1143.2
95% CI Lower	869.4	677.3	798.6	1443.7	908.8	1201.2	1206.5	824.5	1035.5
Upper	1301.3	908.9	1090.3	1811.8	1215.0	1518.8	1487.5	1016.4	1250.9
Work Related Activity									
Mean	133.3	138.9	136.0	207.0	176.7	192.7	168.9	156.8	163.1
95% CI Lower	105.1	113.6	112.6	181.1	151.0	168.6	150.06	138.8	146.1
Upper	161.5	164.2	159.5	233.0	202.5	216.8	187.1	174.8	179.7
Travel Related Activiy									
Mean	36.7	30.1	33.5	41.3	32.1	36.9	38.9	31.1	35.1
95% CI Lower	25.6	22.7	25.2	32.6	24.8	29.4	31.8	25.8	29.4
Upper	47.7	37.5	41.8	50.0	39.5	44.5	46.0	36.3	40.9
Recreational Activity									
Mean	24.4	6.7	15.8	15.2	2.8	9.3	19.9	4.8	12.7
95% CI Lower	20.7	3.3	12.8	9.9	1.4	6.2	16.7	2.9	10.5
Upper	28.0	10.1	18.8	20.4	4.1	12.4	23.1	6.7	14.9
Number	1063	1111	2174	1234	1087	2321	2297	2198	4495

Table 3.4.2 Percentage of respondents classified in three categories of total physical activity per day (P & 95% CI) by sex and place of residence, Mizoram, 2007-08

Physical Activity	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Low	71.0	87.7	79.1	50.0	76.4	62.5	60.9	82.4	71.1
95% CI									
Lower	61.1	83.9	73.0	42.1	69.5	55.6	54.9	78.6	66.9
Upper	79.3	90.7	84.1	57.8	82.1	68.8	66.5	85.5	75.1
Medium	21.8	9.6	15.9	35.2	17.7	26.9	28.3	13.4	21.2
95% CI									
Lower	14.7	7.1	11.9	28.8	13.1	21.8	23.5	10.8	18.1
Upper	31.0	12.7	21.0	42.3	23.3	32.7	33.6	16.5	24.7
High	7.1	2.7	5.0	14.8	6.0	10.6	10.8	4.3	7.7
95% CI									
Lower	3.8	1.5	2.8	9.6	3.5	7.0	7.6	2.8	5.5
Upper	12.9	5.0	8.9	22.2	9.9	15.9	15.3	6.3	10.7

physical activity which was 5 to 10% in the younger age groups people of Mozoram. The total time spent daily in sedentary activities was also recorded and provided in Table 3.4.4. Majority of the respondents (40%) spent more than 4 hours in sedentary activities followed by 26% of the respondents spent 1-2 hours.

Table 3.4.3 Percentage of respondents (with 95% confidence interval) according to three categories of total physical activity by age group and sex, Mizoram, 2007-08

Age group	Sex								
	Men			Women			Both Sex		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
15-24	7.7 (4.8,12.1)	27.6 (20.8,35.5)	64.8 (56.9,71.9)	88.4 (84.2,91.5)	8.9 (6.2,12.6)	2.8 (1.5,5.1)	76.3 (71.3,80.7)	18.4 (14.5,23.1)	5.3 (3.4,8.2)
25-34	11.8 (7.8,17.6)	29.8 (24.7,35.3)	58.4 (51.7,64.8)	80.7 (75.6,84.9)	15.9 (12.1,20.5)	3.4 (1.9,6.2)	69.0 (64.0,73.5)	23.2 (19.5,27.3)	7.9 (5.3,11.6)
35-44	14.8 (9.9,21.7)	29.5 (23.1,36.8)	55.7 (48.2,63.0)	78.2 (71.8,83.5)	15.6 (11.6,20.5)	6.2 (3.9,10.0)	66.3 (60.8,71.4)	22.9 (19.3,27.0)	10.8 (7.2,15.9)
45-54	14.5 (8.9,22.7)	24.0 (18.8,30.1)	61.5 (53.4,69.0)	77.5 (70.7,83.2)	17.2 (12.3,23.5)	5.3 (2.8,9.8)	69.0 (62.9,74.5)	20.8 (16.9,25.4)	10.2 (6.6,15.4)
55-64	4.7 (2.3,9.4)	30.8 (18.6,46.5)	64.5 (49.8,76.8)	76.7 (66.6,84.5)	15.4 (9.2,24.6)	7.9 (4.1,14.9)	70.3 (60.8,78.2)	23.5 (15.7,33.8)	6.2 (3.5,10.8)

Note: WHO Steps guidelines used to calculate the cut off value of low, medium and high for total physical activity.

Table 3.4.4 Sex wise percentage of respondents classified according to total time spent in sedentary activity per day by type of residence, Mizoram, 2007-08

Time spent sitting/ reclining	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Less than 1 hours	6.2	6.4	6.3	3.3	3.9	3.6	4.8	5.2	5.0
1-2 hours	21.8	20.3	21.1	35.1	28.0	31.7	28.2	23.9	26.2
2-3 hours	10.2	13.7	11.9	24.0	22.8	23.5	16.9	18.0	17.4
3-4 hours	10.8	10.3	10.5	11.5	13.1	12.3	11.1	11.6	11.3
More than 4 hours	51.1	49.4	50.3	26.2	32.1	29.0	39.1	41.2	40.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

3.5 SOCIO-DEMOGRAPHIC PATTERN

The socio-demographic patterns of behavioural risk factors of NCD (tobacco, alcohol, fruits and vegetable consumption, and physical activity) by residence are presented in Table 3.5.1, Table 3.5.2, and Table 3.5.3.

Tobacco

Tobacco is mainly used as smoking and other forms of smokeless tobacco among urban and rural residents of Mizoram. The prevalence and pattern of smoking among urban male respondents was varying with age groups (57% in 15-24, 71% in 25-34, 68% in 35-44, 53% in 45-64 and 49% in 55-64). Prevalence was attaining high in the age group (25-34) and than it was declining by increasing of age (older age groups). However, prevalence of smoking was 14% among females and pattern was increasing with age. Pattern of prevalence by education was low (49%) among illiterate, but it was varying from 59% to 65% in the different levels of education of male respondents. Among female respondents, it was decreasing with increasing level of education. Occupation is an important socioeconomic indicator and differences in prevalence of smoking tobacco were observed form one category of occupation to another. Prevalence of smoking among occupational categories of agriculture (79%) and manual worker (74%) was high compare with other categories of occupation of males. Prevalence of smokeless tobacco users among females was higher(48%) compare with males (41%). However, pattern of prevalence was increasing with age (32% in 15-24 to 57% in 55-64) and decreasing with level of education (54% among primary to 33% among college level). In the occupational categories, prevalence of smokeless tobacco users was high among the occupation of domestic work (62%). Among urban male respondents, smokers were higher (62%) than smokeless tobacco users (41%), but the pattern was some extent similar in both.

Rural-urban differences in the prevalence of smoking and smokeless tobacco users were observed across all the socio-demographic categories. Prevalence of smoking among rural male respondents was high (73%) compare with urban males (62%). Overall, pattern of smoking and smokeless tobacco users in urban and rural subgroups of population remain similar across age, education and occupation. The prevalence of smoking among rural male respondents shows the similar pattern with age (61% in 15-24, 83% in 25-34, 78% in 35-44, 75% in 45-54 and 72% in 55-64) as recorded among urban males. It was declining with increasing level of education (85% of illiterate to 59% of college). Prevalence among rural female respondents was comparatively lower (25%) than males (73%). Prevalence of smoking among occupational categories of agriculture (67%) and manual worker (72%) of rural respondents was high compare with other (Table 3.5.2). Similar pattern of smoking and smokeless tobacco users was observed in the combined urban and rural population (Table 3.5.3).

Alcohol

The prevalence of current alcohol drinkers was 19% among urban male respondents, and it was varying with age groups (11% in 15-24, 29% in 25-34, 26% in 35-44, 15% in 45-54 and 6% in 55-64 age groups). It was comparatively low among older age (55-64). An increasing pattern of prevalence with age was observed up to age group of 25-34, than the pattern declined with increasing age groups (in older age). Prevalence of drinking alcohol by education among male respondents was varying (11% of illiterate, 9% of primary, 22% of middle, 26% of secondary, 17% of higher secondary and 16% of college and above). It was increasing with levels of education up to secondary than declining over higher level of education. Prevalence of drinking alcohol among urban respondents was high among the occupation of manual work (28%) and executive and business (24%). As prevalence of drinking alcohol was very low among the urban female respondents, the habit of drinking was mainly confined among males (Table 3.5.1). Among the rural male respondents, current alcohol users were high in the adult age groups (31% in 25-34, 24% in 35-44, 15% in 45-54 and 10% in 55-64). By education, the pattern prevalence was decreasing with increasing level of education (43% among illiterate to 10% among collage and above) in rural male population. However, prevalence in the occupation categories of executive and business (26%) and manual work (24%) were high compare with others (Table 3.5.2). A similar pattern of prevalence of alcohol use was observed in the combined (rural and urban) population across age, education and occupation (Table 3.5.3).

