

PREVALENCE OF NONCOMMUNICABLE DISEASE RISK FACTORS AMONG KANI TRIBE IN THIRUVANANTHAPURAM DISTRICT, KERALA

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**Dissertation submitted in partial fulfillment of the requirements for the
award of the degree of Master of Public Health.**



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DECLARATION

*I hereby declare that this dissertation titled “**PREVALENCE OF NON COMMUNICABLE DISEASE RISK FACTORS AMONG KANI TRIBE IN THIRUVANANTHAPURAM DISTRICT, KERALA**” is a bonafide record of my original field research. It has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published and unpublished work of others has been duly acknowledged in the text.*

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CERTIFICATE

*Certified that the dissertation entitled **“PREVALENCE OF NON COMMUNICABLE DISEASE RISK FACTORS AMONG KANI TRIBE IN THIRUVANANTHAPURAM DISTRICT, KERALA”** is a record of the research work undertaken by **Ms. PRIYANKA.S** in partial fulfillment of the requirements for the award of the degree of **“Master of Public Health”** under my guidance and supervision.*

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October 2014.

I dedicate this work to the Kanikaran tribe.

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ABBREVIATIONS	
NCD	Non Communicable Disease
WHO	World Health Organization
SBP	Systolic Blood Pressure
DBP	Diastolic Blood Pressure
HTN	Hypertension
WC	Waist circumference
BMI	Body Mass Index
GPAQ	Global Physical Activity Questionnaire
MET	Metabolic Equivalent Time
ITDP	Integrated Tribal Development Project

ABSTRACT

Prevalence of non-communicable disease risk factors among Kani tribe in Thiruvananthapuram district, Kerala.

Introduction: The NCD risk factors are on an increase in Kerala. One may expect lower prevalence of risk factors in tribal population as these are linked with modern life styles. The studies on NCD risk factors among tribal population are very limited in India especially in Kerala. This study explores the prevalence of NCD risk factors among Kani tribe in Thiruvananthapuram, which is the most educated tribe in Kerala.

Method: A Cross sectional study was conducted in Vithura panchayath among 300 Kani tribal people (25-64 years) using cluster sampling. Data on NCD risk factors were collected using WHO STEP-wise approach for surveillance of NCD risk factors. Statistical analysis was done in the R statistical package.

Results: Equal number of men and women were studied. Prevalence of hypertension among Kani tribe was 48.3%, which is much higher than general population. Other significant NCD risk factors were overall consumption of any form of tobacco(81.5%), alcohol use(36.2%), abdominal obesity(22.1%), overweight(10.7%) and insufficient consumption of fruits or vegetables(100%). Almost one third (28.2%) of Kani tribes were found to have high combined risk score for NCDs. In bivariate analysis hypertension was significantly ($p<0.05$) associated with higher age, male sex, lower education, current smoking and alcohol use. In multivariate analysis, higher age (OR=2.28, CI=1.03-5.03), and alcohol consumption (OR=9.43, CI=1.11-80.28) were found to be risk factors and education (OR=0.27, CI=0.08-0.87) as protective factor for hypertension among Kani tribe.

Conclusion: Kani tribes in Thiruvananthapuram were found to have higher prevalence of major NCD risk factors like hypertension, tobacco use, alcohol use and inadequate fruits and vegetable intake compared to the general population. Abdominal obesity and physical inactivity among Kani tribes were found to be higher than other tribal groups. This could be a reflection of the fast adoption of modern lifestyle among Kani tribe.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

1.1 INTRODUCTION

1.1.1 Background

Global burden of disease has continued to shift from communicable to non communicable diseases and from premature deaths to years lived with disability.¹ Non Communicable Diseases (NCD) are diseases of long duration and generally of slow progression. NCDs account for more than 60 percent morbidity, 63percent of all deaths killing more than 36 million people every year globally of which 80 percent of deaths occur in low and middle income countries and most of it occur before the age of 60 years.^{2,3}

The incidence of NCDs among socially disadvantaged people will be more when compared to the people of higher social positions, because they are at greater risk of being exposed to harmful products, such as tobacco or unhealthy food, also having limited access to health services according to a systematic analysis done in 21 regions globally on the burden of diseases.²

