A REPORT ON NON-COMMUNICABLE DISEASE PROGRAM OF DEPARTMENT OF HEALTH, C.T.A

PREVALANCE, AWARENESS, TREATMENT AND CONTROL OF HYPERTENSION & DIABETES AMONG ADULT TIBETAN POPULATION IN INDIA DURING CCOCC PROGRAM IMPLEMENTATION - 2018

USAID
FROM THE AMERICAN PEOPLE

THE TIBET FUND

Published by: Department of Health, CTA
September 2019

The publication of this report was sponsored by United State Agency for International Development (USAID). The contents of this report are the sole responsibility of the author and the findings, interpretations and conclusions expressed in this work do not necessarily reflect the views of donor or DoHe-CTA.

Acknowledgements:

My daughter Ms. Tenzin Chodon designed and developed the epi-info data entry form, re-ran the STATA "do file" to check the codes and also the numbers in the tables. She also assisted me in the conduct of the pilot survey in 2014 at Poanta Tibetan settlement. Ms. Tenzin Dhaze (DoHe-CTA CCOCC Program Officer) coordinated the data collection and compilation from the DoHe-CTA health facilities at the settlements and also did the proof reading including verifying the numbers in the documents.

On behalf of DoHe-CTA, I wish to thank all the DoHe-CTA field staffs who collected the data at the household / camp level during their house-house visits and entered the data in Epi-Info software. Special thanks to Dharamsala CCOCC field staffs and volunteers (especially Tibet-Corp) who had to enter the data from smaller settlements into Epi-Info software. The staff at these smaller health facilities do not have the expertise and hardware to enter data into Epi-Info software. The Dharamsala field staff also conducted the house-house survey for Dharamsala and continues to perform the routine CCOCC (outreach) activities there.

This publication is dedicated to late professor emeritus Dr Carl Taylor who was my advisor and mentor during my MPH program at Bloomberg School of Public Health, Johns Hopkins University; Baltimore (USA). He inspired me to work in places where I am needed the most. I am finding that Alma Ata declaration is more relevant now than ever.

Declaration:

The survey design was based on the pilot study carried out by Dr. Lobsang Tsering and assisted by Ms Tenzin Chodon and it was part of practicum required for his PGDBDM (Postgraduate Diploma in Biostatistics and Data Management) at the Indian Institute of Public Health, Hyderabad (IIPH-H) and it involved piloting the study design at the Tibetan settlement of Poanta Sahib in 2014 and analysing & reporting the data.

Dr Lobsang Tsering (MBBS, MPH, PGDBDM) performed the data analysis and also prepared the report of the current survey. He was assisted by his daughter Ms Tenzin Chodon (BSc-Nursing, MSc-Health Informatics, PGDBDM). Ms Tenzin Dhaze (DoHe-CTA CCOCC Program Officer) coordinated the data collection and compilation from the DoHe-CTA health facilities and also did the proof reading of the manuscript.

Conflict of Interest:

Dr. Lobsang Tsering, at the time of preparing the manuscript, is the part-time consultant to DoHe-CTA and oversees the TB, Hepatitis B, Health Information System (HIS) and CCOCC (Outreach) Programs of DoHe-CTA.

Preface

In 2014, a pilot study on hypertension was conducted by the author in the Tibetan settlement of Poanta, Himachal Pradesh. It was carried out as a part of mandatory "field work" required for an in-campus postgraduate diploma program in biostatics and data management from Indian Institute of Public Health, Hyderabad (IIPH-H). The study proposal for the pilot project had gone through the technical and ethical review committee of the institute and the study outcome revealed an overall prevalence of hypertension at 37.5% (CI 28.8 - 46.2). Among all the adults surveyed, 17.5 % (CI 10.7 - 24.3) were newly diagnosed during the survey. 12.5 % (CI 6.6 -18.4) and 7.5 % (CI 2.8 - 12.2) had uncontrolled and controlled blood pressure respectively. This finding suggested that hypertension among adult Tibetan population in India might be high and many adult may remain undiagnosed. It also showed the importance of the need for further larger study.

DoHe-CTA had begun to implement an electronic health information system (DoHe-CTA HIS) in 2012 which also collected among others; clinic morbidity and mortality information and the data showed that hypertension and diabetes related conditions were among the top causes of death in the Tibetan community in India. DoHe-CTA HIS also reported that hypertension is the leading reason of footfalls at DoHe-CTA health facilities (refer annexure 1-3). TMS (Tibetan Medicare System) morbidity data from the claim database also show that NCDs account for majority of TMS participants who claim reimbursement (refer annexure 4)

It has become clear that prevalence of hypertension and diabetes are on the rise. Community based screening of adult population for hypertension and diabetes is important because many people with these conditions do not present with any symptoms and so do not seek care; a substantial proportion of people with these two conditions are undiagnosed and may present latter with fatal complications or lifelong disabilities. In such a situation, population based intervention with household level as the "Point-of Contact & Care" may be an appropriate and effective approach.

Community based screening is advocated in the Government of India Non-Communicable Disease (GoI NCD) operational framework[23] and rationale for population based screening stated that "Studies in health seeking behaviour have shown that most people with diabetes and hypertension do not seek health care even when they know they have the condition, until symptoms appear. Thus in the early phases of the programme, the guidance would be to undertake population based screening. Initiating the programme through a population based screening programme has several benefits. It creates an environmental milieu and increases awareness in the community regarding NCDs. Buttressed by active IEC, the risk assessment questionnaire undertaken by ASHA/ASHA facilitator trained to do this, would enable an increased understanding among respondents of risk factors and the need to be screened. Thus population based screening could serve as an entry point strategy. As awareness increases, states could gradually move towards opportunistic screening".

In 2017, DoHe-CTA initiated (revived) the outreach program under the Primary Health System as part of its preventive and public health extension activities and, with funds from USAID, 18 staffs were recruited to provide the initial impetus to the program. The program was named Comprehensive Community Outreach and Coordinated Care Program (CCOCC Program). As the name suggested, it was intended to be a comprehensive approach. Point-Of-Care-Testing (POCT) kits were provided so that basic investigations like blood sugar and procedures like taking blood pressure could be carried out at the household level. DoHe-CTA had also requested for a grant from USAID to conduct one time free screening of hypertension and diabetes of all the adults staying in the Tibetan settlements in India as a part of its Non-Communicable Disease Program (NCD). A grant of INR nine lac was allocated to purchase diabetes test kits.

To work towards WHO NCD global action plan 2018 – 2020, in 2018, free hypertension and diabetes screening service was offered to all the adult residents of the Tibetans settlements through house-

house visits under the CCOCC Program This report is outcome of the data collected during the screening activities for that year. The outreach visits under the CCOCC Program continue to conduct their multipronged interventions on a continuous basis with the intention of covering the whole settlement at-least once a month and the monthly visits also include screening and follow-up for hypertension and diabetes.

The short term target of DoHe-CTA under the NCD and CCOCC programs with respect to hypertension and diabetes are:

i. Estimate the community prevalence of hypertension and diabetes by end of 2018
ii. Identify all the adults who are hypertensive and diabetic by 2020
iii. By 2020, reduce by 50%, all cases of known hypertensive and diabetic who require medication and currently not taking medicines
iv. By 2020, bring 50% of all cases of uncontrolled hypertensive and diabetic under control with proper medication and other measures
v. By 2020, develop a hypertension and diabetes prevention and risk reduction strategy and Social and Behavior Change Communication (SBCC) campaign

The current report attempts to look mainly at the descriptive analysis of the house-house hypertension and diabetes screening data. Advance statistical analysis will be attempted latter and this ideally will need "peer review" and I would like to welcome you to be part of the team.

Considering that this report is based on program implementation, the data needed considerable cleaning. Field data collection was carried out by the DoHe-CTA regular staff and despite training, they were not professionals in this area of work e.g. data entry in a software. Data entry mistakes into the electronic database through Epi-Info 7 form was there. There was a protocol, but some collected height and waist in inches instead of centimetres. Some did not follow the protocol, as in many instances, there were only one blood pressure readings instead of at-least two whiles many did not measure or reported fasting blood sugar level after the random blood sugar report of more than 140 mg/dl

However, this type of survey or implementation research has its application and I found that the effort was worthwhile and satisfying as we can understand issues right at the lowest level i.e. settlement or village. Most of all, it will help us in monitoring the WHO NCD targets. At-least three targets have direct relation to hypertension and diabetes and they are by 2025:

1. *25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances;*
2. *Halt the rise in diabetes and obesity and*
3. *At least 50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes".*

Dr. Lobsang Tsering (MBBS, MPH, PGDBDM)
Dated: 1st September 2019
Note: For correspondence, kindly email to: ltpekahng@gmail.com

CHAPTER ONE: INTRODUCTION

Hypertension, diabetes and their complications are important determinants of morbidity and mortality in adult population and the problem is likely to be aggravated in the future due to socio-demographic and economic transformation. Tibetans living in India are going through not only epidemiological and demographic transition but they may also be going through lifestyle transition. In Tibet, people were involved in moderate to heavy agricultural or nomadic activities but in India they are increasingly adopting sedentary lifestyles because of the shift in the nature of their occupation and availability of modern transport system both at public and individual levels. This lifestyle shift and its consequences can be implied from study carried out by, Bhatia et al [4, 5] , Tripati et al [14] , Belle Yanyu et al [34] and Norboo et al [27]. Also, Tibetans in India have maintained their distinct culture and food habit which include among others drinking a salted tea.

There is a paucity of information with respect to prevalence, awareness, control and treatment of hypertension and diabetes among the Tibetans in India. There is one published journal related to hypertension [13] and that too is on blood pressure variation among Tibetans at different altitudes. In 2009, Men-Tsee-Khang, also called Tibetan Medical and Astrological Institute headquartered at Dharamsala, did a study on the effect of Tibetan medicine on hypertension and though they reported hypertension prevalence of 46% (age range of 30 and 70 years), the estimate may not be accurate because of selection bias as "In this study Tibetan people within the age range of 30-70 were asked to come for blood pressure screening" (Mentsekhang e-newsletter 2011). A study by Norboo and others [27] showed prevalence of hypertension among people from Ladakh at 37%. The study included Tibetans living in Choglamsar and Jangthang region.

Relatively, there are more published studies on hypertension among the Tibetans living in Tibet (now under China's occupation), but there too, no studies show prevalence of hypertension for the Tibet region as a whole. One study in Lhasa region [18] reported a prevalence of hypertension as high as 51.2 % for the age group of 18 or more. Tibetans seems to be more prone to hypertension as compared other races. Genetic factor (angiotensinogen gene) [20] may be playing an important role in the pathogenesis of essential hypertension among Tibetans. Study by Bei Sun and others [3] indicated angiotensinogen gene 235MM as "a predictor for hypertension development in Tibetan women but not in men, and may exert its hypertensive effect on linkage disequilibrium with a possible function locus of G-6A".

The current community outreach activities under the CCOCC program of DoHe-CTA will help us better understand, among the Tibetan communities in India, the prevalence of hypertension and diabetes, awareness among those who are hypertensive and diabetic and proportion taking treatment and whether their blood pressure or blood sugar levels were under control or not. The current report is the result of data analysis of the information collected during the house-house screening carried out by DoHe-CTA staffs as a part of CCOCC program activities in 2018 and the map below (fig1) shows the location of the Tibetan settlements, an important element being that the settlements are scattered around all the geographical regions of India i.e. north, north-east, central and south India and at different altitudes.

Hypertension and diabetes are silent killers. Many people with these two conditions do not present with any symptoms and by the time they decides to seek help, many would have presented with life threating complications or lifelong disability. Stroke is an important complication of these two disease conditions in the Tibetan communities in India (refer annexure 1-4). Most of these complications could be prevented with early detection and control of blood pressure and/or blood sugar. Lifestyle changes and dietary modification would prevent many individuals from having these two disease conditions in the first place.

Fig1: Tibetan Settlements in India

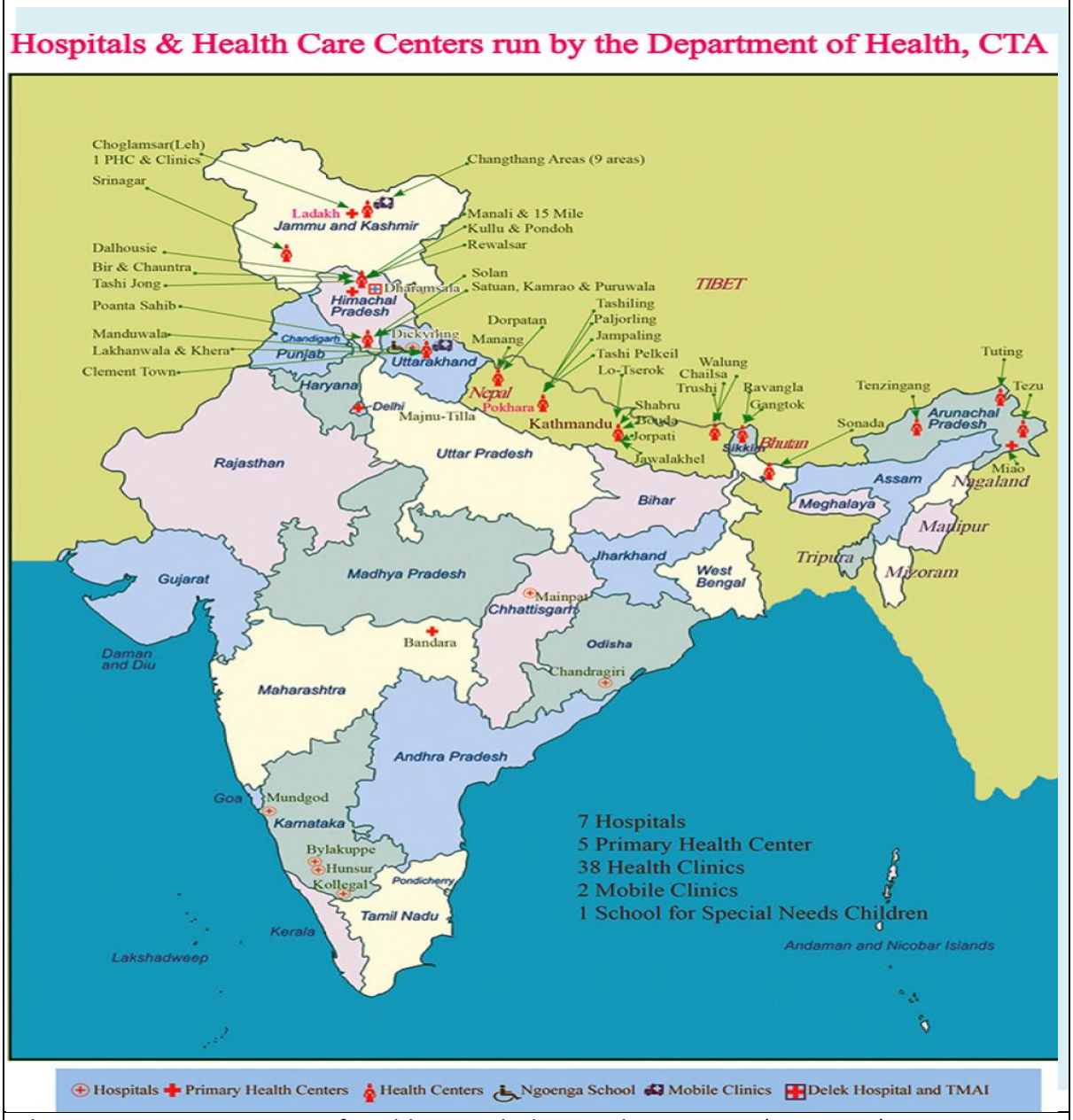


Photo courtesy: Department of Health-Central Tibetan Administration (DoHe-CTA)

CHAPTER TWO: STUDY DESIGN, SURVEY INSTRUMENT AND DATA COLLECTION & ANALYSIS PLAN

The current study is designed as a population based program implementation research as DoHe-CTA has started the CCOCC program in 2017 under which outreach workers will go house-to-house every month to carry out multiple health interventions including hypertension & diabetes screening and services. And one of the immediate objectives is to identify, by 2018, all the adults who are hypertensive and diabetic. All adults 18 years and above were included in the survey.

In 2014, the investigators (Lobsang Tsering and Tenzin Chodon) used a structured questionnaire to conduct a pilot study in Poanta Tibetan settlement. The pilot study was requirement of an academic program and had gone through technical and ethical review committees. We have used the same structured questionnaire but with slight modification based on the field experience and feedback during the pilot study and while conducting workshops for the DoHe-CTA staffs who served as interviewers for this study. Content of structured questionnaire included socio-demographic information (age, sex, educational qualification, family history of the diseases and dietary & other habits including salted Tibetan tea, tobacco & alcohol use). Occupation was differentiated between monks/nuns and others to see if monks/nuns are at greater risks/odds of hypertension. The general perception is that due to more intake of Tibetan salted tea and also relatively more sedentary lifestyles, the monks have higher risk for hypertension than lay Tibetans.

Interviews were conducted by regular health staffs employed at the settlement health facilities and they include qualified nurses proficient in measuring blood pressures and point-of-care testing of random blood sugar. The field staffs collecting the information for the study were trained during a two day CCOCC workshops; one workshop conducted separately for staff of the regions i.e. South, North & Central and North-East India at three different locations. After returning from the workshop, the staff have gone to house to house and filled the pre-structured paper based form and carried out the screening activities after reading out the participant information form and taking written informed consent.

The data collected in paper-based pre-structured form was entered into EPI-INFO 7 based e-form. Because of the volume of data involved in data entry, double data entry could not be done. However data cleaning was done through "Stata" software program and the missing data in the e-form were crosschecked with the paper form and extreme measurements were verified e.g. age < 18, weight less than 40 or more than 100 kg and height less than 120 and more than 180 cms. Waist less than 60 and more than 150 cms. Also, the outliers in weight, height, waist, blood pressure, random blood sugar were crosschecked. A sample will be evaluated for data entry errors during field visits also; as a part of data entry quality evaluation.

Blood Pressure (BP) Measurement and Classification: Two blood pressure measurements were taken (the first BP after resting for ten minutes and then five minutes' resting between the two measurements i.e. 1st and 2nd BP. The next day, a third and fourth BP measurement were taken at the health facility if the average of the 1st and 2nd were found to fulfill the criteria of hypertension i.e. if the average of the systolic and diastolic of 1st and 2nd is 140 and/or 90 or more respectively. Also, they were referred to a doctor for further evaluation.

Recommendations of the WHO and JNC8 (2013) were followed for the classification of hypertension.

BP classification	Systolic BP (mmHg)		Diastolic BP (mmHg)
Normal	<120	and	<80
Prehypertension	120 -139	or	80 – 89
Stage 1 Hypertension	140 -159	or	90 – 99
Stage2 Hypertension	>160	or	>100

Blood Sugar Measurement and Classification: Two stage screening was conducted. In the 1st stage all persons who were 30 years or above were offered one random blood sugar and those with the value

above 140 mg/dl were offered fasting and post prandial blood sugar. 140 is taken as the cut off to go into 2nd stage screening to improve sensitivity. WHO recommendation was followed and fasting blood sugar of > 126 mg/dl will be taken as having diabetes.

Blood Sugar classification	Random Blood Sugar	Fasting Blood Sugar
1st stage screening	>140 mg/dl	
2nd stage screening		>126 mg/dl

If a person was on allopathic medicine for hypertension, then s/he was labelled as hypertensive even if the blood pressure measurement was normal. Similarly, if a person was on allopathic medicine for diabetes, then s/he was labelled as having diabetes even if the blood test was normal.

Definition of Awareness, Treatment and Control of Hypertension and Diabetes:

Awareness of Hypertension & Diabetes: A person diagnosed as hypertensive or diabetic by a health personal prior to the present study.

Treatment of Hypertension & Diabetes: A person previously diagnosed as hypertensive or diabetic by a health personal and was using allopathic medicine to lower blood pressure or blood sugar at the time of survey.

Control of Hypertension & Diabetes:

A hypertensive or diabetic person at the time of survey was taking allopathic medicine to control blood pressure or blood sugar and his/her systolic BP is < 140 and diastolic BP is <90. And his/her fasting blood sugar level is equal or less than 126 mg/dl

Tibetan Tea:

A traditional tea, taken by Tibetans, is brewed with special tea leaves and then churned with butter, salt and milk and served as tea. Tibetan tea is usually not prepared in cup or glass quantity. It is prepared in bulk and usually stored in a flask for consumption as and when required by members of the house hold.

Digital sphygmomanometer WHO STEP surveillance manual (WHO 2017 update) [30] guideline is followed.

(Omron brand) for measuring blood pressure was used as they are easier to carry house-house and they are being used routinely during outreach visits and tested for reliability and accuracy during the survey period by comparing with a machine based at the local health facility. And, they were also checked at regular interval during the survey period by taking blood pressure of at-least two persons with known readings.

Weight measurement: WHO STEP surveillance manual (WHO 2017 update) guideline [30] is followed. A digital weighing machines as they are being routinely used during outreach visits and tested for reliability and accuracy by comparing with the weighing machine at the clinic/hospital. And, they were also checked at regular interval during the survey period by taking weight of at-least two persons with known readings

Height measurement: WHO STEP surveillance manual (WHO 2017 update) guideline [30] is followed. However considering that place of measurement is at household level, we had to modify slightly and use a steel measuring tape and plastic/wooden ruler to measure the height.

BMI and Abdominal Waist Measurement: WHO STEP surveillance manual guideline [30] is followed

BMI is calculated with the formula = {weight in kg / (height in m)^2}

Abdominal waist circumference is measured at the end of several consecutive natural breathes (end of expiration) using non-stretchable cloth measuring tape, at the level, midpoint between the top of the iliac crest and lower margin of the last palpable rib in the mid axillary line.