Fruits and Vegetables

Though fruits and vegetable consumption reduces the risk of non-communicable diseases, but the survey showed larger proportion of population consumed inadequate amount of fruits and vegetables (i.e. less than five servings of fruits and vegetables per day). Prevalence of low (inadequate) consumption was recorded high (79%) among urban population with marginal differences between age groups (77% in 15-24

Table 3.5.1 Percentage of respondents in the category of some high risk factors of NCD (current daily smokers, daily smokeless tobacco user, current drinkers, low fruits and vegetables intake and low physical activity) across age, education, occupation and sex, urban, Mizoram, 2007- 08

Characteristic	Smoker			Smokeless tobacco user			Current drinkers			Less than five servings of fruits & vegetables consumed per day			Low physical activity		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age group															
15-24	57.3	5.3	31.6	30.6	32.3	31.5	11.3	0.0	5.7	81.0	73.7	77.4	69.8	93.5	81.5
25-34	70.9	11.1	42.4	42.6	57.1	49.5	29.1	1.2	15.8	80.4	75.0	77.8	74.4	86.5	80.1
35-44	67.5	16.3	43.4	46.7	59.8	52.9	26.1	2.0	14.8	86.1	69.6	78.4	70.1	85.9	77.5
45-54	52.5	29.3	41.8	47.2	58.9	52.7	15.0	1.0	8.4	82.0	81.7	81.9	73.5	80.6	76.8
55-64	48.6	36.5	42.7	65.9	46.5	56.5	5.6	0.0	2.9	93.3	79.2	86.4	62.0	77.2	69.3
Total	61.9	13.6	38.6	41.4	48.0	44.4	19.1	0.8	10.3	82.7	74.5	78.8	71.0	87.7	79.1
Education															
Illiterate	48.6	31.4	38.9	48.5	41.9	44.8	10.5	0.0	4.6	79.9	79.7	79.8	41.5	66.5	55.9
Primary	60.5	34.8	45.9	59.3	50.8	54.4	9.3	0.0	4.0	74.8	60.4	66.6	37.3	73.1	57.7
Middle	65.3	13.7	39.7	49.1	57.2	53.1	22.4	1.0	11.8	79.1	77.9	78.5	55.8	83.5	69.6
Secondary	62.1	10.1	34.5	44.2	54.9	49.8	25.7	1.3	12.7	90.0	77.3	83.2	67.9	93.0	81.3
Higher Secondary	63.2	5.9	39.1	31.2	38.0	34.1	17.3	0.0	10.0	82.2	72.3	78.0	84.9	93.4	88.5
College & above	59.4	7.8	38.6	32.6	33.0	32.7	15.7	1.2	9.9	82.4	77.1	80.3	90.8	93.5	91.9
Total	61.9	13.6	38.6	41.1	48.0	44.4	19.1	0.8	10.3	82.7	74.5	78.8	71.0	87.7	79.1
Occupation															
Executive/Business	55.3	17.3	37.6	40.8	61.7	50.6	23.7	2.1	13.6	70.5	71.5	70.9	82.1	88.2	84.9
Agriculture	78.8	25.2	56.3	54.0	43.3	49.5	18.5	3.0	12.0	80.0	76.7	78.6	30.2	62.8	43.9
Domestic Work	**	15.3	16.0	54.9	62.6	62.2	0.0	0.2	0.2	76.8	70.0	70.4	91.3	89.0	89.1
Services/Sales	60.2	10.7	42.0	49.7	47.7	48.9	20.2	0.0	12.8	84.3	71.6	79.6	91.0	95.1	92.5
Manual Worker	73.8	12.4	57.2	48.0	47.2	47.8	28.1	1.4	20.9	82.1	80.6	81.7	58.0	78.0	63.4
Other	48.6	8.8	30.2	25.2	29.5	27.2	9.1	0.5	5.1	87.6	78.0	83.1	83.5	94.8	88.7
Total	61.9	13.6	38.6	41.1	48.0	44.4	19.1	0.8	10.3	82.7	74.5	78.8	71.0	87.7	79.1
Number (n)	1061	1109	2170	1063	1109	2172	1063	1109	2172	1063	1109	2172	1063	1109	2172

** Figure not shown; based on fewer than 15 unweighted cases

to 87% in 55-64). Inadequate consumption of fruits and vegetables was also high in all the education levels (80% of illiterate, 67% of primary, 79% of middle, 83% of secondary, 78% of higher secondary and 80% of college and above). Prevalence of low consumption was high (82%) among manual worker whereas it was varying from 70% to 80% in rest of the occupation categories (Table 3.5.1). A similar pattern of inadequate consumption of fruits and vegetables was observed among rural population. Prevalence of inadequate consumption was high among all the age groups (89% in 15-24 to 98% in 55-64). Prevalence by education was varying between 95% among primary to 86% in college and above. The low (inadequate) consumption of fruits and vegetables was varying from 89% to 92% of different occupational categories (Table 3.5.2). Overall, prevalence of low consumption of fruits and vegetables by age, education and occupation was high in all the categories and pattern was similar as recorded in rural and urban population of Mizoram (Table 3.5.3).

Physical Activity

The differences in the prevalence of low physical activity were recorded across age, sex, education and occupation in urban population (Table3.5.1). Large proportion of urban respondents was recorded in the category of low physical activity (79%) and it was varying with age groups (82% in 15-24 to 69% in 55-64). Prevalence of low physical activity was high among young age respondents. Low physical activity by sex was recorded high (88%) among female respondents compare with males (71%), and such differences remain across all the age groups (Table 3.5.1). The pattern of low physical activity was varying with level of education (56 of illiterate to 92% of college and above). Accordingly, low physical activity was recorded high among the occupation of service and sales (93%) and domestic work (89%). The people in the occupation categories of agriculture and manual work were doing more physical work activity (Table 3.5.1).

Urban-rural comparison of low physical activity demonstrated that rural people (63%) were doing more physical work than urban (79%) and such differences observed across all age groups and sex (Table 3.5.2). Low physical activity by education was observed more among higher level of education (90% in college and above) compare with lower level (49% among primary) in rural population. Similarly, occupational differences in low physical activity were also observed across all the categories. The occupational categories of agriculture and manual worker people were doing more physical work compare with others (Table 3.5.2). Overall, low physical activity was high among service and sales occupation (93%) in the combined rural and urban population and pattern of prevalence was similar with age and education (Table 3.5.3).

Physical inactivity is one of the important risk factors of NCD. Most important point to be noted that seven out of ten individual adult population was categorized into low level of physical activity. This invites special attention to health planner.

Table 3.5.2 Percentage of respondents in the category of some high risk factors of NCD (current daily smokers, daily smokeless tobacco user, current drinkers, low fruits and vegetables intake and low physical activity) across age, education, occupation and sex, rural, Mizoram, 2007- 08

Characteristic	Smoker			Smokeless tobacco user			Current drinkers			Less than five servings of fruits & vegetables consumed per day			Low physical activity		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age group															
15-24	61.3	9.2	36.1	37.8	56.4	46.8	20.4	0.0	10.5	90.2	87.3	88.8	59.1	82.4	70.4
25-34	83.3	18.8	53.0	59.5	72.4	65.5	31.2	0.0	16.5	89.9	87.4	88.7	40.1	73.9	56.0
35-44	77.6	33.1	56.8	58.6	67.3	62.7	23.7	2.0	13.5	95.6	86.7	91.4	40.0	69.7	54.0
45-54	75.2	44.8	61.1	57.5	72.5	64.5	14.8	0.5	8.2	95.9	92.4	94.3	50.2	74.5	61.4
55-64	72.3	61.4	67.3	67.2	45.3	57.1	9.8	0.0	5.3	100	96.2	98.2	66.5	76.3	71.1
Total	72.7	24.7	50.0	52.2	63.7	57.7	22.2	0.4	11.9	92.7	88.5	90.7	50.0	76.4	62.5
Education															
Illiterate	84.7	33.7	53.3	52.2	73.3	65.2	43.1	0.5	16.9	97.9	91.4	93.9	36.2	72.3	58.3
Primary	78.2	41.9	60.8	56.4	66.8	61.4	20.2	0.0	10.5	95.4	93.9	94.6	36.5	62.1	48.7
Middle	75.9	19.8	50.1	53.4	61.5	57.1	20.2	0.2	11.0	93.4	88.3	91.1	44.1	73.7	57.7
Secondary	66.2	11.4	41.6	53.3	58.5	55.6	20.7	0.5	11.6	88.3	81.3	85.2	59.0	90.3	73.1
Higher Secondary	57.3	9.3	39.7	43.9	55.7	48.2	21.3	0.0	13.5	94.4	89.2	92.5	73.1	100	83.0
College & above	58.9	16.6	43.7	38.7	54.5	44.4	8.9	4.8	7.4	92.7	86.2	85.9	88.5	91.5	89.6
Total	72.7	24.7	50.0	52.2	63.7	57.7	22.2	0.4	11.9	93.3	88.5	90.7	50.0	76.4	62.5
Occupation															
Executive/Business	66.8	26.5	42.7	65.5	70.0	68.2	26.1	0.0	10.5	93.3	88.2	90.2	82.9	84.9	84.1
Agriculture	82.6	35.0	67.0	56.5	66.6	59.8	23.8	0.6	16.2	94.2	85.9	91.5	27.1	36.1	30.0
Domestic Work	**	23.0	26.4	68.6	69.1	69.1	35.8	0.2	2.9	91.5	88.7	88.9	85.9	89.0	88.8
Services/Sales	68.8	25.4	55.6	55.3	67.5	59.0	18.1	0.0	12.6	90.2	97.6	92.4	92.6	96.5	93.8
Manual Worker	80.1	31.1	71.9	45.5	73.6	50.2	24.2	4.8	20.9	91.6	86.9	90.8	37.0	56.1	40.2
Other	50.8	13.6	34.6	43.8	43.9	43.9	16.5	0.0	9.3	91.6	90.1	90.7	79.7	96.5	87.0
Total	72.7	24.7	50.0	52.2	63.7	57.7	22.2	0.4	11.9	92.7	88.5	90.7	49.9	76.4	62.4
Number (n)	1231	1085	2316	1231	1086	2317	1231	1085	2316	1232	1086	2318	1232	1086	2318

** Figure not shown; based on fewer than 15 unweighted cases

Table 3.5.3 Percentage of respondents in the category of some high risk factors of NCD (current daily smokers, daily smokeless tobacco user, current drinkers, low fruits and vegetables intake and low physical activity) across age, education, occupation and sex, combined, Mizoram, 2007- 08