In the current phase of India's health transition, chronic diseases contribute to an estimated 53 percent of deaths and 44 percent of disability adjusted life years lost.⁴ According to a study done in 2010, the leading cause of death in rural India was found out to be NCDs.⁵ Thus NCDs are steadily increasing in the rural areas as in the urban locations. There is a high burden of NCD risk factors in Kerala, comparable to US, according to a large community based study by Thankappan et al.⁶

Considering the increased risk of NCDs in populations with rapid urbanization and resultant nutritional transition, it can be predicted that the tribal states of Northeast India will have a greater risk of NCDs as revealed in the work of Khongsdier et al.⁷ Studies on different tribes in India reports high prevalence of hypertension and other risk factors of NCDs as per Sachdev et al and other researchers.⁸⁻¹¹

A recent study in 2013 reports that the prevalence of hypertension was higher(40%) among tribal adult population of Kerala and was associated with age, gender, educational status, physical inactivity, alcohol consumption and obesity.¹²

By Government of Kerala's own admittance, “Even after five decades of efforts, STs continue to constitute relatively the most backward and vulnerable sections of the population in the state with extremely weak economic base.”^{13,14}

NCD is increasing in the world and it disproportionately affects the disadvantaged groups in any community. The Kani tribes were famous for their traditional wisdom on medicinal plants.¹⁵ Unfortunately this knowledge is getting endangered. Moreover there can be a chance of reflection of urbanization on their nutritional habits and lifestyles. So it is worth looking at the NCD risk factor among the Kani tribe, the most educated (urbanized) tribe in Kerala.

1.1.2NON COMMUNICABLE DISEASES (NCD)

Non communicable diseases (NCDs) are also known as chronic diseases and they are of long duration and slow progression. NCDs are not spreading from person to person. Four main

categories of NCDs are cardiovascular diseases (heart attack, stroke etc), cancers, chronic respiratory diseases (chronic obstructive pulmonary disorders and asthma) and diabetes.¹

1.1.3 RISK FACTORS FOR NCDs

- **Modifiable behavioral risk factors:**

Modifiable risk factors include tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol. All these will increase the risk of development of NCDs.¹

- **Metabolic/physiological risk factors:**

Behavioral risk factors will lead to metabolic or physiological fluctuations in the body which increase the risk of NCDs. They include raised blood pressure, overweight/obesity, hyperglycemia (elevated blood glucose level) and hyper-lipidemia (elevated level of fat in blood).¹

Prevention of NCDs should focus on minimizing the risk factors associated with NCDs by reducing the common modifiable risk factors (tobacco use, unhealthy diet, physical inactivity and the harmful alcohol consumption) and mapping the epidemic of NCDs and its risk factors.

1.2. LITERATURE REVIEW

1.2.1 Global scenario

Non Communicable Diseases (NCDs) are diseases of long duration and generally of slow progression. NCDs account for more than 60 percent morbidity globally of which 80 percent of deaths occur in low and middle income countries and most of it occurs before the age of 60yrs.^{1,3} It is anticipated that by 2020, the deaths due to non communicable disease will be almost three quarters more compared to communicable, perinatal, neonatal and nutritional disorders. And by 2030 it will become the major cause of death in the world.⁴ In 2012, the UN conference on sustainable development referred NCDs as “one of the major challenges for sustainable development in the 21st century”¹⁶

According to a study by Ikeda et al, though the life expectancy of the Japanese are not affected by the high rates of smoking and high blood pressure at present, it is anticipated to risk for their economic development in future.¹⁷ Jayawardena et al demonstrated that there is a rapid increase in the prevalence of diabetes in South Asian region and several modifiable and non modifiable risk factors played a major role in the development of diabetes.¹⁸ A study done to assess the prevalence of NCD risk factors among adult in urban areas of Kabul city, Afghanistan using WHO STEP wise approach for surveillance revealed high prevalence of NCD risk factors.¹⁹

Though old age groups are more at risk, evidences shows that 9 million of all deaths attributed to non-communicable diseases occur before the age of 60. Children, adults and elderly are more vulnerable to the risk factors of non-communicable diseases through unhealthy diet, physical inactivity, exposure to tobacco smoke or alcohol consumption. According to WHO,

poverty is invariably linked with NCDs which is evident in low and middle income countries (often due to lengthy and expensive treatment, loss of breadwinners and loss of income).¹

According to Murray et al, global burden of disease has continued to shift from communicable diseases to non communicable diseases and from premature death to years lived with disability. Globally there will be a rising trend in the burden of mental and behavioral disorders, musculoskeletal disorders and diabetes.²