BMI Classification (WHO Criteria)			
S No	**Classification**	**Obesity Class**	**BMI**
1	Under weight		<18.5
2	Normal		18.5 – 24.9
3	Over weight		25 – 29.9
4	Obese	I	30 – 34.9
		II	35 – 39.9
	Extreme Obesity	III	>40

Abdominal Waist Circumference (International Diabetes Federation Criteria)			
S No	**Country / Ethnic group**	**Sex**	**Waist Circumference**
1	Europid	Male	>94
		Female	>80
2	South Asian	Male	>90
		Female	>80
3	Chinese	Male	>90
		Female	>80
4	Japanese	Male	>90
		Female	>80

Hypertension and Diabetes Risk factors: The population wide behaviour such as physical activity, alcohol consumption, tobacco use and salt intake etc. were included in the questionnaire to observe and understand the current magnitude of these risk factors in the community as they have implication in cardiovascular and other non-communicable diseases (NCD) risks and in future program planning.

Data Collection and Analysis Plan: Data was collected using a structured questionnaire on a paper form after explaining and reading out the participant information sheet and then obtaining written consent from the survey participants. It was then entered into Epi-Info 7 software. The data in the Epi-Info 7 was exported to Microsoft Excel format and finally Stata 14 was used for data cleaning and for descriptive and statistical analysis including regression and variance analysis.

CHAPTER THREE: DESCRIPTIVE ANALYSIS

Population Covered During the Survey:

The last census (TDS 2009)[9] conducted by Planning Commission of Central Tibetan Administration (CTA) in Dharamsala was in 2009. Since then the population of Tibetans residing in India has been declining steadily.

The current hypertension and diabetes survey was intended to cover all the Tibetan refugee settlements where DoHe-CTA had a health facility and regular staffs. However, during the survey period, staff position in some of the settlements were vacant and survey could not be conducted in these settlements. Table 3.1 and 3.2 show the settlements covered by DoHe-CTA during the house-house listing (mapping) and population survey carried out in 2017 and it also shows the number of people covered during the household screening (survey) of hypertension and diabetes. An average of **48.52%** of the adult population was covered in the current hypertension and diabetes survey of 2018.

Table 3.1
Region Wise Participants of HT-DM Survey 2018 & Resident Population in the Household-Listing Survey 2017 (Age 18 and above)

S No	Region	Current HT_DM Survey n (%)	Household Listing Survey n (%)
1	North India	4816 (46.09)	10448
2	South India	4462 (53.15)	8395
3	Central India	737 (49.36)	1493
4	North-East India	444 (36.39)	1220
	TOTAL	**10459 (48.52)**	**21556**

Table 3.2
Number of Participants in Current Survey and Resident Population in the Household-Listing Survey 2017 (Age 18 and above)

Settlement		Current HT_DM Survey n (%)	Household Listing Survey n (%)
North India			
1	Bir (HP)	903 (125.59)	719
2	Chauntra (HP)	453	-
3	Clementown (Uttarakhand)		734
4	Dalhousie (HP)		256
5	Dekyiling (Uttarakhand)	584 (47.79)	1222
6	Delhi	397 (34.92)	1137
7	Dharamsala (HP)	833 (29.82)	2793
8	Dholanji (HP)	145 (166.67)	87
9	Kamrao (HP)	45 (100.00)	45
10	Khera (Uttarakhand)	44	-
11	Kullu (HP)		623
12a	Ladakh	1168 (53.68)	2176
12b	Ladakh Jangthang	62 (06.28)	988
13	Lhakhanwala (Uttarakhand)	123 (64.40)	191

14	Manali (HP)		
15	Manduwala (Uttarakhand)	230 (66.47)	346
16	Poanta (HP)	150 (54.95)	273
17	Pondoh (HP)		236
18	Puruwala (HP)		300
19	Raipur (Uttarakhand)		147
20	Rajpur (Uttarakhand)		194
21	Rewalsar		185
22	Shimla (HP)	176 (37.37)	471
23	Sataun (HP)		95
24	Shrinagar (J &K)		
25	Tashijong (HP)		
Sub-Total		**4816 (46.09)**	**10448**
South India			
26	Bylakuppe (Karnataka)	1796 (62.64)	2867
27	Hunsur (Karnataka)	549 (33.93)	1618
28	Kollegal (Karnataka)	924 (55.13)	1676
29	Mundgod (Karnataka)	1193 (53.40)	2234
Sub-Total		**4462 (53.15)**	**8395**
Central India			
30	Mainpat (Chhattisgarh)	438	-
31	Bhandara (Maharashtra)	207 (49.05)	422
32	Phuntsokling (Odisha)	530 (49.49)	1071
Sub-Total		**737 (49.36)**	**1493**
North East India			
33	Miao (Arunachal Pradesh)	101 (14.21)	711
34	Ravangla (Sikkim)	164	-
35	Sonada (West Bengal)		197
36	Tenzingang (Arunachal Pradesh)	220	-
37	Tezu (Arunachal Pradesh)	343 (67.39)	509
38	Tuting (Arunachal Pradesh)		
Sub-Total		**444 (36.39)**	**1220**
Note: Ladakh includes a settlement in Choglamsar near Leh and eight settlements in Jangthang (Nomads) region			

A total of 11847 adults age 18 and above participated in the survey, out of which 48.43% (n=5738) were male and 51.57% (n=6109) were female. Monks/nuns consisted of 15.12% (n=1791). 93.13% (n=11033) of participants were Tibetans, 2% (n=237) participants had their nationality missing in the database and 4.87% (n=577) were non-Tibetans.

17.62% (n=2088), 16.32% (n=1933), 15.56% (n=1843), 14.20% (n=1682) and 36.30% (n=4301) were in age group of 18-29, 30-39, 40-49, 50-59 and 60 & above respectively. Among senior citizens (age >60) surveyed for hypertension and diabetes; 86.11% (n=3540) were staying with family or other members, 7.20% (n=296) were staying alone, 1.99% (n=82) were staying in monasteries, 4.23% (n=174) were staying in senior citizen's home (OPH).

Table 3.3 Gender (All Settlements n=32)			Table 3.4 Occupation (All Settlements n=32)		
Gender	**Frequency (n)**	**Percentage (%)**	**Occupation**	**Frequency (n)**	**Percentage (%)**
Male	5,738	48.43	**Monk/Nun**	1791	15.12
Female	6,109	51.57	**Others**	10056	84.88
Total	**11,847**	**100.00**	**Total**	11.847	100.00

Table 3.5 Histogram of Age (All Settlements n=32)

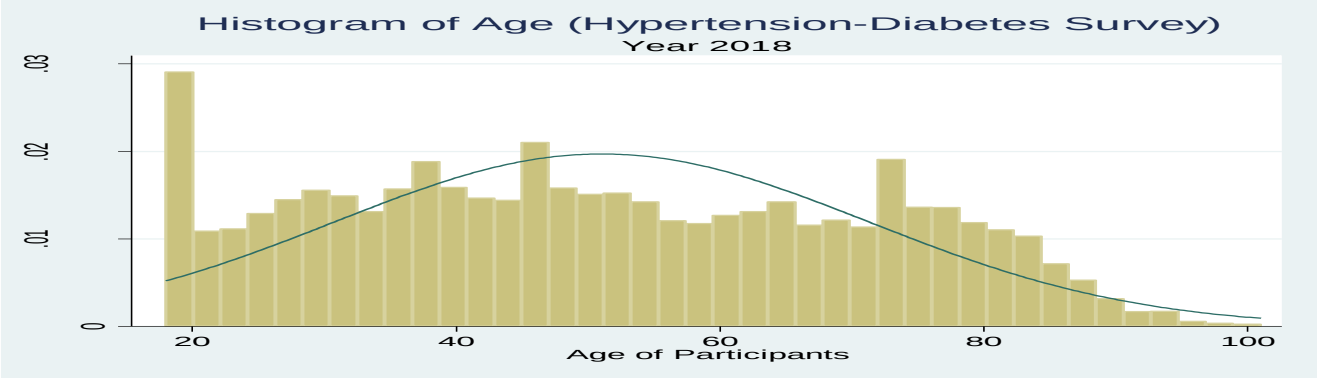
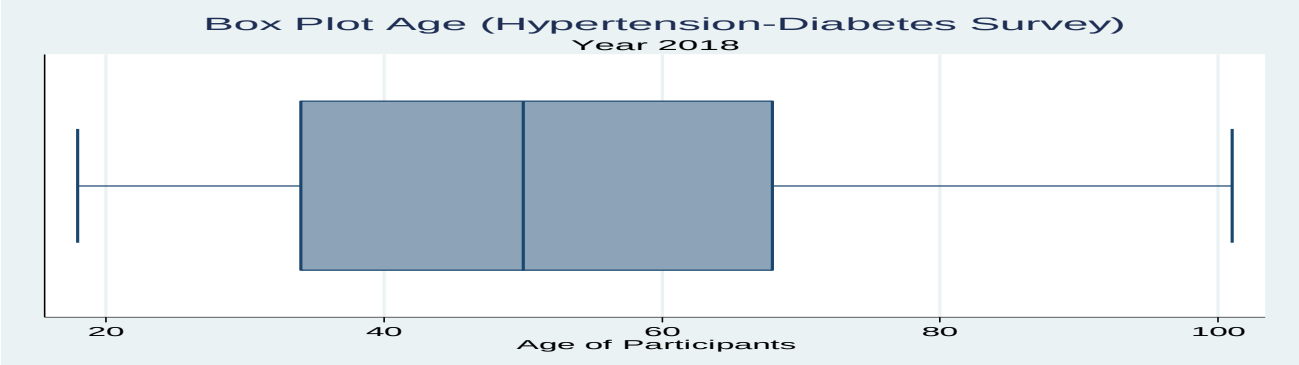


Table 3.6 Boxplot of Age (All Settlements n=32)



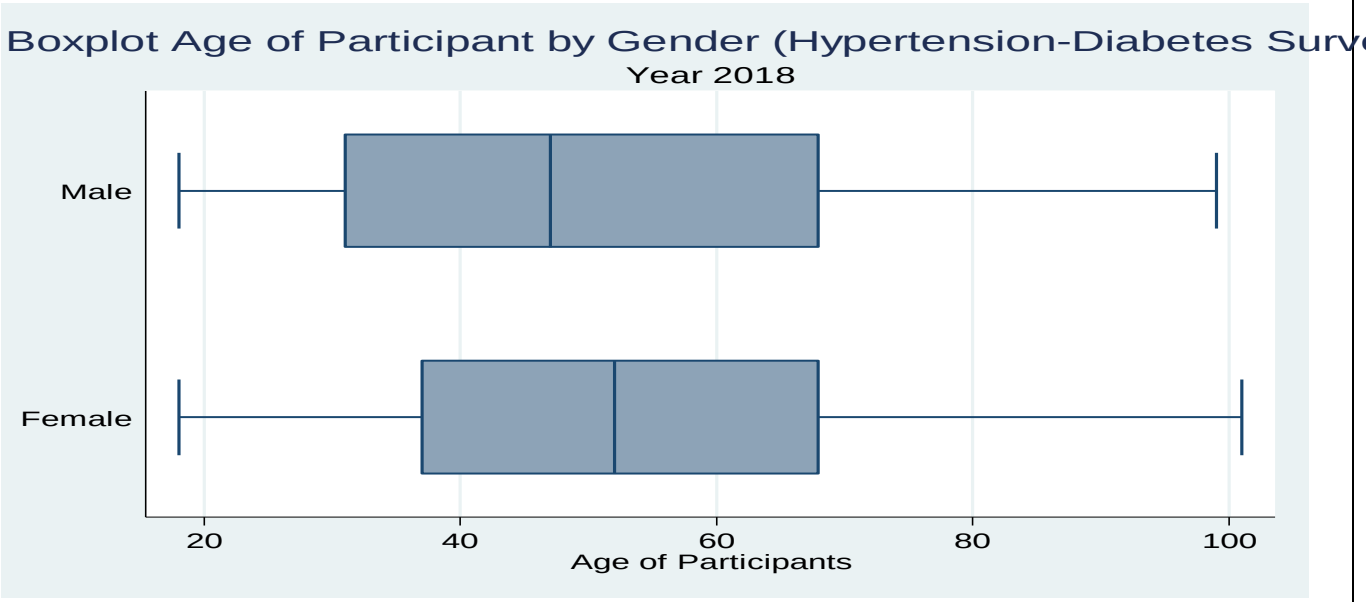
Variable	N	Mean	P50	P25	P75	iqr	Max	Min	sd
Age	11847	51.03	50	34	68	34	101	18	20.24

Table 3.7

Age-group (All Settlements n=32)			Type of residence if age above 60 years (All Settlements n=32)		
Age-group	**Frequency (n)**	**Percentage (%)**	**Senior Citizen Residence Type**	**Frequency (n)**	**Percentage (%)**
18-29	2,088	17.62	**Missing**	9	00.22
30-39	1,933	16.32	**Home alone**	296	07.20
40-49	1,843	15.56	**Home with family or others**	3540	86.11
50-59	1,682	14.20	**Monastery**	82	01.99
60-max	4,301	36.30	**OPH**	174	04.23
Total	**11,847**	**100.00**	**Other**	8	00.19
			School	2	00.05
			Total	**4111**	**100.00**

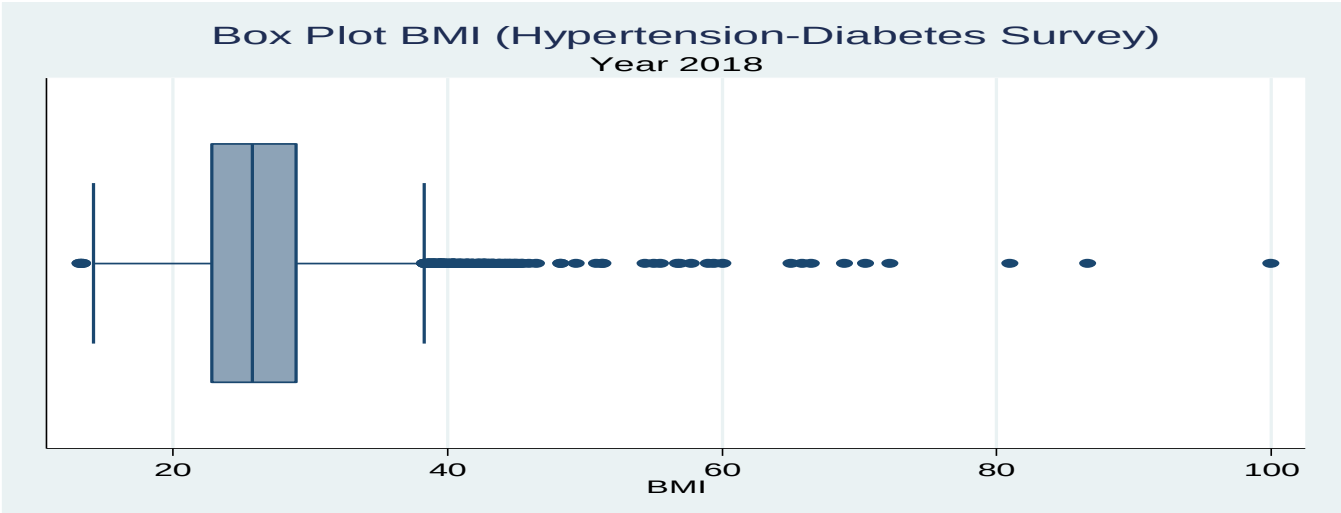
The average age of participants was 51.03 years. The average age of female participants was 52.64 and average age of male was 49.31. The average BMI of the participants was 26.27 with 3.01% (n=342) in the under-weight category, 40.27% (n=4576) has normal weight, 37.09% (n=4215) were over-weight and 19.63% (n=2231) were obese as per the WHO criteria. 62.52% (n=6612) have central obesity as per International Diabetes Federation criteria with women having more central obesity at 75.30% (n=4106) and male with 48.93% (n=2506).

Table 3.8 Boxplot of Age by Gender (All Settlements n=32)



Gender	N	mean	p50	p25	p75	iqr	max	min	sd
Male	5738	49.31	47	31	68	37	99	18	21.17
Female	6109	52.64	52	37	68	31	101	18	19.19

Table 3.9 Boxplot of BMI (All Settlements n=32)



Title	N	mean	p50	p25	p75	Iqr	max	min	sd
BMI	11364	26.27	25.78	22.83	29.03	6.20	100	13.28	5.03

Table 3.10 BMI Category (All Settlement n=32)		
BMI Category	**Frequency (n)**	**Percentage (%)**
Underweight	342	3.01
Normal	4576	40.27
Overweight	4215	37.09
Obese	2331	19.63
Total	**11364**	**100.00**

Table 3.11 Central Obesity (All Settlement n=31*)			
Category	**All n (%)**	**Male n (%)**	**Female n (%)**
Central Obese	6612 (62.52)	2506 (48.93)	4106 (75.30)
Not Obese	3963 (37.48)	2616 (51.07)	1347 (24.70)
Total	**10575**	**5122**	**5453**
**Tezu excluded because the waist circumference seem to be measured in centimetre or inches*			

Table 3.12 – 3.15: Descriptive Analysis of Individual Settlements

Table 3.12 Gender by Settlement (n=32)				
S No	**Settlement**	**Male n (%)**	**Female n (%)**	**Total (n)**
1	**Bhandara**	88 (42.51)	119 (57.49)	207
2	**Bir**	547 (60.58)	356 (39.42)	903
3	**Bylakuppe**	955 (53.17)	841 (46.83)	1796
4	**CTA**	43 (62.32)	26 (37.68)	69
5	**Chauntra**	306 (67.55)	147 (32.45)	453
6	**Dekyiling**	220 (37.67)	364 (62.33)	584
7	**Delhi**	189 (47.61)	208 (52.39)	397
8	**Dharamsala**	361 (43.34)	472 (56.66)	833
9	**Dholanji**	72 (49.66)	73 (50.34)	145
10	**Hunsur**	238 (43.35)	311 (56.65)	549
11	**Kamrao**	24 (53.33)	21 (46.67)	45
12	**Khera**	32 (72.73)	12 (27.27)	44
13	**Kollegal**	437 (47.29)	487 (52.71)	924
14a	**Ladakh**	410 (35.10)	758 (64.90)	1168
14b	**Ladakh Jangthang**	22 (35.48)	40 (64.52)	62
15	**Lakhanwala**	88 (71.54)	35 (28.46)	123
16	**Mainpat**	207 (47.26)	231 (52.74)	438
17	**Manduwala**	131 (56.96)	99 (43.04)	230
18	**Miao**	31 (30.69)	70 (69.31)	101
19	**Mundgod**	605 (50.71)	588 (49.29)	1193
20	**Odisha**	216 (40.75)	314 (59.25)	530
21	**Poanta**	70 (46.67)	80 (53.33)	150
22	**Ravangla**	64 (39.02)	100 (60.98)	164
23	**Shimla**	131 (74.43)	45 (25.57)	176
24	**Tenzingang**	105 (47.73)	115 (52.27)	220
25	**Tezu**	146 (42,57)	197 (57.43)	343
	Total	**5738 (48.43)**	**6109 (51.57)**	**11847**

Table 3.13 Occupation by Settlement (All Settlements n=32)				
S No	**Settlement Name**	**Monk/Nun**	**Others**	**Total**
1	**Bhandara**	8 (03.86)	199 (96.14)	207
2	**Bir**	293 (32.45)	610 (67.55)	903
3	**Bylakuppe**	273 (15.20)	1,523 (84.80)	1,796
4	**CTA**	0 (00.00)	69 (100.00)	69
5	**Chauntra**	160 (35.32)	293 (64.68)	453
6	**Dekyiling**	66 (11.30)	518 (88.70)	584
7	**Delhi**	10 (02.52)	387 (97.48)	397
8	**Dharamsala**	230 (27.61)	603 (72.39)	833
9	**Dholanji**	48 (33.10)	97 (66.90)	145
10	**Hunsur**	0 (00.00)	549 (100.00)	549
11	**Kamrao**	0 (00.00)	45 (100.00)	45
12	**Khera**	15 (34.09)	29 (65.91)	44
13	**Kollegal**	71 (07.68)	853 (92.32)	924
14a	**Ladakh**	36 (03.08)	1,132 (96.92)	1,168
14b	**Ladakh Jangthang**	0 (00.00)	62 (100.00)	62
15	**Lakhanwala**	4 (03.25)	119 (96.75)	123
16	**Mainpat**	40 (09.13)	398 (90.87)	438
17	**Manduwala**	152 (66.09)	78 (33.91)	230
18	**Miao**	0 (00.00)	101 (100.00)	101
19	**Mundgod**	295 (24.73)	898 (75.27)	1,193
20	**Odisha**	0 (00.00)	530 (100.00)	530
21	**Poanta**	0 (00.00)	150 (100.00)	150
22	**Rabangla**	1 (00.61)	163 (99.39)	164
23	**Shimla**	83 (47.16)	93 (52.84)	176
24	**Tenzingang**	6 (02.73)	214 (97.27)	220
25	**Tezu**	0 (00.00)	343 (100.00)	343
	Total	**1,791 (15.12)**	**10,056 (84.88)**	**11,847**
Note: It is obvious that many settlements fail to include majority of the monks/nuns in the survey				