Characteristic	Smoker			Smokeless tobacco user			Current drinkers			Less than five servings of fruits & vegetables consumed per day			Low physical activity		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age group															
15-24	59.2	7.1	33.7	34.0	43.5	38.6	15.6	0.0	8.0	85.4	80.0	82.7	64.8	88.4	76.3
25-34	76.7	14.7	47.3	50.4	64.1	56.9	30.0	0.7	16.1	84.8	80.7	82.9	58.4	80.7	69.0
35-44	72.3	24.3	49.8	52.4	63.4	57.6	25.0	2.0	14.2	90.6	77.8	84.6	55.7	78.2	66.3
45-54	64.3	37.1	51.6	52.5	65.8	58.7	14.9	0.7	8.3	89.2	87.1	88.2	61.5	77.5	69.0
55-64	61.4	49.5	55.8	66.6	45.9	56.8	7.9	0.0	4.2	96.9	88.0	92.7	64.5	76.7	70.3
Total	67.1	18.8	44.0	46.5	55.4	50.8	20.6	0.6	11.1	87.6	81.2	84.5	60.9	82.4	71.1
Education															
Illiterate	78.0	33.3	50.9	51.5	68.4	61.8	37.1	0.4	14.8	94.6	89.5	91.5	37.2	71.4	57.9
Primary	72.6	39.0	55.4	57.3	60.4	58.9	16.7	0.0	8.2	88.8	80.3	84.5	36.7	66.5	52.0
Middle	71.6	17.1	45.8	51.6	59.6	55.4	21.1	0.6	11.3	87.7	83.7	85.8	48.8	78.0	62.7
Secondary	64.1	10.6	37.6	48.5	56.3	52.3	23.4	1.0	12.2	89.2	78.9	84.1	63.7	92.0	77.7
Higher Secondary	61.8	6.6	39.2	34.1	41.4	37.1	18.2	0.0	10.8	85.0	75.5	81.1	82.2	94.6	87.3
College & above	59.3	9.4	39.6	33.8	36.8	35.0	14.3	1.9	9.4	83.1	78.7	81.4	90.3	93.1	91.4
Total	67.1	18.8	44.0	46.5	55.4	50.8	20.6	0.6	11.1	87.6	81.2	84.5	60.9	82.4	71.1
Occupation															
Executive/Business	58.3	20.8	39.2	47.2	64.8	56.2	24.3	1.3	12.6	76.4	77.8	77.1	82.3	86.9	84.6
Agriculture	81.9	32.4	64.6	56.0	60.4	57.5	22.7	1.3	15.2	91.4	83.4	88.6	27.7	43.2	33.1
Domestic Work	**	19.5	21.7	64.0	66.1	66.0	23.9	0.2	1.7	86.6	80.2	80.6	87.7	89.0	88.9
Services/Sales	62.9	14.5	46.1	51.5	52.8	51.9	19.6	0.0	12.7	86.1	78.3	83.4	91.5	95.5	92.9
Manual Worker	75.9	16.5	61.8	47.1	53.1	48.5	26.7	2.2	20.9	85.4	82.0	84.6	50.8	73.2	56.1
Other	49.5	10.6	31.9	32.8	35.0	33.8	12.1	0.3	6.8	89.2	82.6	86.2	82.0	95.4	88.1
Total	67.1	18.8	44.1	46.5	55.4	50.8	20.6	0.6	11.1	87.5	81.1	84.5	60.8	82.3	71.1
Number (n)	2292	2194	4486	2294	2195	4489	2294	2194	4488	2295	2195	4490	2295	2195	4490

** Figure not shown; based on fewer than 15 unweighted cases

CHAPTER 4

Hypertension and Diabetes

This chapter focuses on the prevalence of hypertension and diabetes in the study population along with the information regarding history of hypertension and diabetes and the nature of treatment advised by the treating physician.

4.1 HYPERTENSION

The blood pressure is an important determinant of the risk of cardiovascular diseases, ischemic heart disease, congestive cardiac failure and renal failure. In the survey the blood pressure of the respondents was measured using automated blood pressure measuring instrument (OMRON®). Table 4.1.1 provides percentage of respondents with history of raised blood pressure, treatment and life style modification advised, seeking consultation and treatment from AYUSH by sex and place of residence. Over all 7% respondents (7% of men and 6% of women) were found to have been diagnosed hypertension by the health professional. In the urban area, the prevalence of hypertension was 9% among men and 6% among women. In rural area, 6% of both males and females were hypertensive.

Of those who were diagnosed hypertension, majority of them (46%) were taking the prescribed medicines. About 52% of the urban and 38% of rural respondents, 45% of male and 48% of female respondents were taking medicines for the hypertension. About 40% of those who were diagnosed hypertension, were advised dietary modification including low salt intake; 22% were advised to lose weight and 28% were advised to increase physical activity. If the respondent was a smoker, 25% were advised to quit smoking. The percentage of those who received dietary advice including low salt intake was slightly higher for men (48%) than for women (29%), more for urban (46%) than rural (31%) respondents.

Among those who were diagnosed hypertensive, 6% of them had consulted AYUSH. By sex, 6% such men and 7% women consulted AYUSH practitioner. Among those respondents who had consulted AYUSH, 42% were taking the treatment from the AYUSH practitioner, which was 39% of rural and 44% of urban respondents.

Table 4.1.2 presents the mean systolic and diastolic blood pressure by sex and place of residence. In the

Table 4.1.1 Percentage of respondents with history of raised blood pressure, treatment and lifestyle modification advised, seeking consultation and treatment from an AYUSH practitioner by sex and place of residence, Mizoram, 2007- 08.

Hypertension	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Hypertension diagnosed by health professional (all respondents)	8.5	6.4	7.4	5.6	6.1	5.8	7.1	6.2	6.7
Diagnosed Hypertensives									
Currently taking drugs	49.1	57.1	52.4	37.4	37.9	37.6	44.5	48.2	46.2
Advised dietary modifications	54.3	34.9	46.2	38.3	23.0	30.7	48.1	29.4	39.7
Advised to lose weight	32.3	16.4	25.7	22.4	11.2	16.8	28.4	14.0	22.0
Advised to quit smoking	29.4	13.0	22.5	41.5	17.1	29.4	34.1	14.9	25.4
Advised to increase physical activity	37.7	23.8	31.9	31.9	14.2	23.1	35.4	19.3	28.2
Consulted AYUSH practitioner	4.2	9.0	6.2	8.1	3.7	5.9	5.7	6.6	6.1
Taking treatment from AYUSH practitioner	76.2	29.5	44.0	29.9	60.1	39.2	51.3	35.3	42.3

survey population, the mean systolic blood pressure was 124 mm Hg while mean diastolic blood pressure was 81 mm Hg. These averages were little higher for males than females. There were no rural-urban differentials.

According to WHO STEPS guideline, the population was categorized into four categories namely, normal, pre-hypertensive, Stage-I hypertensive and Stage-II hypertensive on the basis of their blood pressure level[8]. In the present survey, this categorization was done after recording the resting blood pressure for each study subject. The upper and the lower limit of the systolic and diastolic blood pressure for each category has been given in Table 4.1.3.

Table 4.1.4 gives the percentage of respondents

Table 4.1.2 Mean Systolic and Diastolic blood pressure by sex and place of residence, Mizoram, 2007- 08

Blood Pressure	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Systolic blood pressure	126.1	122.0	124.1	127.1	122.1	124.7	126.6	122.1	124.4
95% CI									
Lower	125.0	119.9	122.8	124.6	119.5	122.4	125.3	120.4	123.1
Upper	127.2	124.1	125.4	129.6	124.7	127.1	127.9	123.7	125.8
Diastolic blood pressure	82.7	80.5	81.6	80.9	78.2	79.6	81.8	79.4	80.7
95% CI									
Lower	81.0	78.3	79.9	79.6	77.0	78.5	80.8	78.2	79.6
Upper	84.4	82.7	83.4	82.2	79.4	80.8	82.9	80.6	81.7

Table 4.1.3 Categories of Hypertension

Category	Systolic Blood Pressure (mm Hg)		Diastolic Blood Pressure (mm Hg)
Normal	<120	and	<80
Pre-hypertension	120-139	or	80-89
Stage-I hypertension	140-159	or	90-99
Stage-II hypertension	≥ 160	or	≥ 100

Table 4.1.4 Percentage of respondents according to category of hypertension by sex and place of residence (P & 95% CI), Mizoram, 2007- 08

Category of hypertension	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Normal	11.3	26.6	18.7	17.9	34.6	25.8	14.5	30.4	22.1
95% CI									
Lower	7.8	18.0	13.1	13.7	29.6	21.6	11.8	25.3	18.6
Upper	16.2	37.5	26.0	23.0	40.0	30.5	17.8	36.2	26.2
Pre - hypertension	65.9	58.0	62.1	58.4	50.4	54.6	62.2	54.4	58.5
95% CI									
Lower	58.8	47.0	53.7	53.2	45.0	50.1	57.9	48.4	53.8
Upper	72.3	68.3	69.8	63.3	55.8	59.0	66.3	60.3	63.0
Stage-I hypertension	17.7	11.4	14.7	18.4	11.3	15.0	18.1	11.3	14.8
95% CI									
Lower	14.3	8.0	11.6	15.1	8.7	12.7	15.6	9.1	12.9
Upper	21.7	16.0	18.4	22.2	14.6	17.8	20.7	14.1	17.1
Stage-II hypertension	5.1	4.0	4.5	5.3	3.7	4.6	5.2	3.8	4.6
95% CI									
Lower	2.6	1.8	2.2	2.6	1.3	2.1	3.2	2.1	2.7
Upper	9.8	8.6	9.0	10.6	9.8	9.8	8.4	7.1	7.6

according to categories of hypertension by sex and place of residence. Overall, 22% respondents were normal, 59% were in the category of pre-hypertension, 15% in stage-I hypertension and only 5% in stage-II hypertension. Among males, 15% were normal, 62% were in the category of pre-hypertension, 18% were in stage I hypertension and only 5% were in stage-II hypertension. For females, 30% were normal, 54% pre-hypertension, 11% in stage-I hypertension and 4% in stage-II hypertension.