Driving forces for NCD include ageing, rapid unplanned urbanization and unhealthy lifestyles. Unhealthy lifestyles and unhealthy diets can manifest as raised blood pressure, elevated blood glucose, high blood lipids, overweight and obesity which are called intermediate risk factors which leads to cardiovascular disease which is an important NCD.¹

Tobacco is accountable for 6 million deaths (including deaths due to passive smoking) globally every year and is expected to increase to 8 million by 2030. World Health Organization estimated that, other modifiable risk factors such as insufficient physical activity, low fruit and vegetable intake and harmful alcohol consumption accounts for 3.2million, 1.7million and 1.1million deaths respectively. As per WHO, NCDs disproportionately affects the lower income groups in a society, although the NCD risk factors are often present in the high income groups as well. This could be due to the difference in access to health services for the rich and poor in any society.¹

Elevated blood pressure is the leading NCD risk factor and accounts for 16.5 percent of the attributable deaths globally. Similarly tobacco use (9%), elevated glucose (6%), physical inactivity (6%) and overweight and obesity (5%) all are NCD risk factors that contribute to the

mortality rate in our society. Rapid rise in overweight and obesity rates are seen among young children in low and middle income countries¹

1.2.2 Indian scenario

In the present stage of India's health transition, chronic diseases contribute to an estimated 53 percent of deaths and 44 percent of disability adjusted life years lost.²

As per a study done in Faridabad, it is found that the prevalence of NCD risk factors across all age groups among urban slums is high.²⁰

A study from Andhra Pradesh points out that though cardiovascular risk factors are less in rural areas compared to urban areas, the management of modifiable risk factors is suboptimal.²¹

According to the INTERHEART STUDY, the New Delhi birth cohort evaluation found that the incidence and prevalence of risk factors are high among young age and it rapidly shows a transition. Incidence of obesity is more among women compared to men whereas incidence of hypertension and diabetes were more among men when compared to women.²²

According to a study in 2010, the leading cause of death in rural India was NCDs.⁵ A study done in rural areas of Nagpur showed a high burden of non communicable disease risk factors in which tobacco and alcohol use was high among men and physical inactivity and overweight was high among women. They found low vegetable consumption across the group regardless of the sex of the subjects.²³ A study using WHO STEP approach done in Haryana showed higher prevalence of NCD risk factors.²⁴

According to a study done in Tamil Nadu, apart from central obesity and BMI, alcoholism is the significant risk factor for hypertension among men and family history of hypertension is the risk factor among women for hypertension.²⁵

1.2.3 Kerala scenario

A recent large community based study by Thankappan et al revealed that the burden of NCD risk factors is quite high in Kerala, even comparable to that of United States of America (USA). The study showed an increase in the prevalence of all NCD risk factors with age.⁶

In Kerala, behavioral risk factors such as smoking and alcohol intake are more prevalent among young adults. It has been established that socio economic status played the predictor role for the habit of alcohol intake, tobacco consumption, stress and unhealthy diet.²⁶ Socially disadvantaged people are highly vulnerable to the incidence of NCDs compared to the people of higher social positions.²

1.2.4 Tribal scenario

1.2.4.1 Studies on tribes in India

According to 2011 census, total tribal population in India constitute 104,281,034 which is 8.6 percent of the total population.

A study on problem perceived by tribal women in Haryana revealed some socio cultural issues such as untouchability still exists in the community. Still the economic problems and educational problems were the most dominant problems perceived by the tribal women.²⁷

A genetic study on tribal people in southern India revealed that all Nilgiri Hills' tribal groups are more closely related to each other regardless of phenotypic characteristics and they share a common ancestry although they are morphologically and culturally different.²⁸

According to a study done by Sarkar et al to understand the impact of urbanization on high prevalence of metabolic disorders and its correlates among genetically similar rural Himalayan tribal group compared to urban Himalayan tribal group revealed, an additional impact of urbanization and adoption of urban lifestyles on cardiovascular risk factors.²⁹

There is only limited literature on risk factors of NCDs among tribal population in India. Studies on different tribes in India reports high prevalence of hypertension and other risk factors of NCDs.^{8-11, 30} Considering the increased risk of NCDs in populations with rapid urbanization and resultant nutritional transition, it can be predicted that the tribal states of Northeast India will have a greater risk of NCDs.⁷