Table 3.14 Age-group by Settlement (n=32)							
S No	**Settlement**	**18-29**	**30-39**	**40-49**	**50-59**	**60-max**	**Total**
1	**Bhandara**	9 (04.35)	17 (08.21)	27 (13.04)	29 (14.01)	125 (60.39)	207
2	**Bir**	375 (41.53)	137 (15.17)	128 (14.17)	79 (08.75)	184 (20.38)	903
3	**Bylakuppe**	504 (28.06)	214 (11.92)	248 (13.81)	229 (12.75)	601 (33.46)	1796
4	**CTA**	16 (23.19)	25 (36.23)	18 (26.09)	8 (11.59)	2 (02.90)	69
5	**Chauntra**	142 (31.35)	99 (21.85)	46 (10.15)	49 (10.82)	117 (25.83)	453
6	**Dekyiling**	70 (11.99)	114 (19.52)	93 (15.92)	93 (15.92)	214 (36.64)	584
7	**Delhi**	44 (11.08)	103 (25.94)	102 (25.69)	68 (17.13)	80 (20.15)	397
8	**Dharamsala**	108 (12.97)	164 (19.69)	131 (15.73)	110 (13.21)	320 (38.42)	833
9	**Dholanji**	22 (15.17)	58 (40.00)	18 (12.41)	12 (08.28)	35 (24.14)	145
10	**Hunsur**	45 (08.20)	75 (13.66)	91 (16.58)	82 (14.94)	256 (46.63)	549
11	**Kamrao**	0 (00.00)	10 (22.22)	6 (13.33)	8 (17.78)	21 (46.67)	45
12	**Khera**	17 (38.64)	9 (20.45)	3 (06.82)	6 (13.64)	9 (20.45)	44
13	**Kollegal**	104 (11.26)	105 (11.36)	136 (14.72)	141 (15.26)	438 (47.40)	924
14a	**Ladakh**	116 (09.93)	209 (17.89)	203 (17.38)	222 (19.01)	418 (35.79)	1168
14b	**Ladakh Jangthang**	14 (22.58)	12 (19.35)	7 (11.29)	8 (12.90)	21 (33.87)	62

15	**Lakhanwala**	10 (08.13)	8 (06.50)	13 (10.57)	12 (09.76)	80 (65.04)	123
16	**Mainpat**	70 (15.98)	51 (11.64)	67 (15.30)	63 (14.38)	187 (42.69)	438
17	**Manduwala**	103 (44.78)	58 (11.64)	19 (08.26)	13 (05.65)	37 (16.09)	230
18	**Miao**	1 (00.99)	3 (02.97)	18 (17.82)	30 (29.70)	49 (48.51)	101
19	**Mundgod**	167 (14.00)	202 (16.93)	210 (17.82)	164 (13.75)	450 (37.72)	1193
20	**Odisha**	24 (04.53)	65 (12.26)	76 (14.34)	100 (18.87)	265 (50.00)	530
21	**Poanta**	17 (11.33)	15 (10.00)	29 (19.33)	18 (12.00)	71 (47.33)	150
22	**Ravangla**	23 (14.02)	28 (17.07)	29 (17.68)	34 (20.73)	50 (30.49)	164
23	**Shimla**	49 (27.84)	27 (15.34)	21 (11.93)	15 (08.52)	64 (36.36)	176
24	**Tenzingang**	20 (09.09)	71 (32.27)	49 (22.27)	30 (13.64)	50 (22.73)	220
25	**Tezu**	18 (05.25)	54 (15.74)	55 (16.03)	59 (17.20)	157 (45.77)	343
	Total	**2088 (17.62)**	**1933 (16.32)**	**1843 (15.56)**	**1682 (14.20)**	**4301 (36.30)**	**11847**

Table 3.15 Settlement with Type of Residence of Senior Citizen (All Settlements n=32)

S No	Settlement	Home alone	Home with family or others	Monastery	OPH	Total
1	Bhandara	0 (00.00)	105 (88.24)	0 (00.00)	14 (11.76)	119
2	Bir	11 (06.25)	160 (90.91)	5 (00.00)	0 (00.00)	176
3	Bylakuppe	27 (04.65)	510 (87.78)	9 (01.55)	35 (06.02)	581
4	CTA	1 (50.00)	1 (50.00)	0 (00.00)	0 (00.00)	2
5	Chauntra	11 (10.19)	80 (74.07)	1 (00.93)	16 (14.81)	108
6	Dekyiling	5 (02.40)	203 (97.60)	0 (00.00)	0 (00.00)	208
7	Delhi	7 (09.72)	64 (88.89)	1 (01.39)	0 (00.00)	72
8	Dharamsala	93 (30.10)	201 (65.05)	10 (03.24)	5 (01.62)	309
9	Dholanji	5 (14.71)	29 (85.29)	0 (00.00)	0 (00.00)	34
10	Hunsur	10 (04.15)	217 (90.04)	0 (00.00)	14 (05.81)	241
11	Kamrao	0 (00.00)	17 (100.00)	0 (00.00)	0 (00.00)	17
12	Khera	2 (25.00)	6 (75.00)	0 (00.00)	0 (00.00)	8
13	Kollegal	10 (02.41)	355 (85.54)	23 (05.54)	27 (06.51)	415
14a	Ladakh	27 (06.82)	359 (85.54)	10 (02.54)	0 (00.00)	396
14b	Ladakh Jangthang	2 (02.21)	17 (85.00)	1 (05.00)	0 (00.00)	20
15	Lakhanwala	3 (06.52)	38 (48.72)	0 (00.00)	37 (47.44)	78
16	Mainpat	4 (02.21)	177 (97.79)	0 (00.00)	0 (00.00)	181
17	Manduwala	4 (11.76)	30 (88.24)	0 (00.00)	0 (00.00)	34
18	Miao	3 (06.52)	42 (91.30)	0 (00.00)	0 (00.00)	46
19	Mundgod	11 (02.55)	403 (93.29)	15 (03.47)	3 (00.69)	432
20	Odisha	19 (07.57)	231 (92.03)	0 (00.00)	1 (00.41)	251
21	Poanta	4 (06.25)	60 (93.75)	0 (00.00)	0 (00.00)	64
22	Ravangla	5 (10.87)	40 (86.96)	1 (02.17)	0 (00.00)	46
23	Shimla	1 (01.61)	35 (56.45)	6 (09.68)	20 (32.26)	62
24	Tenzingang	10 (20.83)	38 (79.17)	0 (00.00)	0 (00.00)	48
25	Tezu	21 (14.58)	122 (84.72)	0 (00.00)	1 (00.69)	144
	Total	**269 (07.23)**	**3540 (86.51)**	**82 (02.00)**	**174 (04.25)**	**4092**

**In larger settlements with their own facilities (e.g. Mundgod, Bylakupee monasteries it seems were not covered in this survey)*
***Some of the OPH were not covered it seems*

CHAPTER FOUR: PREVALENCE, AWARENESS AND CONTROL OF HYPERTENSION

PREVALENCE, AWARENESS, TREATMENT AND CONTROL OF HYPERTENSION (AGE 18 AND ABOVE) ALL SETTLEMENT

Hypertension Prevalence (All Settlements n=32)		
Hypertension status	**Frequency (n)**	**Percentage (%)**
Hypertension YES	4330	36.55
Hypertension NO	7304	61.65
Missing Data	213	1.80
Total	**11,847**	**100.00**

Hypertension Category (All Settlements n=32)		
Hypertension Category	**Frequency (n)**	**Percentage (%)**
2= Hypertensive and under control with medication	713	16.47
3= Hypertensive and not under control (medicine or no medicine)	1598	36.91
4= Hypertension newly diagnosed during survey (new i.e. participant not aware that he is hypertensive)	2019	46.63
Total	**4330**	**100.00**

Hypertension Category and Senior Citizen (All Settlements n=32)					
Hypertension Category	**Home Alone n (%)**	**Home with Family/Other n (%)**	**Monastery n (%)**	**OPH n (%)**	**Total n (%)**
2= Hypertensive and under control with medication	37 (21.76)	481 (21.81)	3 (06.38)	26 (22.41)	**547 (21.55)**
3= Hypertensive and not under control (medicine or no medicine)	74 (43.53)	985 (44.67)	26 (55.32)	45 (38.79)	**1130 (44.52)**
4= Hypertension newly diagnosed during survey (new i.e. participant not aware that he is hypertensive)	59 (34.71)	739 (33.51)	18 (38.30)	45 (39.79)	**861 (33.92)**
Total	**170**	**2205**	**47**	**116**	**2538**
Fisher's Exact Test (p-value=0.141)					

Table: Hypertension Status by Settlements (All Settlements n=32)				
Settlement		**Hypertension YES**	**Hypertension NO**	**Total**
North India				
1	BIR_Bir (HP)	229 (25.42)	672 (74.58)	901
2	Chauntra (HP)	161 (35.54)	292 (64.46)	453
3	Dekyiling (Uttarakhand)	199 (38.57)	317 (61.43)	516
4	Delhi	140 (36.55)	243 (63.43)	383
5	Dharamsala (HP)	262 (29.13)	637 (70.86)	899
6	Dholanji (HP)	32 (22.07)	113 (77.93)	145
7	Kamrao (HP)	18 (40.00)	27 (60.00)	45
8	Khera (Uttarakhand)	8 (18.18)	36 (81.82)	44
9a	Ladakh	473 (40.53)	694 (59.47)	1167

9b	Ladakh Jangthang	17 (27.42)	45 (72.58)	62
10	Lhakhanwala (Uttarakhand)	54 (44.26)	68 (55.74)	122
11	Manduwala (Uttarakhand)	38 (16.67)	190 (83.33)	228
12	Poanta (HP)	49 (32.67)	101 (67.33)	150
13	Shimla (HP)	52 (29.89)	122 (70.11)	174
	Sub-Total	**1732 (32.75)**	**3557 (67.25)**	**5289**
South India				
14	Bylakuppe (Karnataka)	586 (33.76)	1150 (66.24)	1736
15	Hunsur (Karnataka)	265 (48.27)	284 (51.73)	549
16	Kollegal (Karnataka)	429 (46.43)	496 (53.57)	924
17	Mundgod (Karnataka)	465 (39.08)	725 (60.92)	1190
	Sub-Total	**1745 (39.67)**	**2654 (60.33)**	**4399**
Central India				
18	Mainpat (Chhattisgarh)	173 (40.52)	254 (59.48)	427
19	Bhandara (Maharashtra)	89 (43.63)	115 (56.37)	204
20	Phunstokling (Odisha)	258 (49.33)	265 (50.67)	523
	Sub-Total	**520 (45.06)**	**634 (54.94)**	**1154**
North East India				
21	Miao (Arunachal Pradesh)	61 (60.40)	40 (39.60)	101
22	Ravangla (Sikkim)	72 (47.68)	79 (52.32)	151
23	Tenzingang (Arunachal Pradesh)	51 (25.50)	149 (74.50)	200
24	Tezu (Arunachal Pradesh)	149 (43.82)	191 (56.18)	340
	Sub-Total	**333 (42.05)**	**459 (57.95)**	**792**

Note: Ladakh includes Settlement in Choglamsar near Leh and eight settlements in Nomadic Jangthang regions

Table: Hypertension Status by Settlements (All Settlements n=32)

Settlement		Hypertensive and under control with medication n (%)	Hypertensive and not under control (medicine or no medicine) n (%)	Hypertension newly diagnosed during survey** n (%)	Hypertension detected only during pregnancy n (%)	Total
North India						
1	Bir (HP)	50 (21.74)	86 (37.39)	93 (40.43)	1 (00.43)	230
2	Chauntra (HP)	32 (19.88)	58 (36.02)	71 (44.10)	0 (00.00)	161
3	Dekyiling (Uttarakhand)	23 (19.88)	83 (41.71)	93 (46.73)	0 (00.00)	199
4	Delhi	16 (11.43)	49 (35.00)	75 (53.57)	0 (00.00)	140
5	Dharamsala (HP)	54 (20.45)	116 (43.94)	92 (34.85)	2 (00.76)	264
6	Dholanji (HP)	6 (18.75)	12 (37.50)	14 (43.75)	0 (00.00)	32
7	Kamrao (HP)	0 (00. 00)	8 (44.44)	10 (55.56)	0 (00.00)	18
8	Khera (Uttarakhand)	1 (12.50)	5 (62.50)	2 (25.00)	0 (00.00)	8
9a	Ladakh	39 (08.04)	216 (44.54)	218 (44.95)	12 (02.47)	485
9b	Ladakh Jangthang	4 (23.53)	8 (47.06)	5 (29.41)	0 (00.00)	17

10	Lhakhanwala (Uttarakhand)	10 (18.52)	19 (35.19)	25 (46.30)	0 (00.00)	54
11	Manduwala (Uttarakhand)	9 (23.68)	7 (18.42)	22 (57.89)	0 (00.00)	38
12	Poanta (HP)	13 (26.00)	24 (48.00)	12 (24.00)	1 (02.00)	50
13	Shimla (HP)	5 (09.62)	27 (51.92)	20 (38.46)	0 (00.00)	52
Sub-Total		**262 (14.99)**	**718 (41.08)**	**752 (43.02)**	**16 (00.92)**	**1748**
South India						
14	Bylakuppe (Karnataka)	94 (16.04)	209 (35.67)	283 (48.29)	0 (00.00)	586
15	Hunsur (Karnataka)	45 (16.73)	103 (38.29)	117 (43.49)	4 (01.49)	269
16	Kollegal (Karnataka)	90 (20.98)	189 (44.06)	150 (34.97)	0 (00.00)	429
17	Mundgod (Karnataka)	112 (24.03)	641 (36.63)	763 (43.60)	5 (00.29)	1750
Sub-Total		**341 (19.49)**	**641 (36.63)**	**763 (43.60)**	**5 (00.29)**	**1750**
Central India						
18	Mainpat (Chhattisgarh)	1 (00.58)	25 (14.45)	147 (84.97)	0 (00.00)	173
19	Bhandara (Maharashtra)	15 (16.85)	33 (37.08)	41 (46.07)	0 (00.00)	89
20	Phuntsokling (Odisha)	81 (31.03)	105 (40.23)	72 (27.25)	3 (01.15)	261
Sub-Total		**97 (18.55)**	**163 (31.17)**	**260 (49.71)**	**3 (00.57)**	**523**
North East India						
21	Miao (Arunachal Pradesh)	4 (06.56)	41 (67.21)	16 (26.23)	0 (00.00)	61
22	Ravangla (Sikkim)	4 (05.56)	14 (19.44)	54 (75.00)	0 (00.00)	72
23	Tenzingang (Arunachal)	4 (07.69)	20 (38.46)	27 (51.92)	1 (01.92)	52
24	Tezu (Arunachal)	1 (00.67)	1 (00.67)	147 (98.66)	0 (00.00)	149
Sub-Total		**13 (03.89)**	**76 (22.75)**	**244 (73.05)**	**1 (00.30)**	**334**
TOTAL		**713 (16.37)**	**1598 (36.63)**	**2019 (46.36)**	**25 (00.29)**	**4355**

Note: Ladakh includes Settlement in Choglamsar near Leh and eight settlements in Nomadic Jangthang regions
***new i.e. participant not aware that he is hypertensive*

CHAPTER FOUR: PREVALENCE, AWARENESS, TREATMENT AND CONTROL OF DIABETES

Table: Population with Random Blood Sugar Above Various Cut off Points (All Settlements n=32)

Random Blood Sugar	Above 140 n (%)	Above 160 n (%)	Above 180 n (%)	Above 200 n (%)
Above Cutoff Level	2094 (21.94)	1152 (12.07)	744 (7.80)	504 (05.28)
Below Cutoff Level	7449 (78.06)	8391 (87.93)	8799 (92.20)	9039 (94.72)
Total	9543 (100.00)	9543 (100.00)	9543 (100.00)	9543 (100.00)

Table: Random Blood Sugar Above Various Cut off Points (By Region and Settlements n=31)					
Settlement		RBS above 140	RBS above 160	RBS above 180	RBS above 200
North India					
1	Bir (HP)	94 (17.87)	57 (10.84)	38 (07.22)	34 (06.46)
2	Chauntra (HP)	71 (22.90)	35 (11.29)	21 (06.77)	13 (04.19)
3	Dekyiling (Uttarakhand)	90 (19.35)	47 (10.11)	33 (07.10)	21 (04.19)
4	Delhi	207 (61.61)	88 (26.19)	58 (17.26)	19 (05.65)
5	Dharamsala (HP)	173 (24.06)	95 (13.21)	56 (07.79)	37 (05.15)
6	Dholanji (HP)	30 (24.59)	17 (13.66)	8 (06.56)	6 (04.92)
7	Kamrao (HP)	7 (15.91)	3 (06.82)	1 (02.27)	0 (00.00)
8	Khera (Uttarakhand)	4 (15.91)	2 (07.41)	2 (07.41)	2 (07.41)
9a	Ladakh	126 (11.98)	66 (06.27)	39 (03.71)	32 (03.04)
9b	Ladakh Jangthang	6 (12.50)	1 (02.08)	1 (02.08)	1 (02.08)
10	Lhakhanwala (Uttarakhand)	36 (32.14)	27 (24.11)	21 (18.75)	16 (14.29)
11	Manduwala (Uttarakhand)	16 (12.60)	9 (07.20)	6 (04.80)	3 (02.40)
12	Poanta (HP)	49 (37.12)	31 (23.48)	19 (14.39)	12 (09.09)
13	Shimla (HP)	21 (16.67)	7 (05.56)	4 (03.17)	3 (02.38)
Total		**930 (22.44)**	**485 (11.70)**	**307 (07.41)**	**199 (04.80)**
South India					
14	Bylakuppe (Karnataka)	226 (18.14)	135 (10.83)	88 (07.06)	64 (05.14)
15	Hunsur (Karnataka)	154 (30.74)	93 (18.56)	52 (10.38)	35 (06.99)
16	Kollegal (Karnataka)	210 (23.58)	111 (13.54)	78 (09.51)	52 (06.34)
17	Mundgod (Karnataka)	241 (23.58)	148 (14.48)	98 (09.59)	75 (07.34)
Total		**831 (23.15)**	**487 (13.57)**	**316 (08.80)**	**226 (06.30)**
Central India					
18	Mainpat (Chhattisgarh)	72 (19.83)	47 (12.95)	32 (08.82)	25 (06.89)
19	Bhandara (Maharashtra)	41 (22.91)	16 (08.94)	8 (04.47)	5 (02.79)
20	Phuntsokling (Odisha)	140 (27.19)	69 (13.69)	44 (08.73)	28 (05.56)
Total		**253 (24.19)**	**132 (12.62)**	**84 (08.03)**	**58 (05.54)**
North East India					
21	Miao (Arunachal Pradesh)	18 (18.00)	9 (09.00)	8 (8.00)	2 (02.00)
22	Ravangla (Sikkim)	27 (19.15)	13 (09.22)	10 (07.09)	7 (04.96)
23	Tenzingang (Arunachal)	13 (06.50)	7 (03.50)	6 (03.00)	1 (00.50)
24	Tezu (Arunachal)	22 (06.81)	19 (05.88)	13 (04.02)	11 (03.41)
Sub-Total		**80 (10.47)**	**48 (06.28)**	**37 (04.84)**	**21 (02.75)**
TOTAL		**2094 (21.94)**	**1152 (12.07)**	**744 (07.80)**	**504 (05.28)**

CHAPTER FIVE: RISK FACTORS & LOGISTIC REGRESSION ANALYSIS FOR TIBETANS

Table 5.1 Risk Factors

S No	Behavior / Risk Factor	YES {n, (%)}		NO {n, (%)}	
1	**Do you on an average exercise or walk briskly for more than 20 minutes daily (q20walk)**	6008 (55.56)		4806 (44.44)	
2	**Do you currently use alcohol? (q19alcohol)**	1109 (10.28)		9674 (89.72)	
3	**Do you currently use tobacco in any form? (q18tobacco)**	666 (06.21)		10062 (93.79)	
4	**If YES to tobacco, do you currently smoke cigarette or biddies or hookah? (q18a_smoke)**	509 (07.05)		6714 (92.95)	
5	**Do you have blood relatives with history of Diabetes? (q17dmhis)**	984 (11.79)		7360 (88.21)	
6	**Do you have blood relatives with history of hypertension? (q16hthis)**	2692 (31.94)		5737 (68.06)	
7	**Do you usually drink Tibetan tea (exclude occasional social gathering)? (q9tibtea)**	5148 (44.24)		5839 (55.76)	
8	**Do you usually use (1) very low/no (2) low (3) moderate (4) high salt in your daily meals? (q10salt)**	**High**	**Moderate**	**Low**	**Very low /NO**
		889 (08.83)	5842 (58.02)	2792 (27.73)	546 (5.42)

Table 5.2 Do "Monk/Nun" as occupation has higher risk of hypertension as compared to Occupation "Others"?
Simple Logistic Regression Analysis Adjusted for Age and Sex. Only Tibetan Ethnicity Included

S no	Variables Description	Variable Name	Hypertension NO	Hypertension YES	OR (Odds Ratio)	CI (95%) (Confidence Interval)	p - value
1	**Occupation**	occu_logi	**n=6625 (61.16%)**	**n=4207 (38.84%)**			
	Others		5921 (60.03%)	3,943 (39.97%)	Ref = 1.00		
	Monks/Nuns		704 (72.73%)	264 (27.27%)	1.38	1.16-1.64	<0.001

Table 5.3: Factors Influencing Hypertension or Diabetes Status
Simple Logistic Regression Analysis Unadjusted. Only Tibetan Ethnicity Included