4.2 SOCIO-DEMOGRAPHIC PATTERN OF HYPERTENSION

Hypertension is a major NCD risk factors especially related to cardiovascular disease. The socio-demographic patterns of respondents in the category of hypertension (stage I & II) are presented in Table 4.2. Overall, prevalence of hypertension was 19% among the urban population and its pattern was increasing with age (14% in 15-24, 17% in 25-34, 25% in 35-44 & 45-54 and 30% in 55-64). The prevalence among male respondents was high (23%) compare with females (15%), but the increasing pattern with age was observed in both sexes (Table 4.2). Prevalence of hypertension by education was 35% among illiterate, 19% of primary, 12% of middle, 15% of secondary, 23% of higher secondary and 27% of college and above. In the occupational categories, the prevalence was high among occupation of agriculture (30%), executive and business (29%). Low prevalence of hypertension was recorded among the occupation of domestic work (13%). Overall, prevalence among rural population was 20% and the pattern was increasing with age (18% in 15-24 to 30% in 55-64). By education, prevalence was high among higher secondary (36%), whereas it was low (17%) among primary level. Among the occupational categories, the prevalence was

Table 4.2 Percentage of respondents in the category of stage I & stage II hypertension across age, education, occupation and by sex and residence, Mizoram, 2007- 08

Characteristic	Stage I & II hypertensive								
	Urban			Rural			Combined		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age group									
15-24	17.6	10.8	14.3	23.6	11.5	17.7	20.5	11.1	15.9
25-34	20.6	13.5	17.2	22.7	13.8	18.5	21.6	13.7	17.9
35-44	28.0	21.5	25.0	21.8	15.8	19.0	25.0	18.7	22.1
45-54	27.0	22.6	25.0	23.9	20.5	22.3	25.4	21.5	23.6
55-64	41.7	19.1	29.7	24.1	26.0	30.2	37.5	22.6	30.0
Total	22.8	15.4	19.2	23.7	15.0	19.6	23.3	15.2	19.4
Education									
Illiterate	26.6	40.5	34.5	18.6	18.6	18.6	20.1	22.1	21.3
Primary	23.5	15.7	18.9	20.1	13.9	17.2	21.2	14.6	17.8
Middle	15.7	7.4	11.6	22.2	13.0	18.0	19.5	10.6	15.3
Secondary	17.5	13.6	15.4	26.8	12.7	20.4	21.9	13.2	17.6
Higher Secondary	28.1	15.6	22.8	40.2	28.9	36.0	30.8	18.2	25.6
College & above	29.2	23.7	27.0	24.0	15.1	20.6	28.1	22.0	25.7
Total	22.8	15.4	19.2	23.7	15.0	19.6	23.3	15.2	19.4
Occupation									
Executive/Business	36.0	20.9	29.2	34.7	14.0	22.4	35.7	18.3	27.0
Agriculture	35.9	21.9	30.1	20.5	17.3	19.4	23.5	18.5	21.8
Domestic Work	**	13.0	12.6	**	12.4	13.8	23.0	12.7	13.3
Services/Sales	22.5	21.7	22.2	27.1	19.7	24.8	24.0	21.2	23.0
Manual Worker	17.5	12.3	16.2	24.8	18.0	23.7	20.0	13.6	18.5
Other	20.6	13.7	17.4	25.6	16.5	21.6	22.6	14.8	19.1
Total	22.8	15.4	19.2	23.7	15.0	19.6	23.3	15.2	19.4
Number (n)	1007	1068	2075	1197	1062	2259	2204	2130	4334

** Figure not shown; based on fewer than 15 unweighted cases

high among service and sales (25%). But, it was low among occupation of domestic work (14%). Overall, prevalence of hypertension was 19% among rural and urban population of Mizoram, but the pattern of prevalence with age, education and occupation was similar (Table 4.2).

Most striking observations of blood pressure measurements was that only around a fifth of the adult population surveyed had normal blood pressure. While more than half of the adult population was categorized into pre-hypertension group, another 15% were found in stage I hypertension with the remaining 5% in stage-II. On the contrary, only 7% of population reported history of hypertension, which requires urgent attention for intervention.

4.3 DIABETES

Diabetes mellitus is an important marker of risk for the arterial disease of the coronary, cerebral and peripheral arterial trees, and for micro vascular disease leading to blindness and renal failure. In the survey, the history pertaining to diabetes was elicited from the respondents. Table 4.3 deals with the percentage of respondents with history of raised blood sugar, treatment and life style modification advised by sex and place of residence. There were very less (<1%) reported cases of diagnosed raised blood sugar in past 12 months. Amongst those who diagnosed diabetes, 28% (28% of urban and 29% of rural respondents) were currently taking insulin; about 62% of diagnosed diabetic respondents (62% of urban and 63% of rural respondents) were taking oral hypoglycemic drugs. A moderate proportion of respondents reported to have received advice from the treating physicians on their life style modification— 40% for dietary advice, 36% to reduce weight and 43% to increase physical activity.

Table 4.3. Percentage of respondents with history of raised blood sugar, treatment and lifestyle modification advised, seeking consultation and treatment from an AYUSH practitioner by sex and place of residence, Mizoram, 2007- 08

Blood sugar	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Raised blood sugar diagnosed (All respondents)	0.8	0.7	0.7	0.6	0.2	0.4	0.7	0.5	0.6
Diagnosed diabetics									
Currently taking insulin	33.6	16.3	28.3	39.0	0.0	28.5	35.1	12.3	28.4
Currently taking oral drugs	68.1	52.4	61.9	69.1	45.3	62.7	68.5	50.7	62.2
Advised dietary modifications	47.2	46.8	47.0	34.7	0.0	25.4	42.2	35.5	39.7
Advised to reduce weight	66.7	7.9	41.3	17.7	45.3	25.1	47.2	16.9	35.8
Advised to increase physical activity	40.1	53.5	45.9	52.6	0.0	38.5	45.1	40.6	43.4

CHAPTER 5

Physical Measurements

This chapter describes various physical measurements such as height, weight, waist circumference and body mass index (BMI), which are key indicators for surveillance of non-communicable diseases. Weight of an individual is directly related to the Body Mass Index (BMI), waist circumference, blood pressure and probability of developing diabetes mellitus-2.

5.1 WEIGHT

Having weight more than the ideal weight for age and height is a risk factor for development of colorectal cancer, uterine cancer, coronary artery disease and it would also exacerbate the symptoms of osteoarthritis. The weight is a continuous variable, reflecting the body mass of an individual in light clothing; it is used for calculating BMI.

5.2 HEIGHT

Height is another key variable required for calculation of body mass index (BMI). Height is a continuous variable measured with the individual standing on a firm leveled surface, without wearing any foot wear, and stand with feet together, with heels, calves, buttocks, dorsal spine and head in same plane.

5.3 BODY MASS INDEX (BMI)

BMI is a valid indicator for finding out whether the body weight of an individual is appropriate for the height of the individual. It is calculated from height and weight measurements as body weight per meter^2. Worldwide researches have shown that there is a strong association between BMI and health risk. The excess of adipose tissue in the adults is associated with excess morbidity and mortality from a large number of health conditions like diabetes, hypertension, hypercholesterolemia, carcinomas of colon and breast, gall bladder stones and osteoarthritis. On the other hand low BMI is an indicator of risk to health, often being associated with tobacco, alcohol use and drug addiction (Table 5.1).

5.4 WAIST CIRCUMFERENCE

The waist circumference is one of the sensitive indicators for abdominal obesity. Abdominal obesity has got a stronger association with coronary heart diseases as compared to BMI. The waist measurement is taken at the level of mid point between the inferior margin of the rib and crest of ileum in the mid axillary plane, using a non-stretchable measuring tape, without clothing. A cut-off level of 102 cm. in males and 88 cm. in females have been recommended for developed countries (ATP3 Guidelines), however lower cut-off levels are appropriate for Indians- 90 cm in males and 80 cm in females (The Asia Pacific Guidelines)[9].

Table 5.2 presents the BMI, mean height, weight and waist circumference by sex and the place of residence. The mean BMI in Mizoram was 21 kg/m^2 (22 for urban and 21 for rural area, 22 for males and 21 for females). The mean height in the survey population was 160 centimeter (162 centimeter for urban, 159 centimeter for rural respondents, 164 centimeter for males and 156 centimeter for females). The mean weight was 56 kg with 57kg in urban area, 54 kg in rural. By sex, the mean weight was 59 kg for males and 51 kg for

Table: 5.1 Categories of BMI

Body Mass Index (BMI)	Category of Relative Weight
<18.5	Under Weight
18.5- 24.9	Normal Weight
25.0- 29.9	Grade-1 Over Weight
30-39.9	Grade-2 Over Weight
≥ 40	Grade-3 Over Weight

Source: WHO Step-wise approach to NCD surveillance

Table 5.2 Mean value for body mass index (BMI), height, weight and waist circumference by sex and place of residence, Mizoram, 2007- 08

Physical measuerments	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
BMI (kg/m^2)	22.0	21.1	21.5	21.8	20.3	21.1	21.9	20.7	21.3
95% CI									
Lower	21.5	20.7	21.2	21.4	20.0	20.8	21.6	20.5	21.1
Upper	22.4	21.4	21.9	22.3	20.7	21.5	22.2	21.0	21.6
Height (cm.)	166.1	156.6	161.5	162.2	154.3	158.5	164.2	155.5	160.1
95% CI									
Lower	164.6	155.0	160.0	161.0	153.0	157.4	163.3	154.5	159.1
Upper	167.6	158.2	163.0	163.4	155.6	159.6	165.2	156.5	161.0
Weight (kg.)	61.0	52.9	57.1	57.4	49.5	53.7	59.3	51.3	55.5
95% CI									
Lower	59.3	50.9	55.6	56.3	48.2	52.7	58.3	50.1	54.6
Upper	62.7	54.9	58.5	58.6	50.9	54.7	60.3	52.5	56.3
Waist circum. (cm.)	79.4	72.2	76.0	75.9	66.7	71.5	77.7	69.6	73.8
95% CI									
Lower	75.5	69.0	72.8	72.4	64.1	68.9	75.1	67.6	71.8
Upper	83.4	75.5	79.1	79.4	69.2	74.1	80.3	71.6	75.9

females. The average waist circumference was 74 centimeters with 76 centimeter for urban respondents and 72 centimeters for rural respondents. The average waist circumference for male and female respondents was 78 centimeters and 70 centimeters respectively.