A study done to find out the reason behind alcoholism among tribals revealed cultural factors such as traditional acceptance and pressure as well as high emotional problems due to low self esteem as the main etiology behind high prevalence of substance dependence among tribals.³¹ According to a study done among the *Chenchus* tribe of Andrapradesh revealed the predominant use of locally prepared alcoholic beverages instead of harmless beverages such as hot milk and tea.³² Different states in India revealed high prevalence of under nutrition among tribal community especially among children and adolescent girls.³³⁻⁴¹ A large number of death occurs among children due to malnutrition among tribals.⁴² A study among *Aimol* tribe of Manipur revealed high intake of animal meat and low intake of fluid as the reason for renal stone among them.⁴³ Thus tribal lifestyles are different from the general population in many manner.

Though government has initiated several schemes for tribals, they have low knowledge about the provisions and their rights.²⁷ Utilization of antenatal care services and family planning services among tribals are substantially low in India.^{44,45}

1.2.4.2 Studies on Tribes in Kerala

According to 2011 census, total tribal population in Kerala is 484,839 which constitute 1.5 percent of the total population in Kerala. Among them 433,092 are residing in rural area. In Thiruvananthapuram district there are 26,759 scheduled tribes of which 20,022 are staying in rural areas. (Data obtained from Census office, Thiruvananthapuram)

The tribal traditional agricultural practices have changed a lot due to changing pattern of land use, intrusion of non tribal into tribal land and changes in the forest rules.^{46,47} There is a shift from food crops to cash crops and this can have a significant effect on their lifestyle and eating habits of tribals.

A recent study reported high prevalence of hypertension (40%) among tribal adult population of Kerala and it was shown to associate with age, gender, educational status, physical inactivity, alcohol consumption and obesity.¹² As per the 2001 Census, there are 36 tribal communities across Kerala. Of them *Koraga*, *Kattunayakan*, *Cholanaickan*, *Kurumbar* and *Kadar* are categorized as particularly vulnerable tribal groups (PTGs) by Government of India.¹³ The Scheduled Tribe (ST) population of Kerala state is 364,189 which contributes to 1.14 percent of the total population of the state (2001 census, Government of India).⁴⁸

The life situation in tribal people is far from satisfactory. It is quite evident from the statement of Government of Kerala that, “Even after five decades of development efforts, STs

continue to constitute relatively the most backward and vulnerable sections of the population in the state with extremely weak economic base".^{13,14}

1.2.5 KANIKARAN TRIBE

Kani is one of the largest and most educated tribe in Kerala. They belong to a traditionally nomadic community, who now lead a primarily settled life in the forests of the Agasthyimalai hills of the Western Ghats in Thiruvananthapuram district of Kerala (90.3% of Kani tribal people lives in Thiruvananthapuram district).⁴⁹ According to the census of India from 2001, their population in Kerala is 21,677 of which 18,872 are settled in Thiruvananthapuram district. Among the Kani tribals in Thiruvananthapuram, 18,463 are residing in rural areas. (Data obtained from Census office, Thiruvananthapuram).

The term “Kanikar” means “landlords”. There is an impeccable and respectful relationship existed between the Kanikaran tribe and the Travancore royal kingdom.⁶⁴ Kani tribe live in deep forest in relative isolation to the external world. Their lifestyles were much different from that of the general population, Thiruvananthapuram. They were famous for their traditional wisdom on medicinal plants and had unique cultural and traditional way of living which is reflected in their cultural festivals and ceremonies. Careful maternal and child health practices and use of medicinal herbs to heal common ailments made them unique from other tribal groups.⁶⁴

1.2.6 RATIONALE FOR USING WHO STEPS

WHO STEP-wise approach for the surveillance of Non Communicable Disease risk factors

WHO step is first initialized in Armstrong and Bonitain 2003. The step methodology is flexible and adaptable so that it can be used in majority of resource constrained settings.⁵⁰ STEP 1 and STEP 2 are more flexible and suitable for developing countries.¹ WHO STEP wise approach for the surveillance of NCD risk factors was successfully implemented in Kerala in a community based study.⁶

The study done by Nawi Ng et al discuss the potential of combining the WHO STEP wise approach for the surveillance within ongoing demographic surveillance system (DSS), (By combining WHO STEPS methodology and INDEPTH methodologies) to assess changes in non communicable disease risk factors.⁵¹ By combining WHO STEPS methodology and INDEPTH methodology we can find out how the NCD risk factors are distributed in populations, who among the population is affected because of it and does it reached the world's poor. In this context DSS will chart the shift of population risk profiles and will give an idea about epidemiological transition in poorer countries.⁵¹ So combination of these two methodologies are more beneficial for developing countries.