S no	Variables Description	Variable Name	Hypertension NO	Hypertension YES	OR (Odds Ratio)	CI (95%) (Confidence Interval)	p - value
1	**Occupation**	occu_logi	**n=6625 (61.16%)**	**N=4207 (38.84%)**			
	Others		5921 (60.03%)	3,943 (39.97%)	Ref = 1.00		
	Mons/Nuns		704 (72.73%)	264 (27.27%)	0.56	0.49 – 0.65	<0.001
2	**Gender**	sex_logi	**n=6,625 (61.16%)**	**n=4,207 (38.84%)**			
	Female		3,730 (64.31%)	2,070 (35.69%)	Ref = 1.00		
	Male		2,895 (57.53%)	2,137 (42.47%)	1.33	1.23-1.44	<0.001
3	**Age Group**	age_logi	**n=6,621 (61.16%)**	**n=4,205 (38.84%)**			
	18 – 29		1,395 (91.12%)	136 (08.88%)	Ref = 1.00		
	30 - 39		1,488 (84.07%)	282 (15.93%)	1.94	1.56-2.42	<0.001
	40 – 49		1,252 (72.08%)	485 (27.92%)	3.97	3.24-4.88	<0.001
	50 – 59		928 (57.50%)	686 (42.50%)	7.58	6.20-9.28	<0.001
	60 and above		1,558 (37.33%)	2,616 (62.67%)	17.22	14.29-20.76	<0.001
4	**Exercise/Walk**	walk_logi	**n=6,544 (61.08%)**	**n=4,169 (38.92%)**			
	YES		3,617 (60.70%)	2,342 (39.30%)	Ref = 1.00		
	NO		2,927 (61.57%)	1,827 (38.43%)	0.96	0.89-1.04	0.358
5	**Alcohol Use**	alcohol_logi	**n=6,532 (61.15%)**	**n=4,150 (38.85%)**			

	NO		5,979 (62.35%)	3,610 (37.65%)	Ref = 1.00		
	YES		553 (50.59%)	540 (49.41%)	1.62	1.43-1.83	<0.001
6	**Tobacco Use**	tobacco_logi	**n=6,503 (61.18%)**	**n=4,126 (38.82%)**			
	NO		6,104 (61.21%)	3868 (38.79%)	Ref = 1.00		
	YES		399 (60.73%)	258 (39.27%)	1.02	0.87-1.20	0.807
7	**Smoking**	smoke_logi	**n=4,358 (60.77%)**	**n=2,813 (39.23%)**			
	NO		4,042 (60.63%)	2,625 (39.37%)	Ref=1.00		
	YES		316 (62.70%)	188 (37.30%)	0.91	0.76-1.10	0.359
8	**Family History of Diabetes**	dmhis_logi	**n=5,119 (61.82%)**	**n=3,162 (38.18%)**			
	NO		4,508 (61.74%)	2,794 (38.26%)	Ref=1.00		
	YES		611 (62.41%)	368 (37.59%)	0.97	0.85-1.12	0.684
9	**Family History of Hypertension**	hthis_logi	**n=5,141 (61.46%)**	**n=3,224 (38.54%)**			
	NO		3,553 (62.39%)	2,142 (37.61%)	Ref=1.00		
	YES		1,588 (59.48%)	1,082 (40.52%)	1.13	1.03-1.24	0.011
10	**Tibetan Tea**	tibtea_logi	**n=6,243 (60.17%)**	**n=4,133 (39.83%)**			
	NO		3,434 (59.25%)	2,362 (40.75%)	Ref=1.00		
	YES		2,809 (61.33%)	1,771 (38.67%)	0.92	0.85-0.99	0.031
11	Salt Intake		**n=6,009 (60.23%)**	**n=3,967 (39.77%)**			
	Very Low		270 (50.00%)	270 (50.00%)	Ref=1.00		
	Low		1,421 (51.37%)	1,345 (48.63%)	0.94	0.79-1.14	0.559
	Moderate		3,716 (64.25%)	2,068 (35.75%)	0.55	0.47-0.66	<0.001
	High		602 (67.95%)	284 (32.05%)	0.47	0.38-0.59	<0.001

Age profile of “Monks/Nuns” and “Others” occupation in the survey sample differ vastly. Monk/Nun participants were much younger. Is it possible that the adult age-group of Tibetans living in the monasteries are younger as compared to settlements? Is it possible that younger age group in the monasteries is reflected because many young lay adult Tibetans are not in the settlements either temporarily or permanently as they are working outside, studying in the college or had immigrated?. It is possible that we have not been able to get representative sample from the larger monasteries. Even during the house-house listing, larger monasteries were not represented adequately. What could be the barriers and bottle necks for DoHe-CTA staffs not conducting surveys efficiently in the large monasteries?

After adjusting for age and sex, there is reversal of the odds ratio and “Monk/Nun” as an occupation may have higher odds (risk) of hypertension as compared to “Others” occupation meaning “Monks/Nuns were more likely to be hypertensive by 1.38 times (p-value <0.001) as compared to occupation “Others”. A study that has larger and representative sample of monks/nuns is required to validate the above finding.

Salt intake by Tibetans seems to have protective effect in the unadjusted regression analysis. That goes against the convention as other studies [35, 41, 42] have shown the contrary. The current survey data needs to be adjusted for confounders and look for interactions. Also risk assessment need to be presented using an appropriate model with all the other known predictors. What might be happening here is that those who are hypertensive have modified their behavior and already taking no or less Tibetan tea and salt in their diet; a possibility one need to consider.

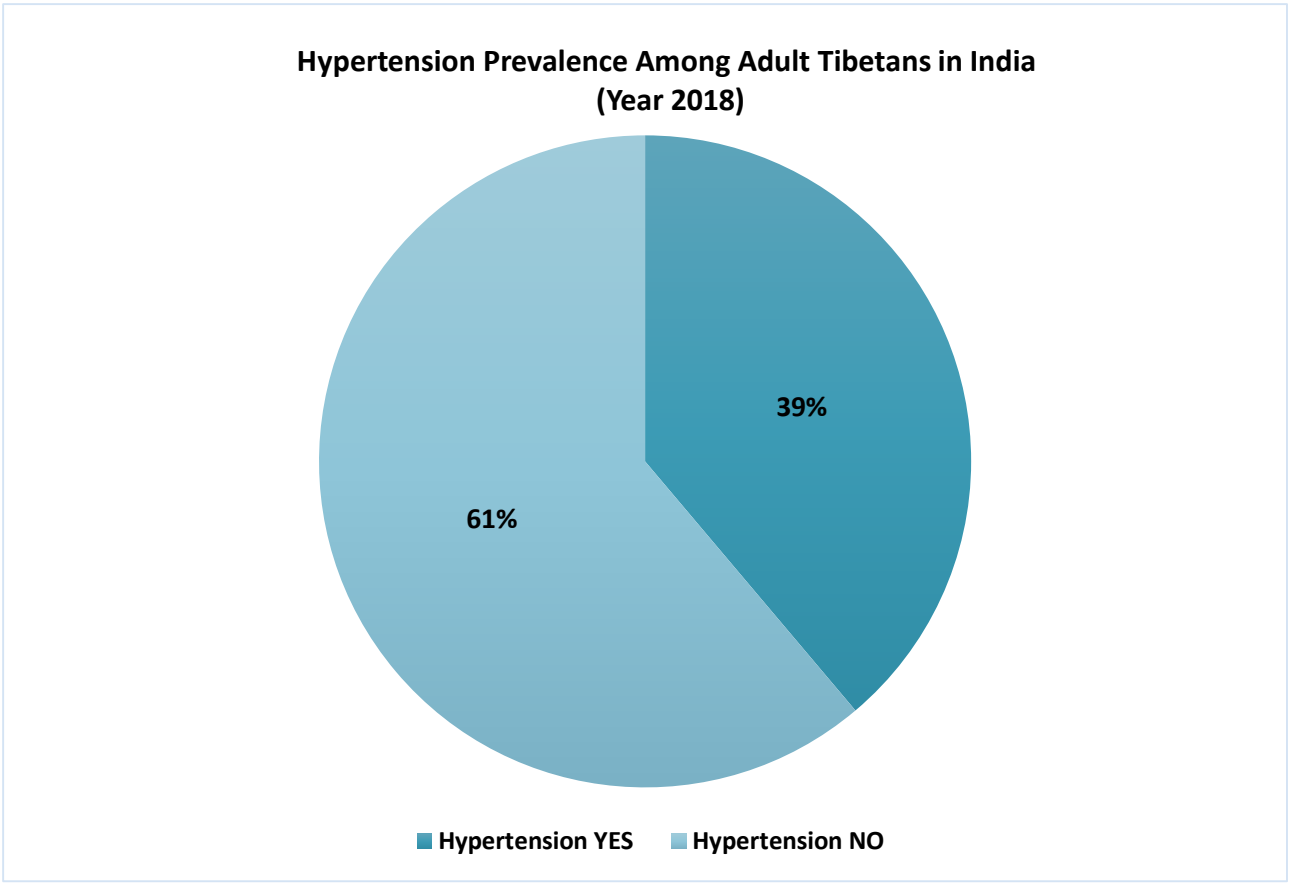
CHAPTER SIX: FINDINGS, DISCUSSION & RECOMMENDATIONS

FINDINGS:

11,847 adults age 18 and above from thirty two settlements (including 8 from Jangthang region of Ladakh) participated in the house-house screening of hypertension and diabetes in 2018. This included 48.52% of the adult population from house hold listing survey (census) carried out in 2017. Among the participants in the hypertension and diabetes survey, 9.92% (n=1175), 45.43% (n=5382), 6.99% (n=828) and 37.66% (n=4462) were from Central, North, North-East and South India respectively. Male consists of 48.43% (n=5738) and 51.57% (n=6109) were female. 63.70% (n=7546) were in the age-group of 18-59, while senior citizen (above 60 years) made up of 36.30% (n=4301) of the participants. 4.87% (n=577) among the participants were non-Tibetans.

Table 6.1 shows that in the current survey, the hypertension prevalence among adult (18 years and above) Tibetans living in India was **38.84%** (n=4205).

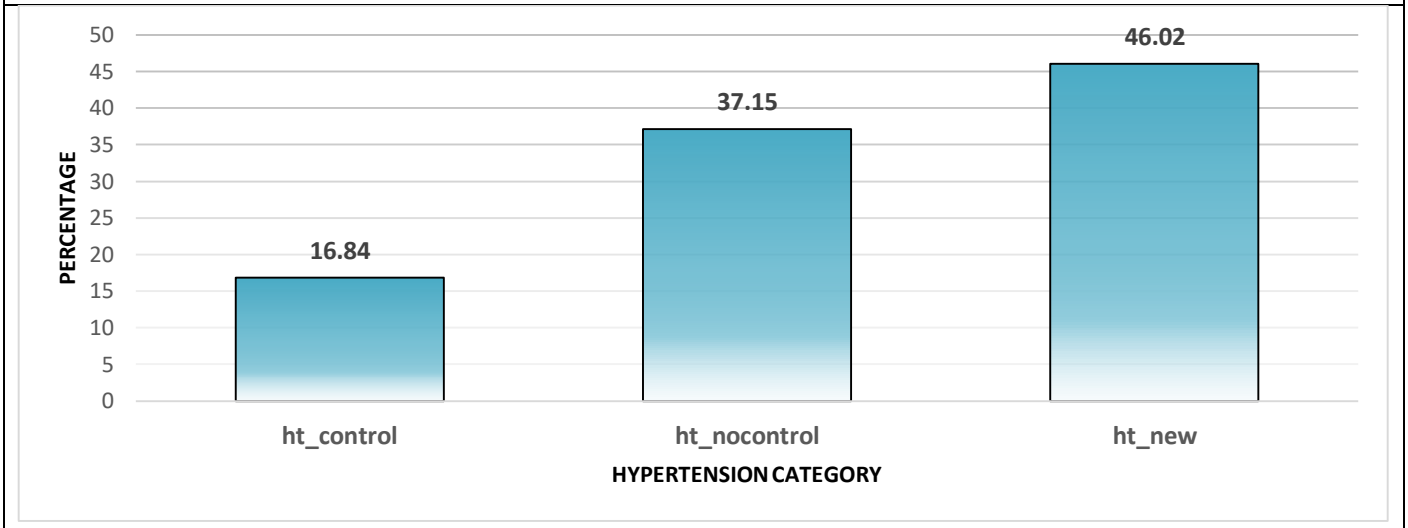
Table 6.1 Hypertension Status Among Tibetans in India 2018



Hypertension Status	Frequency	Percentage
Hypertension - YES	**4205**	**38.84**
Hypertension - NO	6621	61.16
Total	10826	100.00

Table 6.2 shows that among those who were hypertensive and Tibetan, 16.84% (n=708) of them had their blood pressure under control while 37.15% (n=1562) were not under control (medicine or no medicine) and 46.02% (n=1935) were newly diagnosed as hypertensive during the current house-house screening.

Table 6.2: Hypertension Category Among Tibetans Resident in 32 Settlements in India (2018)



Hypertension Category	Frequency (n)	Percentage (%)
2= Hypertensive and under control with medication	708	16.84
3= Hypertensive and not under control (medicine or no medicine)	1562	37.15
4= Hypertension newly diagnosed during survey (new i.e. participant not aware that he is hypertensive)	1935	46.02
TOTAL	**4205**	**100.00**

Table 6.3 shows hypertensive category among those who were above 60 years (senior citizen) and their residence type. Hypertensive among senior citizens whose blood pressure were controlled with residence category as home alone, home with family members or others, monastery and OPH (senior citizen home) were 22.01% (n=35), 21.82% (n=480), 07.32% (n=3) and 22.41% (n=26) respectively. Hypertensive and also whose blood pressure were not controlled among senior citizens with residence category as home alone, home with family members or others, monastery and OPH were 43.40% (n=69), 44.73% (n=984), 48.78% (20) and 38.79% (45) respectively. Hypertensive and newly diagnosed during the survey among senior citizens with residence category as home alone, home with family members or others, monastery and OPH are 34.59% (n=55), 33.45% (n=736), 43.90% (n=18) and 38.79% (n=45) respectively.

Table 6.3: Hypertension Category Among Tibetans Above 60 Years of Age and Residence Type

Category	Home Alone	Home with Family/Other	Monastery	OPH	Total
2= Hypertensive and under control with medication	35 (22.01)	480 (21.82)	3 (07.32)	26 (22.41)	**544 (21.62)**
3= Hypertensive and not under control (medicine or no medicine)	69 (43.40)	984 (44.73)	20 (48.78)	45 (38.79)	**1,118 (44.44)**
4= Hypertension newly diagnosed during survey (new i.e. participant not aware that he is hypertensive)	55 (34.59)	736 (33.45)	18 (43.90)	45 (38.79)	**854 (33.94)**
Total	**159**	**2,200**	**41**	**116**	**2,516**

Random blood sugar (RBS) was measured for participants age 30 and above. The table 6.4 shows that out of 9843 participants with random blood sugar (RBS) above 140 mg/dl, the record of fasting blood sugar (FBS) was available for 998. And that is only 10.14% of the participants with RBS of > 140 mg/dl. As a result the FBS sample may not be representative of the population having RBS > 140 mg/dl and it may not be wise to present diabetes prevalence based on FBS result from the current study. As an interim measure, the author had to use random blood sugar cut-of at 200 mg/dl and reported their prevalence in table 6.5. In the current study, **5.31%** (n=492) of the participants had RBS above 200 mg/dl.

Table 6.4: PREVALENCE, AWARENESS, TREATMENT AND CONTROL OF DIABETES (AGE 30 AND ABOVE)

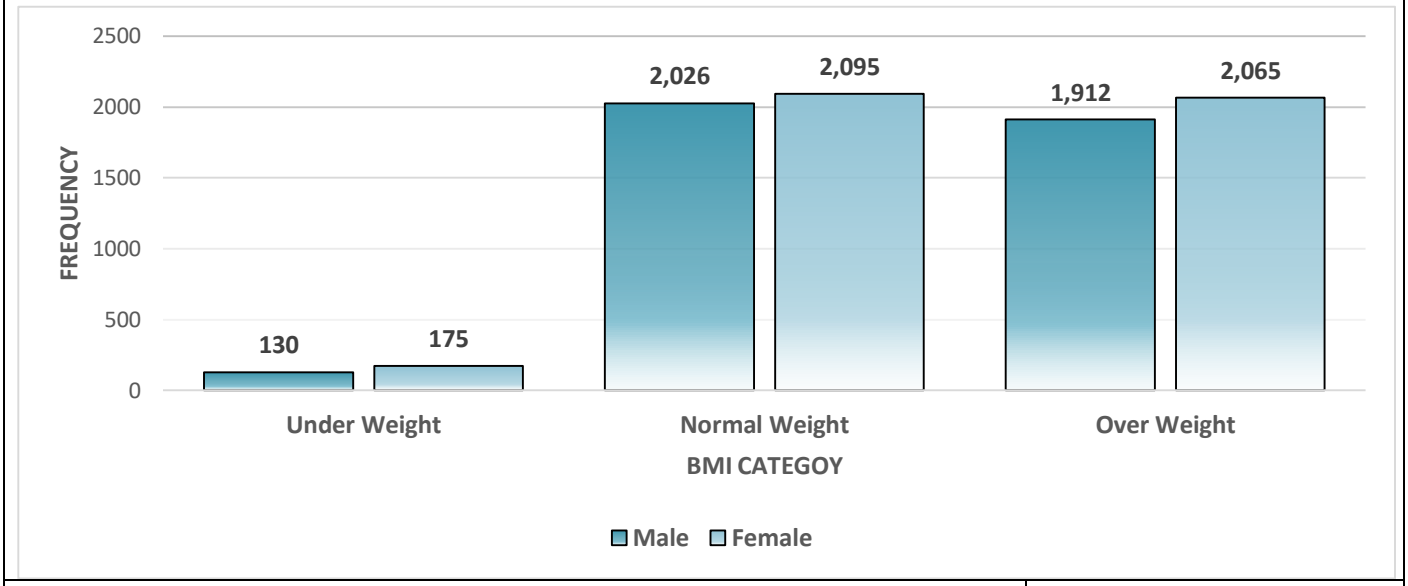
Population Surveyed for Blood Sugar Disaggregated by Settlement (n=32)

S No	Name	Random Blood Sugar >140 n (%)	Fasting Blood Sugar n (%)	Percentage FBS (%)
1	**Bhandara**	179	45	25.14
2	**Bir**	526	21	03.99
3	**Bylakuppe**	1246	83	06.66
4	**CTA (Dharamsala)**	53	4	07.55
5	**Chauntra**	310	9	02.90
6	**Dekyiling**	465	9	01.93
	Delhi	336	241	71.73
7	**Dharamsala**	666	93	13.96
8	**Dholanji**	122	29	23.77
9	**Hunsur**	501	88	17.56
10	**Kamrao**	44	5	11.36
11	**Khera**	27	2	07.41
12	**Kollegal**	820	2	00.24
13	**Ladakh**	1052	125	12.20
	Ladkh Jangthang	48	6	00.57
14	**Lakhanwala**	112	12	10.71
15	**Mainpat**	363	14	38.57
16	**Manduwala**	125	10	08.00
17	**Miao**	100	16	16.00
18	**Mundgod**	1022	65	06.36
19	**Odisha**	504	59	11.71
20	**Poanta**	132	22	16.67
21	**Ravangla**	141	31	21.99
22	**Shimla**	126	6	04.76
23	**Tenzingang**	200	2	01.00
24	**Tezu**	323	4	01.23
	Total	**9543**	**998**	**10.46**

Table 6.5: Population with Random Blood Sugar Above Various Cut off Points (Age 30 and Above) (All Settlements n=32)

Random Blood Sugar	Above 140 mg/dl n (%)	Above 160 mg/dl n (%)	Above 180 mg/dl n (%)	Above 200 mg/dl n (%)
Above Cutoff Level	2048 (**22.10**)	1130 (**12.19**)	730 (**7.88**)	492 (**05.31**)
Below Cutoff Level	7220 (77.90)	8138 (87.81)	8538 (92.12)	8776 (94.69)
Total	9268 (100.00)	9268 (100.00)	9268 (100.00)	9268 (100.00)

Table 6.6: BMI Category by Gender Among Tibetans Living in 32 Settlements in India (2018)



Weight Category	Male	Female	Total
Underweight	130 (02.65)	175 (03.09)	305 (02.89)
Normal	2,026 (41.37)	2,095 (37.01)	4,121 (39.04)
Overweight	1,912 (39.04)	2,065 (36.48)	3,977 (37.67)
Obese	829 (16.93)	1,325 (23.41)	2,154 (20.40)
Total	**4,897**	**5,660**	**10,557**

Note: Based on WHO Classification

Table 6.7: Central Obesity Among Tibetans Living in 31 Settlements in India (2018)

Abdominal Waist	Male n (%)	Female n (%)	Total n (%)
Central Obese	2404 (50.78)	4083 (73.94)	6487 (63.25)
Normal	2330 (49.22)	1439 (26.06)	3769 (36.75)
Total	**4734**	**5522**	**10256**

Note: Based on International Diabetes Federation Criteria. Tezu waist measurement omitted.

Tables 6.6 & 6.7 shows that overweight, general obesity and central obesity in the current study were 37.67% (n=3977), 20.40% (n=-2154) and 63.25% (n=6487) respectively. As compared to male, female were proportionately more overweight and obese. Tables 6.6 & 6.7 shows that overweight, general obesity and central obesity among the males in the current study were 39.04% (n=1912), 16.93% (n=829) and 50.78% (n=2404) respectively. While overweight, general obesity and central obesity among the females in the current study were 36.48% (n=2065), 23.41% (n=1325) and 73.94% (n=4087) respectively

DISCUSSION:

A systemic review conducted by Ragupathy et al [10] showed the prevalence of hypertension at 29.8% for India. However, a study carried out by Norboo T and others [27] showed the prevalence of hypertension in the Ladakh region at 37%. Ladakhis are ethnically similar to Tibetans. In the current program implementation study, the prevalence of hypertension among Tibetans living in India was high at **38.84**% (n=4205) but awareness and control of hypertension was low at **16.84**% (n=708) among the participants having hypertension; showing an urgent need for a prevention, early detection and continuum of care strategy. Population and individual-based measures to prevent and control hypertension should focus on strategy to prevent overweight/obesity and other risk factors and also include comprehensive management of person with hypertension and diabetes. This is especially so because of the recommendations of JNC 8 *(Paul A James 2014*) [8] and the Japan experience (Nayu Ikeda et al 2008)[7]. The Japan study showed that "declining mean SBP in Japan between 1986 and 2002 was partly attributable to the increased use of antihypertensive medications, especially in the older population, and lowered mean BMI in young women" (Taichi Shimazu et al 2014) [12].