Table 5.3 presents the percentage of respondents

Table 5.3 Percentage of respondents according to BMI categories by sex and place of residence, Mizoram, 2007- 08

Category of BMI	Residence						Combined		
	Urban			Rural					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Under weight (<18.5)	9.3	16.3	12.6	8.9	24.4	16.2	9.1	20.1	14.3
95% CI									
Lower	6.1	12.8	10.3	6.2	18.8	12.7	6.9	16.9	12.2
Upper	13.8	20.4	15.4	12.6	31.0	20.4	11.9	23.8	16.7
Normal weight (18.5-24.9)	78.2	73.2	75.8	80.3	68.9	74.9	79.2	71.2	75.4
95% CI									
Lower	72.3	69.9	72.5	76.4	62.6	71.3	75.8	67.8	73.0
Upper	83.1	76.2	78.9	83.6	74.5	78.2	82.3	74.3	77.6
Grade-1 over weight (25.0-29.9)	10.6	8.7	9.7	9.3	5.1	7.3	10.0	7.0	8.5
95% CI									
Lower	7.1	6.1	7.1	6.7	3.5	5.6	7.7	5.3	6.9
Upper	15.6	12.2	13.1	12.7	7.3	9.5	12.8	9.0	10.5
Grade-2 over weight (30.0-39.9)	1.6	1.1	1.3	1.2	1.0	1.1	1.4	1.1	1.2
95% CI									
Lower	0.9	0.4	0.7	0.6	0.5	0.6	0.9	0.5	0.8
Upper	2.6	3.1	2.5	2.4	2.3	2.0	2.1	2.1	1.9
Grade-3 over weight (≥ 40.0)	0.3	0.8	0.5	0.4	0.7	0.5	0.4	0.7	0.5
95% CI									
Lower	0.1	0.4	0.3	0.1	0.3	0.3	0.2	0.4	0.3
Upper	1.0	1.6	1.0	1.1	1.4	0.9	0.8	1.2	0.8

Central Obesity WC ≥ K*	11.3	21.6	16.3	4.2	8.6	6.3	7.9	15.5	11.5
95% CI									
Lower	6.4	16.0	11.2	1.8	6.3	4.4	5.0	12.4	8.7
Upper	19.2	28.5	23.2	9.1	11.7	8.9	12.2	19.1	15.0

*K=90 cm for males and K=80 cm for females

according to their BMI category and central obesity by sex and the place of residence. In the survey, it was found that 14% respondents were under-weight, which was 13% for urban and 16% for rural. By sex, 9% males and 20% females were underweight. Over 10% population was over weight (12% for urban respondents and 9% for rural respondents). Overall the central obesity was 12% (11% among urban males, 21% among urban females; 4% among rural males, 9% among rural females).

5.5 SOCIO-DEMOGRAPHIC PATTERN OF OVERWIGHT

Overweight (obesity) is a major risk factor of NCD. The socio-demographic patterns of respondents in the category of overweight (grade I, II & III) by residence are presented in Table 5.4. Overall, prevalence of overweight was 12% among the urban population and its pattern was found increasing with age (9% in 15-24 & 25-34 to 27% in 55-64). The prevalence among female respondents was low (11%) compare with males (13%),

Table 5.4 Percentage of respondents in the category of overweight (Grade I, II & III) across age, education, occupation and by sex and residence, Mizoram, 2007- 08

Characteristic	Overweight (Grade I, II & III)								
	Urban			Rural			Combined		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age group									
15-24	8.6	9.4	9.0	5.4	5.5	5.5	7.1	7.6	7.4
25-34	9.7	8.6	9.2	12.1	6.7	9.6	10.8	7.7	9.4
35-44	16.0	10.6	13.5	12.2	9.5	10.9	14.2	10.1	12.3
45-54	14.5	12.3	13.4	17.2	6.1	12.1	15.9	9.1	12.7
55-64	32.3	21.6	27.1	16.2	7.1	12.0	23.5	14.0	19.0
Total	12.5	10.5	11.6	10.9	6.8	8.9	11.7	8.7	10.3
Education									
Illiterate	2.3	17.1	10.7	7.1	7.0	7.0	6.2	8.6	7.6
Primary	14.4	7.1	10.3	10.4	4.6	7.6	11.6	5.6	8.6
Middle	11.1	7.1	9.1	10.0	5.9	8.1	10.4	6.4	8.5
Secondary	11.0	15.2	13.2	13.0	9.1	11.3	12.0	12.8	12.4
Higher Secondary	13.3	11.0	12.3	10.8	6.0	9.1	12.7	10.1	11.7
College & above	15.0	7.8	12.2	15.3	11.7	14.0	15.1	8.5	12.5
Total	12.5	10.5	11.6	10.9	6.8	8.9	11.7	8.7	10.3
Occupation									
Executive/Business	19.5	18.5	19.1	21.8	17.2	19.0	20.1	18.0	19.1
Agriculture	8.0	11.1	9.3	10.2	3.8	8.1	9.7	5.8	8.4
Domestic Work	**	11.3	12.5	**	8.1	8.0	16.1	9.6	10.0
Services/Sales	11.6	7.8	10.2	19.1	8.6	16.0	14.0	8.0	11.9
Manual Worker	15.2	10.9	14.0	15.2	7.6	14.0	15.2	10.2	14.0
Other	8.6	7.7	8.1	4.9	3.9	4.4	7.0	6.2	6.7
Total	12.5	10.5	11.6	10.9	6.8	8.9	11.7	8.7	10.3
Number (n)	1060	1095	2155	1227	1070	2297	2287	2165	4452

** Figure not shown; based on fewer than 15 unweighted cases

but the increasing pattern with age was observed in both sexes (Table 5.4). In educational categories, the prevalence was varying with the level of education (11% of illiterate, 10% of primary, 9% of middle, 13% of secondary, 12% of higher secondary and college). Occupational categories, the prevalence was high among the occupation of executive and business (19%) and it was low among occupation of agriculture (9%). Overall, prevalence among rural population was 9% and it was varying with age (6% in 15-24 to 12% in 55-64). Similarly, prevalence in the educational categories was 7% among illiterate, 8% among primary and middle, 11% in secondary, 9% in higher secondary and 14% in college and above. In the occupational category, the prevalence was high among the occupation of executive and business (19%), service and sales (16%), whereas it was low among the occupation of domestic work and agriculture (8%). Overall, prevalence of overweight was 10% among the combined rural and urban population. The pattern of prevalence was increasing with age. Except the younger age group, the overweight peoples were prevalent in all age groups, education levels and occupation (Table 5.4).

In the category of BMI and central obesity, one out of ten adult population surveyed was overweight or categorized into central obesity, constituting a high-risk group for NCD.

Chapter 6

Summary and Conclusions

The NCD risk factors survey in Mizoram collected information from a random sample of 4569 households covering 2341 households from rural and 2228 from urban areas. From these households, 4495 individuals selected randomly were interviewed to collect behavioural information and also to carry out physical measurements. The analysis of the survey data have been presented and discussed in the present report providing information about the proportion of population or subgroup of population under the risk of non-communicable diseases.

In Mizoram, majority households (92%) are Christian followed by a small percentage of Buddhists (5%). While large percentage of households (86%) in urban area had access to piped drinking water, less than half of households in rural area had such access. In every 10 households, 4 households in rural area and 9 households in urban area had access to flush toilet. In the state, large percentage of households (88% in rural area, 99% in urban area and 94% over all) used electricity as main source of lighting. About two-third households in rural area were still using wood as a main source of cooking fuel. However, over 90% households in urban area used LPG as the main source of cooking fuel. About 42% of households in rural area and one in every ten households in urban area resided in *kachha* houses. Over 90% population of Mizoram was literate, but there existed sex and rural-urban differentials in educational attainment.

Tobacco is one of the major risk factors of non-communicable diseases. Over two-third population in Mizoram used tobacco in any form (smoking or smokeless). This prevalence was 76% among males and 60% among females. Two in every three men and one in every five women smoked tobacco daily. Half of the population (44% of men and 53% of women) used smokeless tobacco daily. Use of smokeless tobacco was high in rural area as compared to urban. The mean age of initiation of tobacco use among young adults age 15-34 was 17 years for smokers and 18 years for smokeless tobacco users.

The alcohol consumption is a known risk factor of many non-communicable diseases. One in every five men consumed alcohol at least once in last one year and one in every ten men in last one month. The alcohol consumption among females was quite low. The mean age of initiation of alcohol consumption by men age 15-34 was 21 years.

Nutritional inadequacy is the major risk factors of many non-communicable diseases. In Mizoram, 85% of population with 79% in urban and 91% in rural area consumed less than five servings of fruits and vegetables per day, which was inadequate as per WHO recommended standards. On an average, people consumed fruits only two days in a week against vegetables 7 days in a week.

Physical inactivity is the leading cause of diabetes, hypertension and coronary heart disease. In Mizoram, 71% of population with 79% of urban area and 63% of rural population were in low category of physical activity. More than half of the population was detected with pre-hypertension stage and one-fifth was in stage-I and stage-II hypertension. According to BMI, one-tenth population in the state was in the category of over weight and 14% was under weight. An equal proportion of people (12%) were in the category of central obesity.

Overall, prevalence of smoking among female population was low compare with males, but the prevalence of smokeless tobacco users was more among females. Prevalence of smoking was high in all the age groups. The increasing pattern of prevalence was recorded with increasing age specially among female respondents. A declining pattern of prevalence was observed with increasing level of education. Prevalence of smoking among the occupation of agriculture and manual work was high compare with others. However, prevalence of smokeless tobacco users was high among domestic work. A similar pattern of increasing prevalence with age and decreasing with level of education was also observed with current alcohol drinkers. The habits of tobacco and alcohol use starts at early young age which contributes to the high risk of NCD at later age. High proportion of population was taking inadequate amount of fruits and vegetables which

increases the risk of NCD. Its distribution across all age groups, education and occupation by sex and residence was found very high with marginal differences. Besides that, two-third of population was found in the category of low physical activity. More female respondents were in the category of low physical activity as compare with males across all the age groups. Rural population was doing more physical work than urban. The increasing pattern of prevalence of hypertension was recorded with increasing age of people. It was prevalent in all education levels and occupational categories. High prevalence of overweight was recorded in all the age groups except the younger age. It was prevalent in both sexes, but higher in urban population compare with rural. High prevalence of overweight was recorded among higher level of education as well as in the occupation of executive and service categories. Overall, NCD risk factors were prevalent across all the socio-demographic categories of population in Mizoram.

These are the major health issues related to non-communicable diseases of people in Mizoram.

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Appendix - A

SAMPLE WEIGHTS

First, appropriate sampling weights for households were constructed for each state data set separately for Urban and Rural sectors. The element weight consisted of factors reflecting ward selection probabilities, Census enumeration block (CEB) selection probabilities within wards; and household selection probabilities within CEB; and household non-response adjustments.

For Urban area of a state, the weight HWT_{ijk} for the household k in CEB j of ward i, can be expressed as follows

$$\mathbf{HWT_{ijk}} = \mathbf{w_{1i}} \times \mathbf{w_{2j|i}} \times \mathbf{w_{3k|i,j}} \qquad i = 1, \ldots\ldots, 50, \; j = 1 \; , k = 1, \ldots, 50$$

where $\mathbf{w_{1i}} = \dfrac{\mathbf{1}}{\boldsymbol{\pi}_i}$: the reciprocal of the inclusion probability π_i of ward i

where $\pi_i = \dfrac{\text{a x Population of ward i}}{\text{Total Urban Populaltion}}$ and

a (=50) is the total number wards to be selected from the urban sector

$\mathbf{w_{2j|i}} = \dfrac{\mathbf{1}}{\boldsymbol{\pi}_{j|i}}$: the reciprocal of the conditional probability of selection of CEB j in ward i

where $\pi_{j|i} = \dfrac{\text{Population of selected CEB j within ward i}}{\text{Populaltion of selected ward i}}$

$W_{3k|i,j} = \dfrac{1}{\pi_{k|i,j} \times \bar{\theta}_{k|i,j}}$: the reciprocal of the product of conditional inclusion probability $\pi_{k|i,j}$ of household k in the j^{th} selected CEB of the i^{th} ward and estimated conditional response probability $\bar{\theta}_{k|i,j}$ of household k from within the j^{th} selected CEB of ward i.

where $\pi_{k|l,j} = \dfrac{\text{Number of households sampled from selected CEB j of ward i}}{\text{Number of households in selected CEB j of ward i}}$

$$HWT_{ijk} = \frac{\text{Size of Urban Population}}{\text{50 X Population of selected CEB from ward i}} \text{ X}$$

$$\frac{\text{Number of households in selected CEB of ward i}}{\text{Number of households sampled from selected CEB of ward i with HH Result code completed}}$$

In rural sector, from the lists of villages , 50 villages(or cluster of villages) were selected with probability proportional to size and from each village 50 household were selected using systematic sampling.

Proceeding as above it can be shown the weight for the k^{th} selected household of the i^{th} selected village, HWT_{ik},

$$HWT_{ijk} = \frac{\text{Size of Rural Population}}{\text{50 X Population of ith selected village}} \text{ X}$$

$$\frac{\text{Number of households in ith selected village}}{\text{Number of households selected from ith village with HH Result code complete}}$$

INDIVIDUAL WEIGHTS

From each selected household one member aged 15-54 is selected using the Kish Method and all usual members aged 55-64 were selected. Since objective of the study is to obtain estimates for each age group (15-24 through 55-64) and sex groups, post stratification is used for improvement of efficiency of the estimators.

Post stratification weights for individuals were constructed using the state age distributions for both sexes of the urban sector which are available on the population level. We first divide the target population of persons age 15-64 in 10 age – sex post strata with five age group (15-24 through 55-64) and two sex groups (male and female).

In the subsequent lines the symbol l is used to denote the age group [15 + (l – 1)*10, 15 +10*l], l = 1,2, …, 5 and m for sex, m = 1 if sex is male and m=2 if sex is female.

For Urban,

Define :

δ_{ijknlm} = 1 if nth selected respondent of the kth household of the jth CEB of the ith ward belongs to age group l and of sex m.

0 otherwise

$\hat{\mathbf{N}}_{lm}$ estimated number of persons of age group l and sex m if one person from the list of persons age 15-54 is selected from household of the population (l =1,2,3,4, m=1,2)

estimated number of the persons belonging to the age group l and sex group m (l =5, m=1,2)

$\hat{\mathbf{N}}_{lm}$ is obtained as

$$\hat{\mathbf{N}}_{lm} = \frac{1}{\hat{\theta}_{l,m}} \sum_{\substack{over\ all\ all\ possible\ values\ of\ i,j,k,n}} HWT_{ijk} \times \delta_{ijknlm}$$ where $\hat{\theta}_{lm}$ is the estimated group response rate.

Calibrated Individual weight

$$IWT_{ijklm} = \frac{\mathbf{N}_{lm}}{\hat{\mathbf{N}}_{lm}} \times HWT_{ijk}$$

Denoted by

N_{lm} = Number of person of sex m belonging to age group l in the urban sector of the population (l = 1,2 ,3,4,5 and sex m =1,2)

y_{ijkn}, = the observed value of the study variable for the respondent n belonging to household k, CEB j and ward i.

Estimate of the population total of sex group m and age group l is

$$\hat{\mathbf{Y}}_{l,m} = \sum_{\substack{over\ all\ all\ possible\ values\ of\ i,j,k,n}} \delta_{ijknlm} \times \mathbf{IWT}_{ijklm}$$

$$\hat{N}_{l\cdot} = \hat{N}_{l1} + \hat{N}_{l2} \quad , \quad \hat{Y}_{l\cdot} = \hat{Y}_{l1} + \hat{Y}_{l2} \quad , \quad l = 1, .., 5$$

$$\hat{N}_{\cdot m} = \hat{N}_{1m} + ... + \hat{N}_{5m} \, , \quad \hat{Y}_{\cdot m} = \hat{Y}_{1m} + ... + \hat{Y}_{5m} \quad , \quad m = 1,2$$

$$\hat{N} = \sum_{l=1}^{5} \sum_{m=1}^{2} \mathbf{N}_{l,m} \quad , \quad \hat{Y} = \sum_{l=1}^{5} \sum_{m=1}^{2} \hat{Y}_{l,m}$$

Estimate of the mean of the study variable for sex group m and age group l, $\widehat{Y}_{lm}$ and for and overall are $\frac{\widehat{Y}_{lm}}{\widehat{N}_{lm}}, \frac{\widehat{Y}_{m.}}{\widehat{N}_{m.}}, \frac{\widehat{Y}_{.l}}{\widehat{N}_{.l}}, \frac{\widehat{Y}}{\widehat{N}}$, respectively.

For Rural,

Define :

δ_{iknlm} = 1 if n^{th} selected respondent of the k^{th} household of the i^{th} village belongs to age group l and of sex m.

0 otherwise

$\widehat{\mathbf{N}}_{lm}$ estimated number of persons of age group l and sex m if one person from the list of persons age 15-54 is selected from household of the population (l =1,2,3,4, m=1,2)

estimated number of the persons belonging to the age group l and sex group m (l =5, m=1,2)

$\widehat{\mathbf{N}}_{lm}$ is obtained as

$$\widehat{\mathbf{N}}_{lm} = \frac{1}{\widehat{\theta}_{l,m}} \sum_{\substack{over\ all \\ all\ possible \\ values\ of \\ i,j,k,n}} HWT_{ik} \times \delta_{ijknlm},$$ where $\widehat{\theta}_{lm}$ is the estimated group response rate.

Calibrated Individual weight

$$IWT_{iklm} = \frac{\mathbf{N}_{lm}}{\widehat{\mathbf{N}}_{lm}} \quad x \quad HWT_{ik}$$

Denoted by

N_{lm} = Number of person of sex m belonging to age group l in the rural sector of the population (l = 1,2 ,3,4,5 and sex m =1,2)

y_{ikn}, = the observed value of the study variable for the respondent n belonging to household k of village i.

Estimate of the population total of sex group m and age group l is

$$\widehat{\mathbf{Y}}_{l,m} = \sum_{\substack{over\ all \\ all\ possible \\ values\ of \\ i,j,k,n}} \boldsymbol{\delta}_{ijknlm} \times y_{ikn} \times \mathbf{IWT}_{ijklm}$$

Estimate of the mean of the study variable for age-sex group l and m, sex group m, age group l and overall mean can be obtained.

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Appendix - B

INTEGRATED DISEASE SURVEILLANCE PROJECT (IDSP)

NCD RISK FACTORS SURVEY (PHASE -I), INDIA

(Name of State Year -2007)

HOUSEHOLD QUESTIONNAIRE

IDENTIFICATION	
STATE :	☐☐
DISTRICT :	☐☐
TEHSIL/TALUK	☐☐☐☐
CITY/TOWN/VILLAGE:	☐☐☐☐☐☐☐☐
URBAN/RURAL (*URBAN=1, RURAL =2, URBAN SLUM -3*)	☐
PSU NUMBER	☐☐☐
SEGMENT NUMBER:	☐
Household Number	☐☐☐☐

Name of Household Head: _____

Address oF HOUSEHOLD: _____

_____

INTERVIEWER VISITS				
	1	2	3	FINAL VISIT
Date	_____	_____	_____	Day ☐☐
				Month ☐☐
Interviewer's				Year 2 0 ☐☐
Name	_____	_____	_____	Interviewer Code ☐☐
Result	_____	_____	_____	
				Result* ☐
Next Visit:				Total Number of Visits ☐
Date	_____	_____		
Time				

***RESULT CODES:** 1. COMPLETED
2. NO HOUSEHOLD MEMBER/ NO COMPETENT RESPONDENT AT HOME AT THE TIME OF VISIT
3. ENTIRE HOUSEHOLD ABSENT FOR EXTENDED PERIOD
4. POSTPONED
5. REFUSED
6. DWELLING VACANT OR ADDRESS NOT A DWELLING
7. DWELLING DESTROYED
8. DWELLING NOT FOUND
9. OTHER _____ (SPECIFY)

NAME DATE	SUPERVISOR	EDITED & CHECKED BY	KEYED BY
	..... ☐☐	..... ☐☐	..... ☐☐

HOUSEHOLD STRUCTURE (HS)

List of all household members who usually live in your household aged 12 years and above

LINE NO.	NAME	RELATION-SHIP	SEX	AGE IN COMPLETED YEARS	RESIDENTIAL STATUS	RECRUITED FOR SURVEY
	Please give me names of the persons who usually live in your household (may be temporarily away from home)	(With head of household)	Male-1 Female-2		(Present-1; temporarily away from home-2)	Put a tick mark against one member age 15-54 selected below by kish method and all members age 55-64
(1)	(2)	(3)	(4)	(5)	(6)	(7)
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						

Codes for Q.3 Relationship to Head of Household:

01 - HEAD,
02 - WIFE OR HUSBAND,
03 - SON OR DAUGHTER
04 - SON IN LAW OR DAUGHTER IN LAW
05 - GRANDCHILD
06 - PARENT
07 - PARENT IN LAW
08 - BROTHER OR SISTER
09 - BROTHER IN LAW OR SISTER IN LAW
10 - NIECE OR NEPHEW
11 - OTHER RELATIVE
12 - ADOPTED OR FOSTER CHILD
13 - NOT RELATED

LIST ALL USUAL MEMBERS OF THE HOUSEHOLD AGE 15 - 54 IN THE HOUSEHOLD*.

Line No.	Sex	Age	Adult Number	Select one member (R) by using Kish Table	**Enter a specific Kish Table used for selection of one member below.** (A or B1 or B2 or C..... as assigned for each randomly selected household 1 to 50)

*__Arrange all the members aged 15-54 in the following order__ - oldest male, next oldest male, and so on for all males followed by oldest female, next oldest female, etc. Then use selection table assigned to the household to choose R individual RESPONDENT.