The consequences of untreated hypertension are grave with cardiovascular diseases including stroke and renal complication causing lifelong disabilities and deaths. Hypertension related diseases and stroke are important causes of death among Tibetans in India, as can be seen from the routine DoHe-CTA Health Information System database (refer annexure 1-4). Tibetans seem to be more prone to complication of arterial systems of the brains as compared to that of heart i.e. stroke is more common among Tibetans as compared to ischemic/occlusive heart diseases. The TMS claim data (refer annexure 4) which covers more than 40% of the Tibetan populations in India seems to corroborate the above statement i.e. stroke is more common as compared to ischemic/occlusive heart diseases. Also, the classic study carried out by Jiang He and others [31] published in 1995 revealed that Tibetans had the highest prevalence of hypertension (22.33%), stroke incidence (450.40/100,000) and stroke mortality (370.17/100,000) among the provinces covered in the study.

Table 6.8: Prevalence, Awareness and Control of Hypertension

S. No	Study	Age-group	Prevalence	Awareness	Control of Hypertension	Treatment
1	**Current Study (2018)**	18 & above	38.84%	53.99%	16.84%	-
2	**Ragupathy et al (India 2014)**	18 & above	29.8%	25.3%* 37.60%**	10%* 20.20%**	25.10%* 37.60%**
3	**Ladakh Study (2015)**	20 & above	37%	-	-	-
4	**Anand Krishan et al (SEA Region-2013)**	Above 25	36.6%	24% - 69.80%	6.4% - 43.10%	25.6% - 85.80%

ICMR INDIA B study [37] revealed that "The overall prevalence of diabetes in all 15 states of India in which the study was conducted was 7·3% (95% CI 7·0–7·5). The prevalence of diabetes varied from 4·3% in Bihar (95% CI 3·7–5·0) to 10·0% (8·7–11·2) in Punjab and was higher in urban areas (11·2%, 10·6–11·8) than in rural areas (5·2%, 4·9–5·4; p<0·0001) and higher in mainland states (8·3%, 7·9 –8·7)

than in the northeast (5·9%, 5·5–6·2; p<0·0001)". The study further found that "In the urban areas of more prosperous states, the prevalence of diabetes was higher among individuals of lower socioeconomic status than in individuals of higher socioeconomic status, by contrast with the situation in the less developed states". Diabetes situation is becoming worse in India; probably reaching saturation in affluent cities of India but continuing to rise in rural and less affluent parts of India. India State-Level Disease Burden Initiative Diabetes Collaborators study [40] published in Lancet Global Health in 2018 found that the prevalence of diabetes in adults aged 20 years or older in India increased from 5·5% (4·9–6·1) in 1990 to 7·7% (6·9–8·4) in 2016.

In our current study, **5.31**% (n=492) participants with age 30 and above had RBS **above 200 mg/dl** and diabetes prevalence among Tibetans is probably less than the Indians. A study carried out by Mirza Shohia, Ur Riyaz and Majid Khalil Rather, Parvaiz A. Koul [39] among the Muslim Tibetan immigrants age 18 and above in Kashmir found out that "9.25% (n=26) out of 281 participants had diabetes, meaning one in four adults ≥18 years among Tibetan Muslims have diabetes or pre-diabetes". However this study was limited to Tibetan Muslims from Kashmir only.

The prevalence of general obesity (BMI) and central obesity (waist circumference) in ICMR-INDIA B study 2015 [38] varied from 11.8% to 31.3% and 16.9% to 36.3% respectively. Rajeev and others [28] in a systemic review found out that "factors for variation in obesity are geographical condition, lifestyle and dietary pattern". More affluent cities/states (e.g. Chandigarh and Goa) with sedentary lifestyle and high calorie diet contributed to the higher prevalence rate.

The prevalence of overweight, general obesity and central obesity in the current study among Tibetans was **37.67**% (n=3977), **20.40**% (n=2154) and **63.25**% (n=6487) respectively; women having more central obesity than men. The author was surprised to observe very high prevalence of obesity in the current study but a similar study carried out in 2016 among Tibetans living in Ladakh by Belle Yanyu Lin and others [34] observed similar findings with "prevalence of overweight, general obesity and central obesity at 23.45%, 42.6% and 42.6% in men and 7.8%, 64.7% and 69.9% in women, respectively". The study revealed that about two third of the participants had general or central obesity with women showing higher prevalence as was the case in the current study.

Tibetans living in India are going through not only epidemiological and demographic transition, but they may also be going through lifestyle transition. In Tibet, people were involved in moderate to heavy agricultural or nomadic activities but in India they are increasingly adopting sedentary lifestyles because of the shift in the nature of their occupation and availability of modern transport system both at public and individual levels. This ongoing transition and its consequences can be implied from study carried out by Bhatia et al [4, 5] and Tripati et al [14], Norboo et al [27] and others. Also, Tibetans in India have maintained their distinct culture and food habit which include among others drinking salted tea. The habit of consumption of high salt and low vegetable & fruit diet in Tibet may have continued into refugee life. In addition, they are increasingly consuming modern day "junk foods". Apart from other risk factors, Tibetans may be genetically more susceptible to hypertension as revealed by a study carried out by Bei Sun and others [3] which indicated angiotensinogen gene 235MM as "a predictor for hypertension development in Tibetan women but not in men, and may exert its hypertensive effect on linkage disequilibrium with a possible function locus of G-6A".

GBD 2017 Collaborators in their publication in Lancet [35] states that "our assessment shows that the leading dietary risk factors for mortality are diets that are high in sodium, low in whole grains, low in fruit, low in nuts and seeds, low in vegetables and low in omega-3 fatty acids; each accounting for more than 2% of global deaths. This finding suggests that dietary policies focusing on promoting the intake of components of diet for which current intake is less than the optimal level might have a greater effect than policies only targeting sugar and fat, highlighting the need for comprehensive food system interventions to promote the production, distribution, and consumption of these food across nations". Throughout the life course, being overweight and obese is associated with multiple adverse

health consequences. Obesity is linked to an increased risk of hypertension, many other NCDs (such as diabetes, coronary heart disease, stroke, and cancers), and conditions including obstructive sleep apnoea and osteoarthritis [37].

In 2014, the average world prevalence of diabetes was 7% - 9% and in 2015 the average prevalence of hypertension was 22%. The world obesity prevalence in 2016 was 13% [35]. WHO 2018 report [23] stated that "In 2016, NCDs were responsible for 71% (41 million) of the 57 million deaths which occurred globally. The major NCDs responsible for these deaths included cardiovascular diseases (17.9 million deaths, accounting for 44% of all NCD deaths and 31% of all global deaths); cancers (9 million deaths, 22% of all NCD deaths and 16% of all global deaths); chronic respiratory diseases (3.8 million deaths, 9% of all NCD deaths and 7% of all global deaths); and diabetes (1.6 million deaths, 4% of all NCD deaths and 3% of all global deaths)". These NCDs share common modifiable behavioural risk factors and they are tobacco use, unhealthy diet, lack of physical activity, and harmful use of alcohol. And they lead to overweight and obesity, raised blood pressure, and raised cholesterol. Obesity associated with hypertension, cardiovascular diseases, and some cancers will affect 52.1 million people by 2030. Cardiovascular disease is expected to be the main cause of death (37%) by 2030s. High salt intake contributes to increase in blood pressure and the higher risk of heart disease and stroke [36]. WHO recommended daily intake of sodium is less than 2 grams of sodium or 5 grams of salt.

There are two important routine disease profile data available for the Tibetan community in India and they are the data collected through DHIS2 morbidity and mortality modules (both health facility & outreach) and TMS claim data. Data collected in DHIS2 reflects the disease profiles of health facilities at first point of contact and the TMS data reflect the disease profile of community for secondary and tertiary care facilities (kindly refer to annexure 1 – 4). Both the DHIS2 and TMS Claim data shows that NCDs contribute to a major fraction of disease burden and it makes both economic and public health sense for us to do something to reduce these burdens in the future.

There are 25 indicators and the 9 global targets (India and South Asia region had set 10th target as indoor air pollution) for the prevention and control NCDs. Kindly refer to annexure 5-8. Four of the globally agreed 25 indicators for NCDs i.e. age adjusted hypertension, salt intake, availability of medicines and medicine for hypertension, age-standardized prevalence of raised blood glucose/ diabetes among persons aged 18+ years (defined as fasting plasma glucose concentration ≥ 7.0 mmol/l (126 mg/dl) or on medication for raised blood glucose; are directly related to Hypertension and Diabetes. And two indicators directly related to overweight & obesity are prevalence of overweight and obesity in adolescents (defined according to the WHO growth reference for school-aged children and adolescents, overweight – one standard deviation body mass index for age and sex, and obese – two standard deviations body mass index for age and sex); and age-standardized prevalence of overweight and obesity in persons aged 18+ years (defined as body mass index ≥ 25 kg/ m² for overweight and body mass index ≥ 30 kg/m² for obesity.

The Lancet NCD Action Group and the NCD Alliance (Beglehole R et al 2011)[2] propose five overarching priority actions – "leadership, prevention, treatment, international cooperation, and monitoring & accountability--and the delivery of five priority interventions--tobacco control, salt reduction, improved diets and physical activity, reduction in hazardous alcohol intake, and essential drugs and technologies. The priority interventions were chosen for their health effects, cost-effectiveness, low costs of implementation, and political and financial feasibility". In economic terms, what are the costs of "not acting" and the costs of "best-buy" interventions? Two papers best exemplifies this. "Business as usual" scenario (World Economic Forum and Harvard School of Public Health 2011) would mean that cumulative economic loss to LMIC countries from four major NCDs would amount to approximately 4% of current annual output (nearly US$ 500 billion/year). In contrast the cost of "best buy" intervention strategies (WHO and World Economic Forum) is comparatively very low – "on a per person basis, the annual investment ranges from under US$ 1 in low income countries to US$ 3".

Conclusion and Recommendations:

The United Nations General Assembly in New York in 2011, made a political declaration to advocate for global and national responses to prevent and control NCDs. WHO established the Global Action Plan for the Prevention and Control of NCDs 2013–2020 (Global NCD Action Plan) and it was adopted by the World Health Assembly in 2013. The Global NCD Action Plan included a global monitoring framework and nine voluntary global targets to be attained by 2025 (India had 10th indicator for indoor air pollution). Kindly refer to annexure 5-7. These targets are aligned to the 2030 Agenda for Sustainable Development Goal (SDG). For common NCDs like hypertension and diabetes, it is the most appropriate time for us that the disease burden is understood and based on evidence, plan and develop a strategy for the prevention and control of NCDs.

Community based house-house screening approach seems to be an appropriate strategy as it has the potential to cover all the residents of a village, and addresses the issue of access, equity and inclusiveness to a certain extent. It also make the individual aware of his/her anthropometric profiles and hypertension and diabetes status, and this could be the first step towards individual behaviour changes considering that this study found high prevalence of hypertension and also high proportion of newly diagnosed hypertensive. Also, considering that Tibetan community in India is closely knitted, regular screening program for hypertension and diabetes at the community level could easily be initiated so that treatment may begin early, especially in the light of the new recommendations of JNC 8 and findings from the Japan study discussed above.

Awareness campaign regarding early detection of hypertension and diabetes, weight maintenance and healthy diet could be advocated. And the recently launched CCOCC program (community outreach program) within a horizontal primary health system and funded by USAID, could be one of the key mechanisms for achieving behaviour changes as it has the means for providing focussed and targeted one-one communication. The governments have the responsibility of providing the infrastructures necessary for behaviour changes. To the credit of CTA administration; open gyms, playing fields (football and basketball) and exercise through community campaign including Zumba and Yoga are taking place. Effort should be made to improve the management of hypertension including, if needed, introduction of affordable medicines through subsidies.

There is a need to understand the other risk factors especially salt intake in the Tibetan community and this could be an area for further research. Salted tea is consumed traditionally by the Tibetans and high salt consumption may be a very important risk factor for Tibetans. There is a clear association between hypertension and high salt intake. Intersalt Cooperative Research Group [41] revealed that "sodium excretion ranged from 0-2 mmol/24 h (Yanomamo Indians, Brazil) to 242 mmol/24 h (north China). In individual subjects (within centres) it was significantly related to blood pressure. Four centres found very low sodium excretion, low blood pressure, and little or no upward slope of blood pressure with age. Across the other 48 centres sodium was significantly related to the slope of blood pressure with age but not to median blood pressure or prevalence of high blood pressure". High salt diet among tea plantation workers in India and diet among some Japanese community established that higher intake of salt is an important risk factor for hypertension. Ribeka Takachi et al [42] found that "Sodium intake as a whole salt equivalent may not increase the risk of cancer but may increase that of CVD. In contrast, salted food intake may increase the risk of cancer". Just like Tibetans consume salted tea, tea garden workers in the tea estate of North-East India consume salt while working in the tea garden and studies [45, 46] showed that the prevalence of hypertension was high among this group of people.

But, for diseases like hypertension and diabetes, community level interventions with community ownership i.e. empowering communities to be owners and determine strategies to address their health service needs and social determinants of health, is more likely to effectively bring about appreciable downward trends in NCDs. We (people involved in health sector) can be the vehicle and

catalyst for that to happen. Medicines are helpful, so are the top down selective programs. But the key issue related to non-communicable diseases (NCDs) is behavioural and community "buy-in" will matter the most. Social and behaviour change communication targeted at household or individual level through outreach programs with community involvement and ownership in the program design and implementation may be more effective in changing behaviour. Because of these reasons, only clinic based approaches will be found deficient in making population healthier. That reminds to us the "Alma Ata" declaration and, forty years down the line, Astana declaration [43, 44] reaffirms Alma Ata declaration. Astana declaration also brings attention to community approaches to non-communicable diseases. Let us give Alma Ata a second chance. We cannot let it fail this time.

Study Limitation and Strength:

This is the first prevalence survey which we know had covered all the regions of India where Tibetans are resident and is likely to be the most representative sample. The sample (age 18 and above) included 48.52% of the total population from the 2017 house-house population listing survey.

The study was designed as a program implementation research at the community level and so has the limitations associated with such a study. However, program implementation studies truly represent the implementation activities in the field and this current study shows that it is feasible to have regular community based screening program for hypertension and diabetes and probably for other NCDs also. Hypertension and diabetes are silent killers. Many cases do not have symptoms before they present with a complication and the current study revealed that among the Tibetan participants who were hypertensive, about 47% (n=1935) were detected with hypertension for the first time during the survey.

In some of the settlements, few outreach staffs did not measure the 2nd blood pressure reading especially if the 1st blood pressure reading was found to be within the normal range. Considering this, even if there is one blood pressure reading, we had to take them into the hypertension prevalence calculation to negate overestimation of the prevalence. Also, we had initially intended to use FBS of > 126 mg/dl to calculate the prevalence of diabetes but had to estimate that through RBS > 200 mg/dl as only about 10% of the participants who had RBS >140 mg/dl had their FBS record.

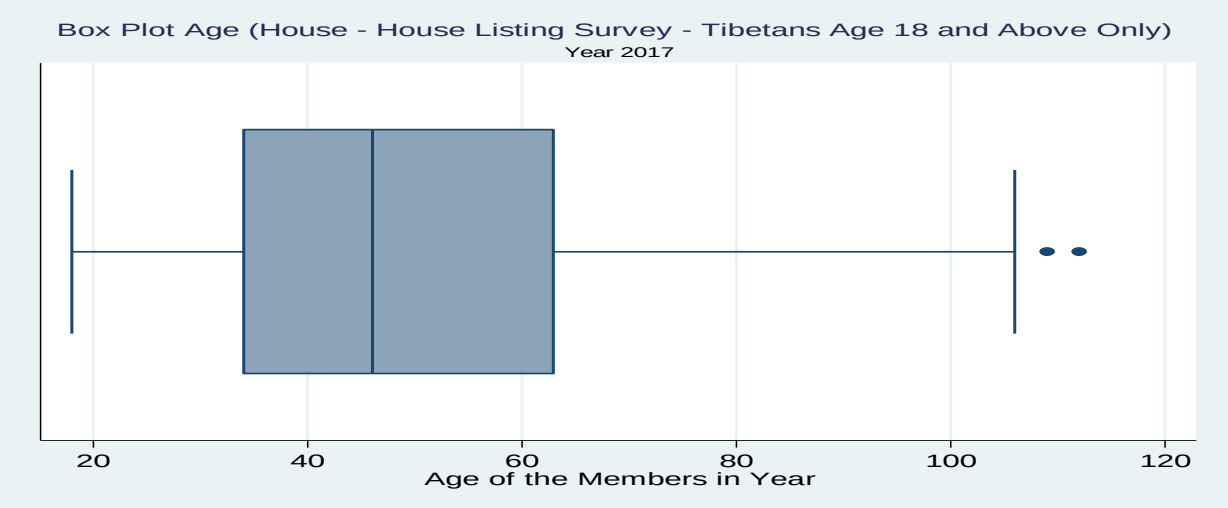
The gender difference between the hypertension & diabetes survey and house-house listing population is about 2 years. The table 6.9 shows that the male and female proportion for hypertension & diabetes survey were 45.75% and 54.25% respectively while that the male and female proportion for house-house population listing survey were 47.69% and 52.31% respectively. And the average age for hypertension & diabetes survey was 52.89 years while the average age for house-house listing population survey was 48.87 years. There is a possibility that the current prevalence of hypertension and diabetes may be over-estimated slightly as the average age of the hypertension & diabetes survey population is older than house-house listing population survey by about 4 years.

Table 6.9: Comparison of Gender of Hypertension & Diabetes Survey and House-House Listing (Adult Tibetans 18 years and above)

Gender	Hypertension & Diabetes Survey (2018)	House-House Listing Population Survey 2017
Male	4467 (45.75)	9249 (47.69)
Female	5297 (54.25)	10143 (52.31)
Total	9764	19392

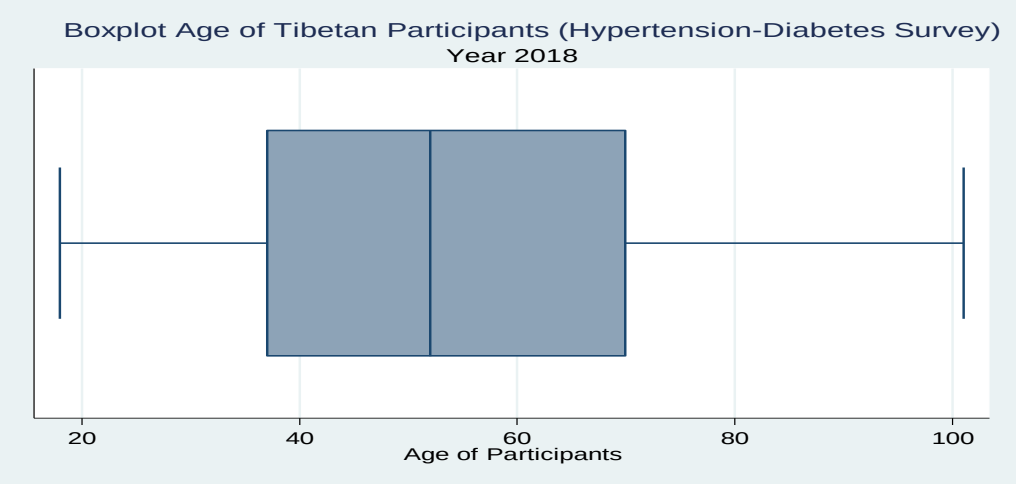
Table 6.10: Comparison of Age of Hypertension & Diabetes Survey and House-House Listing Population (Adult Tibetans 18 Years and Above Only)

Age of Population of House-House Listing 2017



Variable	N	mean	p50	p25	p75	iqr	max	min	sd
Age	19392	48.87	46	34	63	29	112	18	18.72

Age of Participants of Hypertension & Diabetes Survey 2018



Variable	N	mean	p50	p25	p75	iqr	max	min	sd
Age	9764	52.89	52	37	70	33	101	18	19.78

Annexure 1: OPD Module DHIS2 (DoHe-CTA Routine HIS Database)			
Top Ten OPD Diagnosis/Footfalls (Health Facility Footfall in 2018)			
S No	**Diagnosis**	**Frequency**	**Percentage**
1	I10 – I15 Hypertension	4,975	12.02
2	J00 – J06 Acute Upper Respiratory Tract	4,371	10.56
3	N20 – N23 Other Services	2,348	5.67
4	Z00-Z99 Person Encountering Health Services ---	2,249	5.43
5	A09 Acute diarrheal disease	1,553	3.75
6	Dressing/injections	1,517	3.66
7	K00-K008 Dental conditions	1,506	3.64
8	K29 Gastritis/Duodenitis	1,292	3.12
9	R05 Cough	1,272	3.07
10	R50 Fever of unknown origin / PUO	1,121	2.71
	Cumulative (%)	**22204**	**53.63%**
	TOTAL	**41405**	**100.00%**

Annexure 2 : DoHe-CTA Routine HIS Database						
TOP 10 Causes of Deaths (2011 -2016)						
Female				**Male**		
S. No	**Causes of Death**	**No**	**%**	**Causes of Death**	**No**	**%**
1	Hypertension	53	11.47	Hypertension	76	10.69
2	Others	53	11.47	Cancer of Liver	59	8.30
3	Weakness/Tiredness	24	5.19	Others	58	8.16
4	Disease of RS, NOS	22	4.76	Cancer of Stomach	54	7.59
5	Cancer of Stomach	20	4.33	Heart failure, NOS	48	6.75
6	Heart Failure, NOS	17	3.68	Asthma	27	3.80
7	Asthma	16	3.46	Cancer of Oesophagus	25	3.52
8	Cancer of Liver	16	3.46	Weakness /Tiredness	25	3.52
9	Stroke	15	3.25	Disease of RS, NOS	20	2.81
10	Other Heart Diseases, NOS	12	2.6	Stroke	19	2.67
Cumulative %		**248**	**53.67%**	**Cumulative%**	**411**	**57.81%**
TOTAL		**462**		**TOTAL**	**711**	