GENERAL HOUSEHOLD INFORMATION			
	Questions	**RESPONSE**	**SKIP**
1.	Number of members who usually live in the household	☐☐	
2.	Religion of the head of the household:	Hindu ..... 01 Muslim ..... 02 Christian ..... 03 Sikh ..... 04 Buddhist/neo buddhist ..... 05 Jain ..... 06 Jewish ..... 07 Parsi ..... 08 No religion ..... 09 Other ..... 96 (Specify)	
3.	What is the main source of drinking water?	PIPED WATER Piped into Residence ..... 11 Public Tap ..... 12 GROUND WATER: Hand Pump in Residence ..... 21 Public Hand Pump ..... 22 WELL WATER Well in Residence Covered well ..... 31 Open well ..... 32 Public Well Covered well ..... 33 Open well ..... 34 SURFACE WATER: Spring ..... 41 River/Stream ..... 42 Pond ..... 43 Dam ..... 44 Rainwater ..... 51 Tanker Truck ..... 61 Any other ..... 96 (specify)	
4.	What kind of toilet facilities do you have?	Flush Toilet Own Flush Toilet ..... 11 Shared Flush Toilet ..... 12 Public Flush Toilet ..... 13 Pit Toilet/Latrine Own Pit Toilet ..... 21 Shared Pit Toilet ..... 22 Public Pit Toilet ..... 23 No facility/Bush/Field ..... 31 Other ..... 96 (Specify)	

5.	What is the **main** source of lighting for your household?	Electricity ..... 1 Kerosene ..... 2 Gas ..... 3 Oil ..... 4 Other ..... 6 (Specify)	
6.	What is the type of **house**?	Pucca ..... 1 Semi-Pucca ..... 2 Kachha 3	
7.	How many **rooms** are there in your household?	Rooms	
8.	Do you have a separate room, which is used as **kitchen**?	Yes ..... 1 No 2	
9.	What type of **fuel** does your household **mainly use** for cooking?	Wood ..... 01 Crop Residue ..... 02 Dung Cakes ..... 03 Coal/Coke/Lignite ..... 04 Charcoal ..... 05 Kerosene ..... 06 Electricity ..... 07 Liquid Petroleum Gas (LPG) ..... 08 Bio-Gas ..... 09 Others ..... 96 (Specify)	
10.	Does this household **own this house** or any other house?	Yes ..... 1 No 2	
11.	Does this household **own any agriculture land**?	Yes ..... 1 No 2	If No, go to 14
12.	How much **agriculture land** does this household own?	Acres None	
13.	Out of this land, how much is **irrigated**?	Acres None	
14.	Does the household own any livestock?	Yes ..... 1 No 2	
15.	Does the household own any of the following: *(READ ALL THE OPTIONS AND RECORD THE RESPONSE)*	Yes No A mattress? 1 2 A pressure cooker? 1 2 A chair? 1 2 A cot or bed? 1 2 A table? 1 2 A clock or Watch? 1 2 An electric fan? 1 2 A bicycle? 1 2 A radio or transistor? 1 2 A sewing machine? 1 2 A telephone or Mobile? 1 2 A refrigerator? 1 2 A television? 1 2 A moped, scooter, or motorcycle? 1 2 A car? 1 2 A water pump? 1 2 A bullock cart? 1 2 A thresher? 1 2 A tractor? 1 2	

16.	What is the type of oil/cooking medium **most commonly** used in the house? (CHOOSE ONLY ONE IDENTIFIED BY MAXIMUM CONSUMPTION)	Cooking Oil Mustard oil ..... 01 Coconut oil ..... 02 Groundnut oil ..... 03 Sunflower oil ..... 04 Soyabean oil ..... 05 Palm oil ..... 06 Vanaspati oil ..... 07 Pure Ghee ..... 08 Butter ..... 09 Others ..... 96 (Specify)	

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For Research Purpose Only

INTEGRATED DISEASE SURVEILLANCE PROJECT (IDSP)

NCD RISK FACTORS SURVEY (PHASE –I), INDIA

(Name of State Year -2007)

INDIVIDUAL QUESTIONNAIRE

IDENTIFICATION	
STATE CODE:	
DISTRICT CODE	
TEHSIL/TALUK	
CITY/TOWN/VILLAGE	
SEGMENT NUMBER:	
URBAN/RURAL (URBAN=1, RURAL =2, URBAN SLUM = 3)	
PSU NUMBER	
HOUSEHOLD NUMBER	
LINE NUMBER OF PARTICIPANT NAME: _____	

CONSENT	RESPONSE
CONSENT HAS BEEN READ OUT TO PARTICIPANT	YES ..... 1 NO ..... 2 IF NO, READ CONSENT
CONSENT HAS BEEN OBTAINED	YES ..... 1 NO ..... 2 IF NO, END

	1	2	3		FINAL VISIT
Date Interviewer's Name & Code (Step 1 & Step 2) Technician's Name & Code (Step 3)	_____ _____ _____	_____ _____ _____		_____ _____ _____	Day Month Year 2 0 Interviewer's Code Result* (Step-1) Result* (Step- 2) Result* (Step- 3)
Next Visit Date/ Time	_____	_____			Total Number of Visits

***RESULT CODES:** 1. COMPLETED 2. NOT AT HOME 3. POSTPONED 4. REFUSED 5. PARTLY COMPLETED 6. NOT ELIGIBLE
9. OTHER (SPECIFY) _____

NAME DATE	SUPERVISOR	EDITED & CHECKED BY	KEYED BY
	.....	.....	.....

STEP- I DEMOGRAPHIC INFORMATION

QUESTIONS AND FILTERS		Response	Skip
101.	Sex	Male ..... 1 Female 2	
102.	Age	Age in completed Years ☐☐	
103.	What is your **current marital** status?	Never married ..... 1 Currently ..... Married ..... 2 Married but gauna not performed ..... 3 Widowed/Divorced/Separated 4	
104.	Have you ever attended school?	Yes ..... 1 No 2	If no, go to 107
105.	**if yes,** what is the **highest grade** of education you completed?	Grade*..... ☐☐	
106.	**Check 105** Grade 0-5 ☐ ↓	Grade 6 & above ☐ → Go to 108	
107.	Can you read and write?	Yes ..... 1 No 2	
108.	What is your main work/ occupation?	Professional/Executive/Manager/ Big business ..... 1 Clerical/Medium business ..... 2 Sales ..... 3 Agriculture/Self-employed ..... 4 Agriculture employer ..... 5 Household and domestic work ..... 6 Services ..... 7 Skilled manual ..... 8 Unskilled manual ..... 9 Other (Specify) ..... 10 Do not work 11	

**GRADE FOR DIFFERENT LEVEL OF COMPLETED EDUCATION*

EDUCATION LEVEL			GRADE
CLASS I TO XII	:	1 TO 12 YEARS	= 1 TO 12 GRADE
BACHELOR'S DEGREE	:	15 YEARS (12+3)	= 15 GRADE
MASTER'S DEGREE	**:**	**17 YEARS (12+3+2)**	**= 17 GRADE**
ENGINEERING	:	16 YEARS (12+4)	= 16 GRADE
MBBS	:	17 YEARS (12+5)	= 17 GRADE
POLYTECHNIC	:	13 YEARS (10+3)	= 13 GRADE
ITI	**:**	**11 YEARS (10 +1)**	**= 11 GRADE**
PH. D.	:	20 YEARS (12+3+2+3)	= 20 GRADE

STEP- I BEHAVIOURAL INFORMATION

Now I am going to ask you some questions about various health behaviours. This includes things like smoking, drinking alcohol, eating fruits and vegetables and physical activity. Let's start with tobacco

Smoking Tobacco use

	Questions	Response	Skip
201.	Do you **currently smoke** any tobacco products, such as bidis, cigarettes, cigars or pipes, hookah or any other local tobacco products?	Yes ..... 1 No 2	If No, go to 205
202.	**If Yes**, do you smoke **daily?**	Yes ..... 1 No 2	if No, go to 205
203.	On an average, **how many (number of times in case of hookah)** of the following do you smoke each day? ***(RECORD FOR EACH TYPE)*** *RECORD 88, IF ANY PRODUCT IS NOT USED INSTEAD OF LEAVING BLANK IN THE PRODUCT CATEGORIES).* *(RECORD FOR ANY NEW FORM OF TOBACCO USE REPORTED BY THE RESPONDENT e.g. REVERSE SMOKING etc.)*	Number Bidis ☐☐ Manufactured Cigarettes ☐☐ Hand-rolled Cigarettes ☐☐ Pipes ☐☐ Cigars, Cheroots ☐☐ Hookah ☐☐ Other local smoked tobacco products..... (SPECIFY) ☐☐	
204.	How old were you at that time when you **first started** using the tobacco product(s) **daily?**	Age in completed years ☐☐ Don't remember 7 7	Go to 208
205.	In the past, did you **ever smoke** tobacco products such as bidis, cigarettes, cigars or pipes **daily?**	Yes ..... 1 No 2	If No, go to 207
206.	How **old** were you when you **stopped smoking** daily?	Age in completed years ☐☐ Don't remember 7 7	
207.	Are you **currently exposed** to tobacco smoke at your home or workplace **daily?**	Yes ..... 1 No 2	

Smokeless Tobacco use

	Questions	Response	Skip
208.	Do you **currently use** any **smokeless tobacco**, such as (chewing tobacco, *tuibu* snuff, betel, gutka, pan masala, etc.)?	Yes ..... 1 No 2	if No, go to 212
209.	**If yes,** Do you **currently use smokeless tobacco** products **daily?**	Ye ..... 1 No 2	if No, go to 212
210.	On average, **how many** times a day do you use... ***(RECORD FOR EACH TYPE)*** *SPECIFY 77 IF NO PRODUCTS WERE USED IN EACH CATEGORY INSTEAD OF LEAVING CATEGORIES BLANK.*	Chewing tobacco ☐☐ Pan with tobacco ☐☐ *Tuibu*, Tobacco Snuff, by mouth ☐☐ Snuff, by nose ☐☐ Other ☐☐ Other (specify).....	
211.	How old were you at that time when you **first started** using smokeless tobacco **daily?**	Age in completed years ☐☐	Go to 214
212.	If you are not using currently, in the past did you **ever use** smokeless tobacco products **daily** such as chewing tobacco, tuibu, snuff, betel, gutka, etc.?	Yes .....1 No 2	if No, go to 214
213.	How **old** were you when you **stopped** using smokeless tobacco products **daily?**	Age in completed years ☐☐	

Alcohol Consumption

The next questions ask about the consumption of alcohol.