Annexure 3: Mortality Module DHIS2 (DoHe-CTA Routine HIS Database)						
Causes of Deaths (2018)						
Female				Male		
S No	Cause of Death	No	%	Cause of Death	No	%
1	Ca Stomach including oesophagus	9	12.86	Ca Stomach including oesophagus	15	13.89
2	Other Neoplasm	7	10.00	COPD	10	9.26
3	Asthma	5	7.14	Cirrhosis of liver	8	7.41
4	Cirrhosis of liver	5	7.14	Ca Liver	7	6.48
5	COPD	4	5.71	Other Neoplasm	7	6.48
6	Stroke	4	5.71	Drug & Alcohol Addiction Related	6	5.56
7	Accident Traffic	2	2.86	Ca Throat	5	4.63
8	Aspiration Pneumonia	2	2.86	Asthma	4	3.70
9	Ca Liver	2	2.86	Chronic Renal Disease/Failure	4	3.70
10	Chronic Renal Disease/Failure	2	2.86	Hypertension Diabetes Related Unspecified	4	3.70
	Cumulative %		**60%**	**Cumulative %**		**61.11%**
11	Congestive Cardiac failure/Heart Failure	2	2.86	Stroke	3	2.78
12	Gastritis/Duodenitis	2	2.86	WEAKNESS	3	2.78
13	Hypertension Related	2	2.86	Accident Traffic	2	1.85
14	Ischemic Heart Diseases (include Angina)	2	2.86	Diabetes Related	2	1.85
15	Other Cardiovascular Disorder	2	2.86	Diarrheal Diseases	2	1.85
16	Other Injuries	2	2.86	Hypertension Related	2	1.85
17	TB	2	2.86	Ischemic Heart Diseases (include Angina)	2	1.85
18	Anemia	1	1.43	Liver diseases NS	2	1.85
19	Brain Damage	1	1.43	Other Diseases of Blood & Blood Forming	2	1.85
20	Cholelithiasis/Gallstone	1	1.43	Other Injuries	2	1.85
21	Diabetes Related	1	1.43	Suicide	2	1.85
22	Diarrheal Diseases	1	1.43	ALPS Syndrome	1	0.93
23	Drug & Alcohol Addiction Related	1	1.43	Anaemia	1	0.93
24	HEADACHE	1	1.43	Ca Bronchus/Lung	1	0.93
25	Hepatitis B Positive Ca Liver	1	1.43	Congestive Cardiac failure/Heart Failure	1	0.93
26	Hepatitis B Related	1	1.43	Gastritis/Duodenitis	1	0.93
27	Hypertension Diabetes Related Unspecified	1	1.43	Hepatitis B Positive Ca Liver	1	0.93
28	LEPROSY	1	1.43	Hepatitis B Related	1	0.93
29	Liver diseases NS	1	1.43	Other Musculoskeletal	1	0.93
30	PUO	1	1.43	Other Respiratory Disorder	1	0.93
31	UTI	1	1.43	RHEUMATOID ARTHRITIS	1	0.93
32	-	-	-	TB	1	0.93
33	-	-	-	UTI	1	0.93
34	-	-	-	Food poisoning	1	0.93
35	-	-	-	Premature baby	1	0.93
	TOTAL	**70**	**100**	**TOTAL**	**108**	**100**

Annexure 4.1: TMS Claim Database 2013 – 2018 (Top 70%)		
S No	**Disease / Condition**	**n (%)**
1	Cataract	760 (11.53)
2	Pregnancy in Labour	393 (05.96)
3	Fracture	272 (04.13)
4	Cholelithiasis/Gallstone	265 (04.02)
5	Acute Diarrheal Disease (including acute gastroenteritis)	189 (02.87)
6	Dengue/DHF/DSS/Yellow Fever	156 (02.37)
7	Hypertension and Complications	147 (02.23)
8	Chronic Lower Respiratory Tract Infection	130 (01.97)
9	Chronic Liver Disease/Cirrhosis and Liver Failure	128 (01.94)
10	Other Neoplasm	123 (01.87)
11	Pterygium	123 (01.87)
12	Pneumonia & Bronchopneumonia	122 (01.85)
13	Diabetes Mellitus Type 2	121 (01.84)
14	Ca Stomach	115 (01.75)
15	New Born	113 (01.71)
16	Normal Vaginal Delivery	107 (01.62)
17	Other Injuries	100 (01.52)
18	Urinary Tract Infection, Urosepsis	93 (01.41)
19	Appendicitis	90 (01.37)
20	Gastritis/Duodenitis	89 (01.35)
21	Other Musculoskeletal Disorder	88 (01.34)
22	Cerebro Vascular Accident (Stroke)	87 (01.32)
23	Renal Colic including calculi	74 (01.12)
24	Enteric Fever (Typhoid)	70 (01.06)
25	Fever of Unknown Origin/PUO	69 (01.05)
26	Cholecystitis	68 (01.03)
27	Ischemic Heart Diseases (include Angina, Myocardial infarction and complications)	67 (01.02)
28	Osteoarthritis	64 (00.97)
29	Other Digestive Disorder	64 (00.97)
30	Chronic Renal Failure	60 (00.91)
31	Ca Liver	56 (00.85)
32	Other Genitourinary Disorder	54 (00.82)
33	Other Gynaecological Disorder	54 (00.82)
34	Haemorrhoids/Piles	53 (00.80)
35	Viral Fever	53 (00.80)
36	LSCS Delivery	52 (00.79)
37	Anemia	51 (00.77)
38	Other Maternal & Obstetric Conditions	50 (00.76)
39	Hernia	47 (00.71)
40	Malaria	45 (00.68)
41	Ca Oesophagus	43 (00.65)
42	Viral Hepatitis B	43 (00.65)
	Cumulative (75%)	**4947 (75.07%)**
	TOTAL	**6590 (100.00%)**

Annexure 4.2: TMS Claim Database 2013 – 2014 – Disease Category								
S No	Year							
	Disease Category	2013	2014	2015	2016	2017	2018	Total
1	Digestive	111 (18.81)	170 (19.72)	227 (19.67)	251 (19.34)	216 (15.520	222 (17.16)	1,197 (18.16)
2	Eye	80 (13.56)	85 (09.86)	113 (09.79)	191 (14.71)	254 (18.25)	221 (17.08)	944 (14.32)
3	Obstetrics	69 (11.69)	97 (11.25)	119 (10.31)	148 (11.40)	132 (09.48)	153 (11.82)	718 (10.90)
4	Neoplasm	34 (05.76)	74 (08.58)	91 (07.89)	78 (06.01)	94 (06.75)	91 (07.03)	462 (07.01)
5	Respiratory	27 (04.58)	51 (05.92)	66 (05.72)	92 (07.09)	115 (08.26)	67 (05.18)	418 (06.34)
6	Genitourinary	37 (06.27)	45 (05.22)	65 (05.63)	67 (05.16)	61 (04.38)	72 (05.56)	347 (05.27)
7	CVS	30 (05.08)	55 (06.38)	65 (05.63)	68 (05.24)	58 (04.17)	63 (04.87)	339 (05.14)
8	Injuries/Musculoskeletal	22 (03.73)	33 (03.83)	52 (04.51)	49 (03.78)	58 (04.17)	64 (04.95)	278 (04.22)
9	Infectious	30 (05.08)	47 (05.45)	58 (05.03)	56 (04.31)	48 (03.45)	32 (02.47)	271 (04.11)
10	Vector Borne	26 (04.41)	37 (04.29)	37 (03.21)	40 (03.08)	41 (02.95)	21 (01.62)	202 (03.07)
11	Musculoskeletal	17 (02.88)	28 (03.83)	35 (03.03)	30 (02.31)	50 (03.59)	23 (01.78)	183 (02.78)
12	New Born	1 (00.17)	0 (00.00)	9 (00.78)	48 (03.70)	58 (04.17)	58 (04.48)	174 (2.64)
13	General	10 (01.69)	17 (01.97)	36 (03.12)	20 (01.54)	40 (02.87)	40 (03.09)	163 (02.47)
14	Endocrine, Metabolic, Nutritional etc.	22 (03.73)	20 (02.32)	22 (01.91)	21 (01.62)	33 (02.37)	38 (02.94)	156 (02.37)
15	Injuries, Poisoning etc.	14 (02.37)	24 (02.78)	36 (03.12)	33 (02.54)	26 (01.87)	20 (01.55)	153 (02.32)
16	CNS	11 (01.86)	20 (02.32)	28 (02.43)	39 (03.00)	28 (02.01)	24 (01.85)	150 (2.28)
17	Gynaecology	12 (02.03)	12 (01.39)	32 (02.77)	14 (01.08)	22 (01.58)	26 (02.01)	118 (01.79)
18	Dermatology	17 (02.88)	18 (02.09)	23 (01.99)	12 (00.92)	16 (01.15)	23 (01.78)	109 (01.65)
19	ENT/Respiratory	10 (01.69)	11 (01.28)	15 (01.30)	22 (01.69)	22 (01.58)	19 (01.47)	99 (01.50)
20	Haematology	5 (00.85)	8 (00.93)	15 (01.30)	13 (01.00)	15 (01.08)	10 (00.77)	66 (01.00)
21	Congenital	2 (00.34)	5 (00.58)	7 (00.61)	4 (00.31)	4 (00.29)	4 (00.31)	26 (00.39)
22	Psychiatry, Behavioural, Neurodevelopment disorders	3 (00.51)	5 (00.58)	0 (00.00)	1 (00.08)	1 (00.07)	2 (00.15)	12 (00.18)
23	Bites & Stings	0 (00.00)	0 (00.00)	3 (00.26)	1 (00.08)	0 (00.00)	1 (00.08)	5 (0.08)
TOTAL								**6590**

Annexure 4.3: TMS Claim Database 2013 - 2018
Disease Category & Individual Diseases by Year

S No	A. Bites & Stings	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Other Bites & Stings	0 (00.00)	0 (00.00)	2 (66.67)	1 (100.00)	0 (00.00)	0 (00.00)	3 (60.00)
2	Dog Bite	0 (00.00)	0 (00.00)	1 (33.33)	0 (00.00)	0 (00.00)	1 (20.00)	1 (20.00)
3	Snake Bite	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.00)	1 (20.00)
Total		**0 (100.00)**	**0 (100.00)**	**3 (100.00)**	**1 (100.00)**	**0 (100.00)**	**1 (100.00**	**5 (100.00)**

S No	B. Central Nervous System	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Cerebro-Vascular Accident (Stroke)	7 (63.64)	5 (25.00)	19 (67.86)	29 (74.36)	13 (46.43)	14 58.33)	87 (58.00)
2	Other Nervous System Disorder	2 (18.18)	6 (30.00)	4 (14.29)	1 (02.56)	4 (14.29)	5 (20.83)	22 (14.67)
3	Epilepsy/Seizure	1 (09.09)	3 (15.00)	3 (10.71)	5 (12.82)	6 (21.43)	0 (00.00)	18 (12.00)
4	Febrile Convulsion	1 (09.09)	3 (15.00)	1 (03.57)	3 (07.69)	1 (03.57)	2 (08.33)	11 (07.33)
5	Paraplegia (Paraparesis) or Quadriplegia (Quadriparesis)	0 (00.00)	1 (05.00))	0 (00.00)	0 (00.00)	2 (07.14)	0 (00.00)	3 (02.00)
6	Parkinsonism	0 (00.00)	0 (00.00)	0 (00.00)	1 (02.56)	1 (03.57)	1 (04.17)	3 (02.00)
7	Peripheral Neuropathy	0 (00.00)	1 (05.00)	1 (03.00)	0 (00.00)	0 (00.00)	1 (04.17)	3 (02.00)
8	Migraine/Cluster Headache	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (03.57)	1 (04.17)	2 (01.33)
9	Cerebral Palsy	0 (00.00)	1 (05.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.67)
Total		**11**	**20**	**28**	**39**	**28**	**24**	**150**

S No	C. Cardiovascular System	Year						
		2013	2014	2015	2106	2017	2018	Total
1	Hypertension and Complications	15 (50.00)	25 (45.45)	31 (47.69)	22 (32.35)	23 (39.66)	31 (49.21)	147 (43.36)
2	Ischemic Heart Diseases (include Angina, Myocardial infarction and Complications)	6 (20.00)	13 (23.64)	8 (12.31)	17 (25.00)	16 (27.59)	7 (11.11)	67 (19.76)

3	Cardiac Arrhythmia, Cardiac Block	4 (13.33)	6 (10.91)	9 (10.91)	4 (05.88)	7 (12.07)	10 (15.87)	40 (11.80)
4	Congestive Cardiac Failure/Heart Failure	2 (06.67)	5 (09.09)	5 (07.69)	7 (10.29)	6 (10.34)	6 (09.52)	31 (09.14)
5	Other Cardiovascular Disorder	3 (10.00)	2 (03.64)	8 (12.31)	11 (16.18)	3 (05.17)	4 (06.35)	31 (09.14)
6	Vericose Vein	0 (00.00)	2 (03.64)	1 (01.54)	1 (01.47)	2 (03.45)	1 (01.59)	7 (02.06)
7	Rheumatic and Other Valvular Heart Diseases	0 (00.00)	1 (01.82)	0 (00.00)	3 (04.41)	1 (01.72)	1 (01.59)	6 (01.77
8	Deep Vein Thrombosis	0 (00.00)	1 (01.82)	1 (01.54)	1 (01.47)	0 (00.00)	2 (03.17)	5 (01.47)
9	Lymphadenitis	0 (00.00)	0 (00.00)	2 (03.08)	2 (02.94)	0 (00.00)	1 (01.59)	5 (01.47)
Total		**30**	**55**	**65**	**68**	**58**	**63**	**339**

S No	D. Congenital Disorders	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Other Congenital Disorders	1 (50.00)	5 (100.00)	4 (57.14)	4 (100.00)	4 (100.00)	2 (50.00)	20 (76.92)
2	Congenital Heart Disease	1 (50.00)	0 (00.00)	3 (42.86)	0 (00.00)	0 (00.00)	2 (50.00)	6 (23.08)
Total		**2**	**5**	**7**	**4**	**4**	**4**	**26**

S No	E. Dermatology	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Other Skin Diseases	3 (17.65)	5 (27.78)	5 (21.74)	6 (50.00)	6 (37.50)	9 (39.13)	34 (31.19)
2	Cellulitis	4 (23.53)	5 (27.78)	5 (21.74)	1 (08.33)	5 (31.25)	8 (34.78)	28 (25.69)
3	Cutaneous Abscess, Furuncle and Curbuncle	6 (35.29)	4 (22.22)	6 (26.09)	1 (08.33)	3 (18.75)	3 (13.04)	23 (21.10)
4	Infected Wound	1 (05.88)	1 (05.56)	3 (13.04)	4 (33.33)	2 (12.50)	2 (08.70)	13 (11.93)
5	Urticaria & Erythemia	1 (05.88)	2 (11.11)	1 (04.35)	0 (00.00)	0 (00.00)	1 (04.35)	5 (04.59)
6	Ulcer	0 (00.00)	0 (00.00)	3 (13.04)	0 (00.00)	0 (00.00)	0 (00.00)	3 (02.75)
7	Herpes Zoster and Complications	1 (05.88)	1 (05.56)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	2 (01.83)
8	Vitiligo	1 (05.88)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.92)
Total		**17**	**18**	**23**	**12**	**16**	**23**	**109**

S No	Year							
	F. Digestive	2013	2014	2015	2016	2017	2018	Total
1	Cholelithiasis/Gallstone	20 (18.02)	24 (14.12)	46 (20.26)	57 (22.71)	60 (27.78)	58 (26.13)	265 (22.14)
2	Acute Diarrheal Disease (including acute gastroenteritis)	19 (17.12)	38 (22.35)	41 (18.06)	37 (14.74)	26 (12.04)	28 (12.61)	189 (15.79)
3	Chronic Liver Diseases, Cirrhosis and Liver Failure	13 (11.71)	17 (10.00)	29 (12.78)	29 (11.55)	14 (06.48)	26 (11.71)	128 (10.69)
4	Appendicitis	8 (07.21)	12 (07.06)	18 (07.93)	11 (04.38)	19 (08.80)	22 (09.91)	90 (07.52)
5	Gastritis / Duodenitis	15 (13.51)	11 (06.47)	20 (08.81)	15 (05.98)	16 (07.41)	12 (05.41)	89 (07.44)
6	Cholecystitis	3 (02.70)	14 (08.24)	11 (04.85)	13 (05.18)	12 (05.56)	15 (06.76)	68 (05.68)
7	Other Digestive Disorder	5 (04.50)	15 (08.82)	9 (03.96)	21 (08.37)	7 (03.24)	7 (03.15)	64 (05.35)
8	Haemorrhoids/Piles	6 (05.41)	7 (04.12)	14 (06.17)	8 (03.19)	6 (02.78)	12 (05.41)	53 (04.43)
9	Hernia	4 (03.60)	5 (02.94)	7 (03.08)	14 (05.58)	10 (04.63)	7 (03.15)	47 (03.93)
10	Fissure / Fistula	4 (03.60)	4 (02.35)	7 (03.08)	4 (01.59)	9 (04.17)	7 (03.15)	35 (02.92)
11	Disease of Gallbladder	6 (05.41)	5 (02.94)	3 (01.32)	4 (01.59)	7 (03.24)	8 (03.60)	33 (02.76)
12	Pancreatitis	1 (00.90)	5 (02.94)	6 (02.64)	7 (02.79)	3 (01.39)	6 (02.70)	28 (02.34)
13	Intestinal Obstruction	1 (00.90)	4 (02.35)	4 (01.76)	10 (03.98)	3 (01.39)	2 (00.90)	24 (02.01)
14	Peptic Ulcer	2 (01.80)	1 (00.59)	4 (01.76)	8 (03.19)	5 (02.31)	1 (00.45)	21 (01.75)
15	Alcoholic Liver Diseases	1 (00.90)	3 (01.76)	4 (01.76)	4 (01.59)	2 (00.93)	1 (00.45)	15 (01.25)
16	GI Bleed	1 (00.90)	1 (00.59)	1 (00.44)	3 (01.20)	5 (02.31)	3 (01.35)	14 (01.17)
17	Hydatid Cyst of Liver	1 (00.90)	0 (00.00)	1 (00.44)	1 (00.40)	3 (01.39)	0 (00.00)	6 (00.50)
18	Peritonitis	0 (00.00)	1 (00.59)	0 (00.00)	1 (00.40)	1 (00.46)	3 (01.35)	6 (00.50)
19	Dysentery Unspecified	0 (00.00)	1 (00.59)	0 (00.00)	1 (00.40)	3 (01.39)	0 (00.00)	5 (00.42)
20	Acute Abdomen	0 (00.00)	1 (00.59)	1 (00.44)	0 (00.00)	1 (00.46)	1 (00.45)	4 (00.33)
21	Amoebic Dysentery	1 ((00.90)	0 (00.00)	1 (00.44)	0 (00.00)	1 (00.46)	1 (00.45)	4 (00.33)
22	Ascites	0 (00.00)	1 (00.59)	0 (00.00)	1 (00.40)	0 (00.00)	1 (00.45)	3 (00.25)
23	Diseases of Oral cavity	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.40)	2 (00.93)	0 (00.00)	3 (00.25)
24	Parotitis	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.46)	1 (00.45)	2 (00.17
25	Constipation	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.40)	0 (00.00)	0 (00.00)	1(00.08)
	Total	**111**	**170**	**227**	**251**	**216**	**222**	**1,197**

S No	G. ENT / Respiratory	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Otitis Media	5 (50.00)	8 (72.73)	5 (33.33)	6 (27.27)	10 (45.45)	8 (42.11)	42 (42.42)
2	Other ENT Disorder	1 (10.00)	1 (09.09)	2 (13.33)	5 (22.73)	3 (13.64)	4 (21.05)	16 (16.16)
3	Acute Tonsillitis/Abscess	1 (10.00)	0 (00.00)	2 (13.33)	5 (22.73)	4 (18.18)	2 (10.53)	14 (14.14)
4	Deviated Nasal Septum	1 (10.00)	0 (00.00)	3 (20.00)	1 (04.55)	3 (13.64)	3 (15.79)	11 (11.11)
5	Sinusitis (Acute/Chronic)	2 (20.00)	1 (09.09)	1 (06.67)	4 (18.18)	2 (09.09)	1 (05.26)	11 (11.11)
6	Acute Pharyngitis	0 (00.00)	0 (00.00)	2 (13.33)	0 (00.00)	0 (00.00)	0 (00.00)	2 (02.02)
7	Hearing Loss (Conduct	0 (00.00)	1 (09.09)	0 (00.00)	1 (04.55)	0 (00.00)	0 (00.00)	2 (02.02)
8	Acute Laryngitis	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (05.26)	1 (01.01)
Total		**10**	**11**	**15**	**22**	**22**	**19**	**99**

S No	H. Endocrine	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Diabetes Mellitus Type 2	19 (86.36)	16 (80.00)	19 (86.36)	19 (90.48)	23 (69.70)	25 (65.79)	121 (77.56)
2	Other Endocrine, Metabolic & Nutritional Diseases	1 (04.55)	2 (10.00)	1 (04.55)	2 (09.52)	4 (12.12)	7 (18.42)	17 (10.90)
3	Other Disorder of Thyroid	1 (4.55)	2 (10.00)	2 (09.09)	0 (00.00)	5 (15.15)	3 (07.89)	13 (08.33)
4	Dehydration	1 (04.55)	0 (00.00)	0 (00.00)	0 (00.00)	1 (03.03)	3 (07.89)	5 (03.21)
Total		**22**	**20**	**22**	**21**	**33**	**38**	**156**

S. No	I. Eye Disorders	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Cataract	62 (77.50)	65 (76.47)	87 (76.99)	144 (75.39)	215 (84.65)	187 (84.62)	760 (80.51)
2	Pterygium	11 (13.75)	15 (17.65)	18 (15.93)	30 (15.71)	26 (10.24)	23 (10.41)	123 (13.03)
3	Other Eye Disorder	4 (05.00)	4 (04.71)	5 (04.42)	8 (04.19)	12 (04.72)	7 (03.17)	40 (04.24)
4	Choroid and Retina Diseases	1 (01.25)	0 (00.00)	3 (02.65)	5 (02.62)	1 (00.39)	3 (01.36)	13 (01.38)
5	Glaucoma	1 (01.25)	0 (00.00)	0 (00.00)	3 (01.57)	0 (00.00)	1 (00.45)	5 (00.53)
6	Eye Refraction Disorders	0 (00.00)	1 (01.18)	0 (00.00)	1 (00.52)	0 (00.00)	0 (00.00)	2 (00.21)
7	Blindness & Low Visio	1 (01.25)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.11)
Total		**80**	**85**	**113**	**191**	**254**	**221**	**944**

S. No	J. General	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Fever of Unknown Origin	4 (40.00)	5 (29.41)	13 (36.11)	11 (55.00)	23 (57.50)	13 (32.50)	69 (42.33)
2	Abdominal Pain Unspecified	0 (00.00)	2 (11.76)	7 (19.44)	3 (15.00)	2 (05.00)	5 (12.50)	19 (11.66)
3	Jaundice NOS	3 (30.00)	2 (11.76)	5 (13.89)	3 (15.00)	1 (02.50)	2 (05.00)	16 (09.82)
4	Pain (Unspecified)	1 (10.00)	0 (00.00)	0 (00.00)	1 (05.00)	3 (07.50)	4 (10.00)	9 (05.52)
5	Vertigo/Dizziness/Giddiness	1 (10.00)	2 (11.76)	3 (08.33)	0 (00.00)	0 (00.00)	3 (07.50)	9 (05.52)
6	Weakness/Tiredness	1 (10.00)	1 (05.88)	2 (05.56)	0 (00.00)	1 (02.50)	2 (05.00)	7 (04.29)
7	Headache	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	4 (10.00)	2 (05.00)	6 (03.68)
8	Cough	0 (00.00)	1 (05.88)	2 (05.56)	0 (00.00)	0 (00.00)	1 (02.50)	4 (02.45)
9	Fever with rash or thrombocytopenia	0 (00.00)	1 (05.88)	1 (02.78)	0 (00.00)	1 (02.50)	1 (02.50)	4 (02.45)
10	Epistaxis	0 (00.00)	0 (00.00)	1 (02.78)	0 (00.00)	0 (00.00)	2 (05.00)	3 (01.84)
11	Food Poisoning	0 (00.00)	0 (00.00)	0 (00.00)	1 (05.00)	0 (00.00)	2 (05.00)	3 (01.84)
12	Other General	0 (00.00)	0 (00.00)	2 (05.56)	0 (00.00)	0 (00.00)	1 (02.50)	3 (01.84)
13	Anorexia	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	2 (05.00)	0 (00.00)	2 (01.23)
14	Dysphagia/Aphagia	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	2 (05.00)	2 (01.23)
15	Haematuria	0 (00.00)	1 (05.88)	0 (00.00)	0 (00.00)	1 (02.50)	0 (00.00)	2 (01.23)
16	Multi organ dysfunction	0 (00.00)	2 (11.76)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	2 (01.23)
17	Other Allergies	0 (00.00)	0 (00.00)	0 (00.00)	1 (05.00)	1 (02.50)	0 (00.00)	2 (01.23)
18	Dysuria	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (02.50)	0 (00.00)	1 (00.61)
	Total	**10**	**17**	**36**	**20**	**40**	**40**	**163**

S No	K. Genitourinary Disorder	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Urinary Tract Infection	9 (24.32)	12 (26.67)	23 (35.38)	13 (19.40)	16 (26.23)	20 (27.78)	93 (26.80)
2	Renal Colic including	9 (24.32)	12 (26.67)	12 (18.46)	16 (23.88)	14 (22.95)	11 (15.28)	74 (21.33)
3	Chronic Renal Failure	6 (16.22)	6 (13.33)	6 (09.23)	5 (07.46)	18 (29.51)	19 (26.39)	60 (17.29)
4	Other Genitourinary Disorder	9 (24.32)	4 (08.89)	8 (12.31)	15 (22.39)	4 (06.56)	14 (19.44)	54 (15.56)
5	Benign Prostatic Hype	1 (02.70)	3 (06.67)	10 (15.38)	13 (19.40)	4 (06.56)	6 (08.33)	37 (10.66)

6	Chronic Kidney Diseases	1 (02.70)	3 (06.67)	0 (00.00)	3 (04.48)	2 (03.28)	1 (01.39)	10 (02.88)
7	Acute Renal Failure	1 (02.70)	3 (06.67)	2 (03.08)	0 (00.00)	2 (03.28)	1 (01.39)	9 (02.59)
8	Other Breast Disorder	1 (02.70)	2 (04.44)	4 (06.15)	1 (01.49)	1 (01.64)	0 (00.00)	9 (02.59)
9	Nephrotic Syndrome	0 (00.00)	0 (00.00)	0 (00.00)	1 (01.49)	0 (00.00)	0 (00.00)	1 (00.29)
Total		**37**	**45**	**65**	**67**	**61**	**72**	**347**

S No	L. Gynaecology Disorder	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Other Gynaecological Disorder	5 (41.67)	7 (58.33)	16 (50.00)	4 (28.57)	9 (40.91)	13 (50.00)	54 (45.76)
2	Uterine Fibroid	6 (50.00)	2 (16.67)	8 (25.00)	5 (35.71)	7 (31.82)	8 (30.77)	36 (30.51)
3	Uterine and Vaginal B	1 (08.33)	1 (08.33)	2 (06.25)	3 (21.43)	2 (09.09)	2 (07.69)	11 (09.32)
4	Menorrhagia	0 (00.00)	1 (08.33)	4 (12.50)	0 (00.00)	1 (04.55)	0 (00.00)	6 (05.08)
5	Female Genital Prolapse	0 (00.00)	1 (08.33)	2 (06.25)	2 (14.29)	1 (04.55)	1 (03.85)	7 (05.93)
6	Vaginitis/Vulvitis	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (04.55)	1 (03.85)	2 (01.69)
7	Female Pelvic Inflammatory Disease	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (04.55)	1 (03.85)	2 (01.69)
Total		**12**	**12**	**32**	**14**	**22**	**26**	**118**

S No	M. Haematology	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Anaemia	4 (80.00)	8 (100.00)	12 (80.00)	10 (76.92)	11 (73.33)	6 (60.00)	51 (77.27)
2	Other Diseases of Blood --	0 (00.00)	0 (100.00)	3 (20.00)	1 (07.69)	0 (00.00)	3 (30.00)	7 (10.61)
3	Thrombocytopenia	1 (20.00)	0 (00.00)	0 (00.00)	2 (15.38)	4 (26.67)	1 (10.00)	8 (12.12)
Total		**5**	**8**	**15**	**13**	**15**	**10**	**66**

S No	N. Infectious Diseases	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Chicken Pox	0 (00.00)	0 (00.00)	0 (00.00)	1 (01.79)	1 (02.08)	0 (00.00)	2 (00.74)
2	Enteric Fever (Typhoid)	8 (26.67)	14 (29.79)	12 (20.69)	19 (33.93)	8 (16.67)	9 (28.13)	70 (25.83)
3	Viral Fever	8 (26.67)	5 (10.64)	9 (15.52)	10 (17.86)	15 (31.25)	6 (18.75)	53 (19.56)

4	Viral Hepatitis B	6 (20.00)	4 (08.51)	11 (18.97)	11 (19.64)	7 (14.58)	4 (12.50)	43 (15.87)
5	Viral Fever with Thrombocytopenia	0 (00.00)	7 (14.89)	12 (20.69)	1 (01.79)	3 (06.25)	3 (09.38)	26 (09.59)
6	Hepatitis Unspecified	2 (06.67)	5 (10.64)	3 (05.17)	6 (10.71)	3 (06.25)	1 (03.13)	20 (07.38)
7	Septicaemia/Severe Sepsis	1 (03.33)	4 (08.51)	2 (03.45)	5 (08.93)	3 (06.25)	5 (15.63)	20 (07.38)
8	Tuberculosis	4 (13.33)	4 (08.51)	4 (06.90)	0 (00.00)	3 (06.25)	2 (06.25)	17 (06.27)
9	Other Infectious & Parasitic Diseases	1 (03.33)	1 (02.13)	0 (00.00)	1 (01.79)	2 (04.17)	2 (06.25)	7 (02.58)
10	Viral Hepatitis C	0 (00.00)	2 (04.26)	3 (05.17)	0 (00.00)	0 (00.00)	0 (00.00)	5 (01.85)
11	Meningitis Unspecified	0 (00.00)	0 (00.00)	1 (01.72)	2 (03.57)	1 (02.08)	0 (00.00)	4 (01.48)
12	Chicken Pox	0 (00.00)	0 (00.00)	0 (00.00)	1 (01.79)	1 (02.08)	0 (00.00)	2 (00.74)
13	Measles	0 (00.00)	1 (02.13)	0 (00.00)	0 (00.00)	1 (02.08)	0 (00.00)	2 (00.74)
14	HIV/AID	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (02.08)	0 (00.00)	1 (00.37)
15	Viral Hepatitis A	0 (00.00)	0 (00.00)	1 (01.72)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.37)
Total		**30**	**47**	**58**	**56**	**48**	**32**	**271**

S No	O. Injuries, Poisoning etc.	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Other Injuries	7 (50.00)	18 (75.00)	21(58.33)	19 (57.58)	17 (65.38)	18 (90.00)	100 (65.36)
2	Accident Traffic	2 (14.29)	2 (08.33)	7 (19.44)	8 (24.24)	4 (15.38)	1 (05.00)	24 (15.69)
3	Burns and Corrosions	4 (28.57)	2 (08.33)	6 (16.67)	6 (18.18)	4 (15.38)	1 (05.00)	23 (15.03)
4	Drug Toxicity	1 (07.14)	2 (08.33)	1 (02.78)	0 (00.00)	1 (03.85)	0 (00.00)	5 (03.27)
5	Entrance of Foreign body	0 (00.00)	0 (00.00)	1 (02.78)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.65)
Total		**14**	**24**	**36**	**33**	**26**	**20**	**15**

S No	P. Injuries, Musculoskeletal.	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Fracture	20 (90.91)	33 (100.00)	50 (96.15)	48 (97.96)	58 (100.00)	63 (98.44)	272 (97.84)
2	Dislocation & Sprain	2 (09.09)	0 (00.00)	2 (03.85)	1 (02.04)	0 (00.00)	1 (01.56)	6 (02.16)
Total		22	33	52	49	58	64	278

S no	Q. Musculoskeletal	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Other Musculoskeletal	10 (58.82)	12 (42.86)	12 (34.29)	9 (30.00)	31 (62.00)	14 (60.87)	88 (48.09)
2	Osteoarthritis	3 (17.65)	10 (35.71)	19 (54.29)	16 (53.33)	12 (24.00)	4 (17.39)	64 (34.97)
3	Spondylopathies	3 (17.65)	0 (00.00)	1 (02.86)	1 (03.33)	5 (10.00)	1 (04.35)	11 (06.01)
4	Arthritis Other	1 (05.88)	3 (10.71)	1 (02.86)	1 (03.33)	1 (02.00)	1 (04.35)	8 (04.37)
5	Osteoporosis with or fracture	0 (00.00)	2 (07.14)	0 (00.00)	1 (03.33)	1 (02.00)	1 (04.35)	5 (02.73)
6	Rheumatoid Arthritis	0 (00.00)	0 (00.00)	1 (02.86)	1 (03.33)	0 (00.00)	2 (08.70)	4 (02.19)
7	Pyogenic Arthritis	0 (00.00)	1 (03.57)	0 (00.00)	1 (03.33)	0 (00.00)	0 (00.00)	2 (01.09)
8	Chronic Osteomyelitis	0 (00.00)	0 (00.00)	1 (02.86)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.55)
Total		**17**	**28**	**35**	**30**	**50**	**23**	**183**

S No	R. Neoplasm	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Other Neoplasm	6 (17.65)	18 (24.32)	22 (24.18)	21 (26.92)	29 (30.85)	27 (29.67)	123 (26.62)
2	Ca Stomach	5 (14.71)	17 (22.97)	19 (20.88)	21 (26.92)	31 (32.98)	22 (24.18)	115 (24.89)
3	Ca Liver	12 (35.29)	11 (14.86)	12 (13.19)	7 (08.97)	6 (06.38)	8 (08.79)	56 (12.12)
4	Ca Oesophagus	2 (05.88)	3 (04.05)	17 (18.68)	6 (07.69)	7 (07.45)	8 (08.79)	43 (09.31)
5	Ca Oral Cavity including Larynx	1 (02.94)	8 (10.81)	8 (08.79)	7 (08.97)	3 (03.19)	5 (05.49)	32 (06.93)
6	Neoplasm Benign	3 (08.82)	5 (06.76)	1 (01.10)	8 (10.26)	5 (05.32)	10 (10.99)	32 (06.93)
7	Ca Bronchus/Lung	4 (11.76)	7 (09.46)	2 (02.20)	2 (02.56)	8 (08.51)	3 (03.20)	26 (05.63)
8	Ca Cervix	1 (02.94)	1 (01.35)	7 (07.69)	4 (05.13)	3 (03.19)	5 (05.49)	21 (04.55)
9	Ca Breast	0 (00.00)	4 (05.41)	3 (03.30)	2 (02.56)	2 (02.13)	3 (03.30)	14 (03.30)
Total		**34**	**74**	**91**	**78**	**94**	**91**	**462**

S No	S. New Born	Year					
		2013	2015	2016	2017	2018	Total
1	New Born	0 (00.00)	1 (11.11)	20 (41.67)	46 (79.31)	46 (79.31)	113 (64.94)
2	Neonatal Jaundice	0 (00.00)	2 (22.22)	18 (37.50)	7 (12.07)	5 (08.62)	32 (18.39)

3	Respiratory Distress	1 (100.00)	2 (22.22)	7 (14.58)	3 (05.17)	0 (00.00)	13 (07.47)
4	Umbilical Sepsis/Bacterial Sepsis of New Born	0 (00.00)	1 (11.11)	1 (02.08)	1 (01.72)	3 (05.17)	6 (03.45)
5	Other new-born conditions	0 (00.00)	2 (22.22)	0 (00.00)	1 (01.72)	3 (05.17)	6 (03.45)
6	Preterm	0 (00.00)	1 (11.11)	1 (02.08)	0 (00.00)	1 (01.72)	3 (01.720
7	Neonatal dehydration	0 (00.00)	0 (00.00)	1 (02.08)	0 (00.00)	0 (00.00)	1 (00.57)
Total		**1**	**9**	**48**	**58**	**58**	**174**

S No	T. Obstetrics	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Pregnancy in Labour	13 (18.84)	24 (24.74)	33 (27.73)	68 (45.95)	116 (87.88)	139 (90.85)	393 (54.74)
2	Normal Vaginal Delivery	1 (01.45)	15 (15.46)	29 (24.37)	50 (33.78)	8 (06.06)	4 (02.61)	107 (14.90)
3	LSCS Delivery	13 (18.84)	17 (17.53)	13 (10.92)	4 (02.70)	1 (00.76)	4 (02.61)	52 (07.24)
4	Other Maternal & Obstetrics Disorder	15 (21.74)	15 (15.46)	11 (09.24)	8 (05.41)	1 (00.76)	0 (00.00)	50 (06.96)
5	Maternal Care for Disproportion including Cephalo-pelvic Disproportion	5 (07.25)	6 (06.19)	6 (05.04)	0 (00.00)	0 (00.00)	1 (00.65)	18 (02.51)
6	Full term with previous C/S	0 (00.00)	3 (03.09)	9 (07.56)	3 (02.03)	0 (00.00)	0 (00.00)	15 (02.09)
7	Spontaneous Abortion	1 (01.45)	0 (00.00)	2 (01.68)	3 (02.03)	3 (02.27)	1 (00.65)	10 (01.39)
8	Prolong Labour	5 (07.25)	4 (04.12)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	9 (01.25)
9	Edema, Protenuria, and Hypertensive Disorder in Pregnancy, Childbirth & Puerperium	2 (02.90)	4 (04.12)	1 (00.84)	0 (00.00)	0 (00.00)	1 (00.65)	8 (01.11)
10	Pre-Eclampsia / Eclampsia	1 (01.45)	2 (02.06)	3 (02.52)	2 (01.35)	0.(00.00)	0 (00.00)	8 (01.11)
11	Assisted Vaginal Delivery	1 (01.45)	1 (01.03)	4 (03.36)	1 (00.68)	0 (00.00)	0 (00.00)	7 (00.97)
12	Ectopic Pregnancy (include ruptured ectopic pregnancy)	1 (01.45)	0 (00.00)	0 (00.00)	3 (02.03)	1 (00.76)	0 (00.00)	5 (00.70)
13	Anaemia Complicating Pregnancy, Childbirth and Puerperium	2 (02.90)	0 (00.00)	1 (00.84)	1 (00.68)	0 (00.00)	0 (00.00)	4 (00.56)
14	Preterm Labour	1 (01.45)	1 (01.03)	2 (01.68)	0 (00.00)	0 (00.00)	0 (00.00)	4 (00.56)
15	Stillbirth	0 (00.00)	0 (00.00)	1 (00.84)	0 (00.00)	1 (00.76)	1 (00.65)	3 (00.42)

16	Haemorrhage in Early	0 (00.00)	0 (00.00)	0 (00.00)	2 (01.35)	0 (00.00)	1 (00.65)	3 (00.42)
17	Maternal Infections,	1 (01.45)	0 (00.00)	0 (00.00)	2 (01.35)	0 (00.00)	0 (00.00)	3 (00.42)
18	Antepartum Haemorrhage	1 (01.45)	0 (00.00)	1 (00.84)	0 (00.00)	0 (00.00)	0 (00.00)	2 (00.28)
`19	Breech Delivery	2 (02.90)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	2 (00.28)
20	Malpresentation of Foetus	1 (01.45)	0 (00.00)	1 (00.84)	0 (00.00)	0 (00.00)	0 (00.00)	2 (00.28)
21	Persons Encountering	0 (00.00)	2 (02.06)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	2 (00.28)
22	Placenta Previa	1 (01.45)	0 (00.00)	1 (00.84)	0 (00.00)	0 (00.00)	0 (00.00)	2 (00.28)
23	Postpartum Haemorrhage	0 (00.00)	1 (01.03)	0 (00.00)	0 (00.00)	1 (00.76)	0 (00.00)	2 (00.28)
24	False Labour	1 (01.45)	1 (01.03)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	2 (00.28)
25	Diabetes Mellitus in	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.65)	1 (00.14)
26	Excessive Vomiting in	0 (00.00)	0 (00.00)	1 (00.84)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.14)
27	Obstructed Labour	1 (01.45)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.14)
28	Puerperal Sepsis & Other Puerperal Infections	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.68)	0 (00.00)	0 (00.00)	1 (00.14)
29	Amenorrhoea	0 (00.00)	1 (01.03)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (00.14)
Total		**69**	**97**	**119**	**148**	**132**	**153**	**718**

S No	U. Psychiatry, Behavioural, Neurodevelopmental Disorder	Year					
		2013	2014	2016	2017	2018	Total
1	Anxiety, Dissociative	0 (00.00)	3 (60.00)	0 (00.00)	0 (00.00)	2 (100.00)	5 (41.67)
2	Alcohol or Other Substance Use Disorder	1 (33.33)	0 (00.00)	1 (100.00)	1 (100.00)	0 (00.00)	3 (25.00)
3	Mood Disorder (Mania, Bipolar, Major Depression)	1 (33.33)	1 (20.00)	0 (00.00)	0 (00.00)	0 (00.00)	2 (16.67)
4	Other Psychiatric, Behavioural, Neurodevelopmental Disorder	0 (00.00)	1(20.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (08.33)
5	Psychotic Disorder including Schzophrenia	1 (33.33)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (08.33)
Total		**3**	**5**	**1**	**1**	**2**	**12**

S No	V. Respiratory Disorders	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Chronic Lower Respiratory Tract Infection including Chronic Bronchitis and Emphysema	7 (25.93)	9 (17.65)	18 (27.27)	33 (35.87)	39 (33.91)	24 (35.82)	130 (31.10)
2	Pneumonia & Bronchopneumonia	11 (40,74)	16 (31.37)	18 (27.27)	25 (27.27)	32 (27.83)	20 (29.85)	122 (29.19)
3	Other Respiratory Disorders	2 (07.41)	3 (05.88)	9 (13.64)	2 (02.17)	14 (12.17)	11 (16.42)	41 (09.81)
4	Asthma	5 (18.52)	10 (19.61)	5 (07.58)	9 (09.78)	7 (06.09)	1 (01.49)	37 (08.85)
5	Acute Bronchitis/Bronchiolitis	1 (03.70)	4 (07.84)	6 (09.09)	9 (09.78)	2 (01.74)	2 (02.99)	24 (05.74)
6	Acute Upper Respiratory Infection	0 (00.00)	4 (07.84)	5 (07.58)	7 (07.61)	8 (06.96)	0 (00.00)	24 (05.74)
7	Pleural effusion	0 (00.00)	5 (09.80)	1 (01.52)	3 (03.26)	6 (05.22)	2 (02.99)	17 (04.07)
8	Respiratory Distress	1 (03.70)	0 (00.00)	4 (06.06)	3 (03.26)	3 (02.61)	5 (07.46)	16 (03.83)
9	Bronchiectasis	0 (00.00)	0 (00.00)	0 (00.00)	1 (01.09)	4 (03.48)	2 (02.99(	7 (01.67)
Total		**27**	**51**	**66**	**92**	**115**	**67**	**418**