	Questions	Response	Skip
214.	Have you consumed any alcoholic products (such as beer, wine, whisky, locally prepared alcohol, etc.) within the **past 12 months?**	Yes ..... 1 No 2	if No, go to 219
215	In the past 12 months, **how frequently** have you had at least one drink?	5-7 days per week ..... 1 1-4 days per week ..... 2 1-3 days per month ..... 3 Less than once per month 4	
216.	When you drink alcohol, **on average**, how many **standard drinks** do you have during one day? *(USE SHOWCARD)*	Number ☐☐	
217.	Have you consumed alcohol (such as beer, wine, spirits, or any locally prepared wine, etc.) within the **past 30 days?**	Yes ..... 1 No 2	If No go to 220
218.	During each of the past 7 days, how many **standard drinks** of any alcoholic drink did you have each day? *(USE SHOWCARD)*	Monday ☐☐ Tuesday ☐☐ Wednesday ☐☐	Go to 220

		Thursday	
		Friday	
		Saturday	
		Sunday	
219.	**If answer to Question 214 is No, then** Have you **ever** (past user) **consumed** alcohol (such as beer, wine, spirits, or any local wine product)?	Yes ..... 1 No 2	if No, go to 221
220.	How **old** were you when you **started** consuming alcohol **regularly?**	Age in years Don't Remember 7 7	

Diet

The next questions ask about the fruits and vegetables that you usually eat. I have a nutrition card here that shows you some examples of local fruits and vegetables. Each picture represents the size of a serving. As you answer these questions please think of **a 'typical' or a 'usual' week.**

	Questions	Response	Skip
221.	In a typical week, on how many days do you **eat fruit?**	Number of days	If zero days, go to 223
222.	How many **servings** of fruit do you eat on **one of those days?** *(USE SHOWCARD)*	Number of servings	
223.	In a typical week, how many days do you **eat vegetables?** *(USE SHOWCARD)*	Number of days	If zero days, go to 225
224.	How many **servings** of vegetables do you eat on **one** of those days? *(USE SHOWCARD)*	Number of servings	
225.	How often do you consume each of the following ? *(USE CODE: DAILY - 1; AT LEAST ONCE IN A WEEK - 2; ONCE IN A MONTH -3; OCCASIONALY OR RARELY - 4; NEVER - 5)*	Butter/Ghee	
		Fried local foods (Samosa, Kachori, etc.)	
		Red meat	
		Eggs	
		Chicken	
		Fish	
		Aerated drinks	
		Sweetened drinks	
		Pizza/burgers/French fries etc	
		Cakes, Pastries or other bakery items	
		Chips, Namkeen etc	

Physical Activity

Next I am going to ask you about the time you spend doing different types of physical activity in a **typical week.** Please answer these questions even if you do not consider yourself to be a physically active person.

Think first about the time you spend doing work. Work includes things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment.

In answering the following questions **'Vigorous -Intensity activities'** are activities that require hard physical effort and cause large increase in breathing or heart rate, **'Moderate-Intensity activities'** are activities that require effort and cause small increases in breathing or heart rate.

	Questions	Response	Skip
226.	Does your work involve **vigorous-intensity activity** that causes large increases in breathing or heart rate like (carrying or lifting heavy loads, digging or construction work etc.) for **at least 10 minutes continuously?**	Yes ..... 1 No 2	If No, go to 229
227.	In a typical week, on how many days do you do **vigorous-intensity activities** as part of your work?	Number of days ☐☐	
228.	How much time do you spend doing **vigorous-intensity** activity at home/work on a typical day?	Hours : minutes ☐☐ : ☐☐ Hours minutes	
229.	Does your work involve **moderate -intensity** activity that causes small increases in breathing or heart rate for **at least 10 minutes** continuously (such as brisk walking or carrying loads, manual washing of clothes, dry sweeping of floor, wet mopping of floor, drawing water from well, carrying water from tap, carrying water from river or well, manual grinding or pounding of cereals, gardening at home, carrying groceries from market, etc.) ?	Yes ..... 1 No 2	If No,go to 232
230.	In a typical week, on how many days do you do **moderate-intensity** activities as part of your work?	Number of days ☐☐	
231.	How much time do you spend doing **moderate-intensity** activity at work on a typical day?	Hours : minutes ☐☐ : ☐☐ Hours minutes	

Travel (related to Physical Activity) to and from places

The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship etc.

232.	Do you **walk** or use **a bicycle** (pedal cycle) for **at least 10 minutes** continuously to get to and from places?	Yes ..... 1 No 2	If No, go to 235
233.	In a typical week, on **how many days** do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Number of days ☐☐	
234.	How **much time** do you spend walking or bicycling for travel on a typical day?	Hours : minutes ☐☐ : ☐☐ Hours minutes	

Recreational Activity			
235.	Do you do any **vigorous**-intensity **sports**, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like (running or football,…) for **at least 10 minutes continuously?**	Yes ..... 1 No 2	If No, go to 238
236.	In a typical week, on **how many days** do you do vigorous-intensity sports, fitness, or recreational activity?	Number of days ☐	
237.	How **much time** do you spend doing vigorous-intensity sports, fitness or recreational (leisure) activities on **a typical day?**	Hours : minutes ☐☐ : ☐☐ Hours minutes	
238.	Do you do any **moderate**-intensity **sports**, fitness or recreational (leisure) activities that cause small increases in breathing or heart rate such as brisk walking (cycling, swimming, volleyball etc.) for **at least 10 minutes continuously?**	Yes ..... 1 No 2	If No, go to 241
239.	In atypical week, on **how many days** do you do moderate-intensity sports, fitness, or recreational activity?	Number of days ☐	
240.	How **much time** do you spend doing moderate-intensity sports, fitness, or recreational activities on a typical day?	Hours : minutes ☐☐ : ☐☐ Hours minutes	
Yoga Activity			
241.	Do you regularly practice **Yogic Exercise /*Yogasan?***	Yes ..... 1 No 2	If No, go to 244
242.	If **yes**, **how many days** in a week?	Number of days ☐	
243.	How much **time** do you spend doing Yoga in a **typical day?**	Hours : minutes ☐☐ : ☐☐ Hours minutes	
Sedentary Behaviour			
The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, traveling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping.			
244.	How **much time** do you usually spend **sitting or reclining** on a **typical day**?	Hours : minutes ☐☐ : ☐☐ Hours minutes	

History of Raised Blood Pressure			
	Questions	**Response**	**Skip**
245.	When was your blood pressure last **measured** by a **health professional?**	Within past 12 months ..... 1 1-5 years ago ..... 2 More than 5 years ago ..... 3 Never 4	
246.	Have you ever been told by a doctor or other health worker that you have **raised (high) blood pressure** or hypertension?	Yes ..... 1 No 2	If No, go to 248
247.	Are you currently receiving any of the following treatments/advice for raised (high) blood pressure prescribed by a doctor or other health worker as well as **any advice?**		
	Drugs (medication) that you have taken in the last 2 weeks	Yes ..... 1 No 2	
	Special prescribed **diet**	Yes ..... 1 No 2	
	Advice or treatment to lose weight	Yes ..... 1 No 2	
	Advice or treatment to stop smoking	Yes ..... 1 No ..... 2 Not Applicable 8	
	Advice to start or do **more physical activity**	Yes ..... 1 No 2	
248.	During the **past 12 months** have you visited to an AYUSH Practitioner for high blood pressure or hypertension?	Yes ..... 1 No 2	If No, go to 250
249.	Are you currently taking any treatment/medicine from an **AYUSH Practitioner** for your high blood pressure?	Yes ..... 1 No 2	
History of Diabetes			
250.	Has your blood sugar been **measured** in the last **12 months?**	Yes ..... 1 No 2	
251.	Have you ever been **told** by a doctor or health worker that you have **diabetes?**	Yes ..... 1 No 2	If No, go to 253
252.	Are you currently receiving any of the following treatments/advice for diabetes prescribed by a doctor or other health worker as well as **any advice?**		
	Insulin	Yes ..... 1 No 2	
	Oral **drug** (medication that you have taken in the last 2 weeks).	Yes ..... 1 No 2	
	Special Prescribed **diet**	Yes ..... 1 No 2	
	Advice or treatment to **lose weight**	Yes ..... 1 No 2	
	Advise to start or do **more exercise**	Yes ..... 1 No 2	
253.	During the past 12 months have you visited/ seen an **AYUSH Practitioner** for diabetes?	Yes ..... 1 No 2	If No, go to 301
254.	Are you currently taking **any treatment/medicine** from an AYUSH Practitioner for your diabetes?	Yes ..... 1 No 2	

STEP 2. Physical Measurement			
Questions		**Response**	**Skip**
301.	Technician / Interviewer ID		
302.	Device ID for height and weight	Height..... ☐☐ Weight..... ☐☐	
303.	Height	In Centimeter(cm)... ☐☐☐.☐	
304.	Weight	In Kilograms (kg).... ☐☐☐.☐	
305.	(For Women) Are you pregnant?	Yes ..... 1 No 2	If Yes, go to 309
Waist Measurement			
306.	Device ID for waist	☐☐	
307.	Waist circumference Reading 1	In Centimeter (cm)... ☐☐☐.☐	
308.	Waist circumference Reading 2	In Centimeter (cm)... ☐☐☐.☐	
Blood Pressure and Pulse Rate			
309.	Technician ID	☐☐	
310.	Device ID for Blood Pressure	☐☐	
311.	Cuff Size Used	Small ..... 1 Medium ..... 2 Large 3	
312.	B.P. Reading 1	Systolic (mmHg) ☐☐☐ Diastolic (mmHg) ☐☐☐	
313.	Pulse Rate Reading 1	☐☐☐	
314.	B.P. Reading 2	Systolic (mmHg) ☐☐☐ Diastolic (mmHg) ☐☐☐	
315.	Pulse Rate Reading 2	☐☐☐	
316.	B. P. Reading 3	Systolic (mmHg) ☐☐☐ Diastolic (mmHg) ☐☐☐	
317.	Pulse Rate Reading 3	☐☐☐	

Appendix - C

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