S No	W. Vector Borne Diseases	Year						
		2013	2014	2015	2016	2017	2018	Total
1	Dengue/DHF/DSS/Yellow	16 (61.54)	25 (67.57)	31 (83.78)	34 (85.00)	31 (75.61)	19 (90.48)	156 (77.23)
2	Malaria	10 (38.46)	12 (32.43)	6 (16.22)	5 (12.50)	10 (24.39)	2 (09.52)	45 (22.28)
3	Chickungunya	0 (00.00)	0 (00.00)	0 (00.00)	1 (02.50)	0 (00.00)	0 (00.00)	1 (00.50)
Total		**26**	**37**	**37**	**40**	**41**	**21**	**202**

Annexure 5: COMPREHENSIVE GLOBAL MONITORING FRAMEWORK, INCLUDING 25 INDICATORS, AND A SET OF NINE VOLUNTARY GLOBAL TARGETS FOR THE PREVENTION AND CONTROL OF NONCOMMUNICABLE DISEASES		
Framework Element	*Target*	*Indicators*
Premature mortality from non-communicable disease	1: A 25% relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases	1: Unconditional probability of dying between ages of 30 and 70 from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases
Additional Indictors		2: Cancer incidence, by type of cancer, per 100 000 population
Harmful use of alcohol	2: At least 10% relative reduction in the harmful use of alcohol, as appropriate, within the national context	3: Total (recorded and unrecorded) alcohol per capita (aged 15+ years old) consumption within a calendar year in litres of pure alcohol, as appropriate, within the national context
		4: Age-standardized prevalence of heavy episodic drinking among adolescents and adults, as appropriate, within the national context
		5: Alcohol-related morbidity and mortality among adolescents and adults, as appropriate, within the national context
Physical inactivity	3: A 10% relative reduction in prevalence of insufficient physical activity	6: Prevalence of insufficiently physically active adolescents, defined as less than 60 minutes of moderate to vigorous intensity activity daily
		7: Age-standardized prevalence of insufficiently physically active persons aged 18+ years (defined as less than 150 minutes of moderate-intensity activity per week, or equivalent)
Salt/sodium intake	4: A 30% relative reduction in mean population intake of salt/sodium	8: Age-standardized mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years
Tobacco use	5: A 30% relative reduction in prevalence of current tobacco use in persons aged 15+ year	9: Prevalence of current tobacco use among adolescents
		10: Age-standardized prevalence of current tobacco use among persons aged 18+ years
BIOLOGICAL RISK FACTORS		
Raised blood pressure	6: A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstance	11. Age-standardized prevalence of raised blood pressure among persons aged 18+ years (defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg) and mean systolic blood pressure
Diabetes and obesity	7: Halt the rise in diabetes & obesity	12: Age-standardized prevalence of raised blood glucose/ diabetes among persons aged 18+ years (defined as

		fasting plasma glucose concentration ≥ 7.0 mmol/l (126 mg/dl) or on medication for raised blood glucose)
		13: Prevalence of overweight and obesity in adolescents (defined according to the WHO growth reference for school-aged children and adolescents, overweight – one standard deviation body mass index for age and sex, and obese – two standard deviations body mass index for age and sex
		14: Age-standardized prevalence of overweight and obesity in persons aged 18+ years (defined as body mass index ≥ 25 kg/ m² for overweight and body mass index ≥ 30 kg/m² for obesity)
Additional indicators		15: Age-standardized mean proportion of total energy intake from saturated fatty acids in persons aged 18+ year
		16: Age-standardized prevalence of persons (aged 18+ years) consuming less than five total servings (400 grams) of fruit and vegetables per day
		17: Age-standardized prevalence of raised total cholesterol among persons aged 18+ years (defined as total cholesterol ≥5.0 mmol/l or 190 mg/dl); and mean total cholesterol concentration
Drug therapy to prevent heart attacks and strokes	8: At-least 50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes	18: Proportion of eligible persons (defined as aged 40 years and older with a 10-year cardiovascular risk ≥30%, including those with existing cardiovascular disease) receiving drug therapy and counselling (including glycaemic control) to prevent heart attacks and stroke
Essential non-communicable disease medicines and basic technologies to treat major non-communicable diseases	9: An 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major non-communicable diseases in both public and private facilities	19: Availability and affordability of quality, safe and efficacious essential non-communicable disease medicines, including generics, and basic technologies in both public and private facilities
Additional Indicators		20: Access to palliative care assessed by morphine-equivalent consumption of strong opioid analgesics (excluding methadone) per death from cancer
		21: Adoption of national policies that limit saturated fatty acids and virtually eliminate partially hydrogenated vegetable oils in the food supply, as

	appropriate, within the national context and national programmes
	22: Availability, as appropriate, if cost-effective and affordable, of vaccines against human papillomavirus, according to national programmes and policies
	23: Policies to reduce the impact on children of marketing of foods and non-alcoholic beverages high in saturated fats, trans fatty acids, free sugars, or salt
	24: Vaccination coverage against hepatitis B virus monitored by number of third doses of Hep-B vaccine (HepB3) administered to infants
	25: Proportion of women between the ages of 30–49 screened for cervical cancer at least once, or more often, and for lower or higher age groups according to national programmes or policies
Reference: WHO 2013: Global action plan for the prevention and control of non-communicable diseases 2013 - 2020	

Annexure 6: WHO's 16 Best Buys Interventions for NCDs		
Risk factor/ disease to be addressed	***Intervention***	***Detailed description***
Reduce Tobacco use	*Tax*	*Increase excise taxes and prices on tobacco products*
	Packaging	*Implement plain/standardized packaging and/or large graphic health warnings on all tobacco packages*
	Advertising, promotion and sponsorship	*Enact and enforce comprehensive bans on tobacco advertising, promotion and sponsorship*
	Smoke-free public places	*Eliminate exposure to second-hand tobacco smoke in all indoor workplaces, public places, and public transport*
	Educate	*Implement effective mass media campaigns that educate the public about the harms of smoking/tobacco use and second-hand smoke*
Reduce harmful use of alcohol	*Tax*	*Increase excise taxes on alcoholic beverages*
	Advertising	*Enact and enforce bans or comprehensive restrictions on exposure to alcohol advertising (across multiple types of media)*
	Availability	*Enact and enforce restrictions on the physical availability of retailed alcohol (via reduced hours of sale)*
Reduce unhealthy diet	*Reformulate food*	*Reduce salt intake through the reformulation of food products to contain less salt and the setting of target levels for the amount of salt in foods and meals*
	Supportive environments	*Reduce salt intake through the establishment of a supportive environment in public institutions such as hospitals, schools, workplaces and nursing homes, to enable lower sodium options to be provided*
	Educate	*Reduce salt intake through a behaviour change communication and mass media campaign*
	Packaging	*Reduce salt intake through the implementation of front-of-pack labelling*
Reduce physical inactivity	*Educate*	*Implement community-wide public education and awareness campaigns for physical activity which includes a mass media campaign combined with other community based education, motivational and environmental programmes aimed at supporting behavioural change of physical activity levels*
Manage cardiovascular disease and diabetes	*Drug therapy and counselling*	*Drug therapy (including glycaemic control for diabetes mellitus and control of hypertension using a total risk2 approach) and counselling to individuals who have had a heart attack or stroke and to persons with high risk (≥ 30%) of a fatal and non-fatal cardiovascular event in the next 10 years*
Manage cancer	*Vaccinate*	*Vaccination against human papillomavirus (2 doses) of 9-13 year old girls*
	Screening	*Prevention of cervical cancer by screening women aged 30–49, either through:* *• Visual inspection with acetic acid, linked with timely treatment of precancerous lesions;* *• Pap smear (cervical cytology) every 3–5 years, linked with timely treatment of precancerous lesions; or* *• Human papillomavirus test every 5 years linked with timely treatment of precancerous lesions*
Reference: WHO/Sustainable Development Goal 2017: 'Best buys' and other recommended interventions for the prevention and control of non-communicable diseases. Tackling NCDs.		

Annexure 7: National NCD Target for India

World Health Organization

National NCD Targets for India

Premature mortality from noncommunicable disease

- 25% relative reduction in overall mortality from the 4 main NCDs by 2025

Harmful alcohol use

- 10% relative reduction in alcohol use by 2025

Physical inactivity

- 10% relative reduction in the prevalence of physical inactivity by 2025

Sodium intake

- 30% relative reduction in mean population salt intake by 2025, with aim of achieving less than 5 mg of salt per day

Tobacco use

- 30% relative reduction in prevalence of current tobacco use by 2025

Raised blood pressure

- 25% relative reduction in prevalence of raised blood pressure by 2025

Diabetes and obesity

- Halt the rise in diabetes by 2025
- Halt the rise in obesity by 2025

Drug therapy to prevent heart attacks and strokes

- 50% of eligible people receive drug therapy and counseling (including glycemic control) to prevent heart attacks and strokes by 2025

Essential noncommunicable disease medicines and basic technologies to treat major noncommunicable diseases

- 80% availability and affordability of quality, safe and efficacious essential NCD medicines including generics and basic technologies by 2025

Reference: National Action Play and Monitoring Framework for Prevention and Control of NCDs in India

Based on country-provided documents as of September 2017.
Listed targets are only those closely linked to the Global NCD Targets.
Other national targets may exist.

Annexure 9: Consent and Participant Information Form

1. Study Title: Implementation Research on Hypertension and Diabetes under Comprehensive Community Outreach and Coordinated Care (CCOCC) Program of DoH-CTA, Dharamsala

2. Researchers and Institutional Affiliation:

Principal Investigator: Dr. Lobsang Tsering [1] (MBBS, MPH, PGDBDM)

Co-investigators: Ms. Tenzin Chodon[2] (BSc Nursing, MSc-Health Informatics, PGDBDM) Ms. Tenzin Dhaze[1] (GNM Nursing)

[1] Department of Health, Central Tibetan Administration, Dharamsala (HP) [2] Tibet Fund, Dharamsala

Please give this sheet to the participant and if s/he wishes read this out to the participant

Tashi Delek,

We (I), _____are here to do research on Hypertension (high blood pressure) and Diabetes (sugar disease). We will be taking your blood pressure, weight and height and also take blood for blood sugar measurement if you are above 30 years. We (I) will also be asking questions about Hypertension and Diabetes and issues related to them. It is hoped that this study will help us understand about Hypertension and Diabetes and the issues related to Hypertension and Diabetes in our community. The survey should take about 30-45 minutes to complete. The participation in the survey is voluntary and you can choose not to answer any question or all the questions. Whatever information questions you provide will be kept strictly confidential. Do you have question? If you have, we (I) will try to answer all the.

If you wish we can share with you what we know about Hypertension and Diabetes and if you are found to have Hypertension (high blood pressure) and/or Diabetes, we will also discuss with you about them and where you can go for further check-ups and you can finally make your own decision. If you have any doubts and clarification regarding Hypertension and Diabetes then you can ask us without hesitation. We will try to answer them to the best of our capacity.

Benefits

The immediate benefit of your participation is that you will know about your current Blood Pressure and Blood Sugar status. And that will be done free of cost. Also, your participation will help us to understand the Hypertension and Diabetes prevalence in our community and help DoH-CTA in planning for health intervention strategies.

Confidentiality

The information that we collect from this research study will be kept confidential. We will not be sharing the information to anyone outside the research team/field staff collecting the study, and no-one will be able to see it. The information collected from you will only carry the allotted random number and will not carry your name or any personal information. If the name is used, then it will be erased after the data is collected and entered into the computer. That way both the computer and form will not have your name. We will give you a code number. Please refer to that number if you wish to communicate to us.

Sharing of research findings

At the end of the study, we will be sharing what we have learnt with you if you so desire.

Right to refuse or withdraw

The participation in this study is entirely voluntary and you can choose not to participate in this study at any point of time and walk away without giving any explanation.

Contact Details

If you have any questions you may ask them now or later, even after the study has started and in progress. If you wish to ask questions later, you may contact any of the following study researchers: Name/ address/ telephone number/ e-mail (provided separately)

Certificate of consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate in this study and understand that I have the right to withdraw from the study at any time. I am aware that there may be no benefit to me personally. I have been provided with the name of the researcher who can be contacted using the information I was given for that person.

Print Name: Signature: Date:

If cannot sign: Use witness

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness: Signature: Date:

Consent taken by Name: Signature: Date:

***References**:*

1. *Anand Krishnan et al. Hypertension in South East Asia Region: an overview: Regional Health Forum Vol 17, 1, 2013. Accessed 30th July 2014 (look for Hypertension 2025 target)*
2. *Beglehole R et al. Priority Actions for the Non-communicable Disease Crisis. Lancet 2011 23:377(9775): 1438-41. E-pub 2011 April 5*
3. *Bei Sun et al: Polymorphisms of Renin-angitensin System in essential Hypertensionin Chinese Tibetans. Biomedical and Environmental Sciences 17, 209-216 2004.*
4. *Bhatia S, Rowley D, 1996. The Demographic and Health Surveillance Project. Department of Health, CTA. Dharamsala*
5. *Bhatia, Rowley, Dranyi: A social and demographic study of Tibetan refugees in India, Social Science & Medicine 54 (2002) 411- 422.*
6. *Maurice Michael et al: Capitalising the demographic transition: Tackling non-communicable diseases in South Asia 2011. World Bank*
7. *Naya Ikeda et al Understanding the decline of mean systolic blood pressure in Japan: an analysis of pooled data from the National Nutrition Survey, 1986-2002 Bulletin of the World Health Organization 86 (12) 2008.*
8. *Paul A James et al 2014 Evidence-Based Guidelines for the management of High Blood Pressure in Adults. Report from the panel members appointed to the eight Joint National Committee (JNC8). JAMA 284-427 2013. Published online December 18 2013. Accessed from https//:jama.jamanetwork.com/29/03/2014*
9. *Planning Commission, 2009. Demographic Survey of Tibetans in Exile – 2009, Planning Commission, CTA, Dharamsala*
10. *Ragupathy A et al. Hypertension in India: a systematic review and metaanlysis of prevalence, awareness, and control of Hypertension in India: Journal of Hypertension Vol 32,6 2014 www.jhypertension. Accessed 31st July 2014*
11. *Rajeev Gupta, V P Gupta Hypertension epidemiology in India: lessons from Jaipur Heart Watch. Current Science Vol 97,3, 2009*
12. *Taichi Shimazu et al Dietary patterns and cardiovascular disease mortality in japan: a prospective cohort study. International Journal of Epidemiology 36: 600-609. Downloaded on 29th March 2014*
13. *Tripathy V, Gupta R. Blood Pressure variation among Tibetans at different altitudes. Ann Human Biol 34(4) 470-83 2007*
14. *Vikal Tripathy et al Nutritional Status and Hypertension among Tibetans in India. Human Ecology Special Issue 14: 77-82 2006*
15. *WHO From burden to best buys: Reducing the economic impact of non-communicable diseases in low and middle income countries 2011. WHO/World Economic Forum www.who.int*
16. *WHO Report of the Formal Meeting of Member States to concludes the work on Comprehensive Global Monitoring Framework, including Indicators and a Set of Voluntary Global Targets for the Prevention and Control of NCD 2012 WHO. www.who.int*
17. *World Economic Forum Global economic burden of non-communicable diseases 2011. World Economic Forum and Harvard School of Public Health. www.weforum.org/economicsofNCD*
18. *Xi Zheng et al Prevalence, Self-Awareness, Treatment and Control of Hypertension in Lhasa Vol 34 No5 328-333 2012: http:informahealthcare.com/doi/abs/10.3019/10641963.2011.649930*
19. *Xing Lin Feng et al Health system strengthening and hypertension awareness, treatment and control: data from the China Health and Retirement Longitudinal Study. Bull World Health Organ 92,29-42 2014*
20. *Zhonghua Yi et al. Association of variants in the core promoter region of angiotension gene with essential hypertension in Tibetan population (original article inn Chinese) abstract Accessed from pubmed PID 12194787*
21. *WHO: Best buys' and other recommended interventions for the prevention and control of non-communicable diseases. Tackling NCDs. WHO, Department for Management of NCDs, Disability, Violence and Injury Prevention (NVI) 2017*
22. *WHO: Global action plan for the prevention and control of non-communicable diseases 2013-2020. WHO 2013*
23. *WHO: Non-communicable diseases country profiles 2018 Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO*
24. *National Rural Health Mission: Operational Guideline: Prevention, Screening and Control of Non-Communicable Diseases: Hypertension, Diabetes and Common cancers (Oral, Breast, Cervix) – Part of Comprehensive Primary Health Care 2015*
25. *Ministry of H & FW, GoI: National Multisectoral Action Plan for Prevention and Control of Common Non-communicable Disease (2017-2022) 2017*
26. *Ministry of H & FW, GoI Module for Medical Officer, Population-based screening for Non-Communicable Diseases 20??*
27. *Norboo T, Stobdan T, Tsering N, et al. Prevalence of hypertension at high altitude: cross-sectional survey in Ladakh, Northern India 2007–2011. BMJ Open 2015. doi:10.1136/bmjopen-2014007026 (accessed online 2018)*
28. *Rajeev Ahirwar, Prakash Ranjan Mondal Prevelance of Obesity in India: A systematic review.* Diabetes & Metabolic Syndrome: Clinical Research & Reviews 13 (2019) doi.org/10.1016/j.dsx.2018.08.032 (obesity)
29. *WHO 2011. Waist Circumference and Waist–Hip Ratio: Report of a WHO Expert Consultation Geneva, 8–11 December 2008 (look at measurement protocol and recommendation)*

30. *WHO STEP Surveillance Manual (2017 update).* The WHO STEP wise approach to non-communicable disease risk factor surveillance.
31. *Jiang He et al 1995, Stroke in the People's Republic of China. Geographic Variations in Incidence and Risk Factors. Originally published1 Dec 1995 https://doi.org/10.1161/01.STR.26.12.2222 Stroke.1995;26:2222–2227. Downloaded August 2019.*
32. *Intersalt Cooperative Research Group. Intersalt: an international study ofelectrolyte excretion and blood pressure. Results for 24 hour urinary sodium and potassium excretion BMJ VOLUME 297 30 JULY 1988*
33. *Ribeka Takachi et al: Consumption of sodium and salted foods in relation to cancer and cardiovascular disease: the Japan Public Health Center–based Prospective Study. Am J Clin Nutr 2010;91:456–64ICMR*
34. *Belle yanyu Lin et al 2017 The prevelance of obesity and metabolic syndrome in Tibetan immigrant living in high altitude areas in ladakh, india. Obes Res Cli pract 2018; 12(4): 365-371. Doi 10.1016/j.orcp.2017.03.002*
35. *GBD 2017 Collaborators. Health effect of dietary risks in 195 countries, 1990-2017: a systemic analysis for the Global Burden of Disease Study 2017. Lancet 2019; 393:1958-72. 2019. Doi.org/10.10.1016/s0140-6736919)30041-8. Downloaded 2019.*
36. *WHO 2012. Guideline: Sodium intake for adults and children. Geneva: World Health Organization; 2012. (http://www.who.int/nutrition/publications/ guidelines/sodium intake/en/ accessed 16 August 2018).*
37. *Final report of the Commission on Ending Childhood Obesity. Geneva: World Health Organization; 2016. (http://www.who.int/endchildhood-obesity/final-report/en/, accessed 20 August 2018).*
38. *ICMR INDIAB Diabetes Study 2017. Prevalence of diabetes and prediabetes in 15 states of India: results from the ICMR–INDIAB population-based cross-sectional study. Lancet Diabetes Endocrinol 2017 Published Online June 7, 2017 http://dx.doi.org/10.1016/ S2213-8587(17)30174-2. Accessed 2019.*
39. *Mirza Shohiab Ur Riyaz, Majid Khalil Rather, Parvaiz A. Koul 2018. Diabetes in Immigrant Tibetan Muslims in Kashmir, North India. Journal of Immigrant and Minority Health April 2018, Volume 20, Issue 2, pp 410–415*
40. *India State-Level Disease Burden Initiative Diabetes Collaborators 2018, The increasing burden of diabetes and variations among the states of India: the Global Burden of Disease Study 1990–2016. Lancet Glob Health 2018; 6: e1352–62 Published Online September 12, 2018 http://dx.doi.org/10.1016/ S2214-109X(18)30387-5*
41. *Intersalt Cooperative Research Group, Intersalt: An international study of electrolyte excretion and blood pressure. Results for 24 hour urinary sodium and potassium excretion BMJ VOLUME 297 30 JULY 1988*
42. *Ribeka Takachi, Manami Inoue, Taichi Shimazu 2010 Consumption of sodium and salted foods in relation to cancer and cardiovascular disease: the Japan Public Health Center–based Prospective Study. Am J Clin Nutr 2010;91:456–64*
43. Lancet Editorial The Astana Declaration: The future of primary health care? www.thelancet.com Vol 392 October 20, 2018. Downloaded August 2019
44. *WHO 2018 Declaration of Astana, Astana, Kazakhstan, 25 and 26 October 2018, Global Conference on Primary Health Care. WHO/HIS/SDS/2018.61. Downloaded August 2019.*
45. *N. C. Hazarika, D. Biswas, K. Narain, h. C. Kalita, J.Mohanta. 2002 Hypertension and its risk factors in tea garden workers of Assam Mohanta the National Medical Journal of India vol. 15, no.2, 2002*
46. *Prasanta K. Borah et al 2018 An information, education and communication module to reduce dietary salt intake and blood pressure among tea garden workers of Assam Indian Heart Journal 70 (2018) 252–258*