GLOBAL IMPLIMENTATION OF WHO STEPS

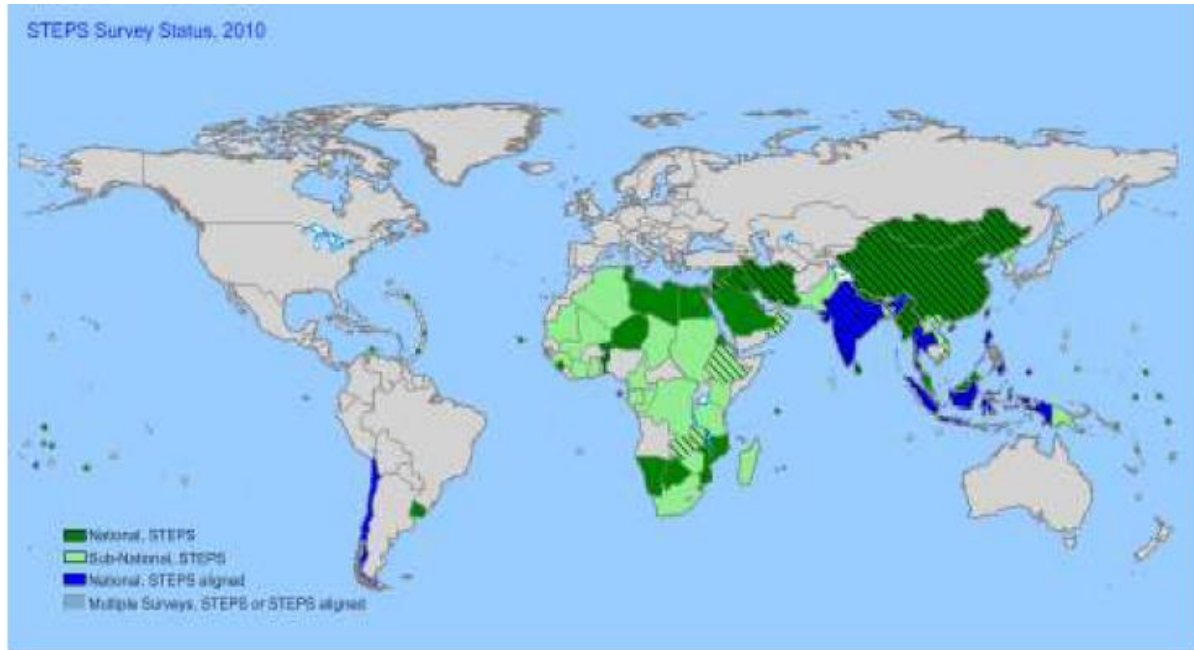


Figure 1. Status of STEPS implementation in 2005 and 2010.

Source: Ng N, Minh HV, Tesfaye F, Bonita R, Byass P, Stenlund H, et al. Combining risk factors and demographic surveillance: Potentials of WHO STEPS and INDEPTH methodologies for assessing epidemiological transition. **Scand J Public Health** 2006; 34(2):199–208.

1.3 RATIONALE FOR THE STUDY

Many ethno pharmacological studies had revealed the richness of traditional knowledge on medicinal plants among Kani tribe.^{15,52,53} Unfortunately the transmission of these traditional knowledge to next generation is getting endangered as more and more young tribes adopt the fascinating modern way of living.⁵⁴

As their health practices and life habits are different from the general population, it is worth looking at their NCD risk factors.^{40, 49}

Moreover there can be a chance of reflection of urbanization on their nutritional habits and lifestyles. No study has been done to assess the burden of NCD risk factors among this vulnerable population. Understanding the pattern of NCD risk factors among 'Kani tribe' is essential to address the health issues of this population.

CHAPTER 2

METHODOLOGY

2.1 OBJECTIVE OF THE STUDY

To assess the prevalence of NCD risk factors among Kani tribe in Thiruvananthapuram district, Kerala.

2.2 RESEARCH QUESTION

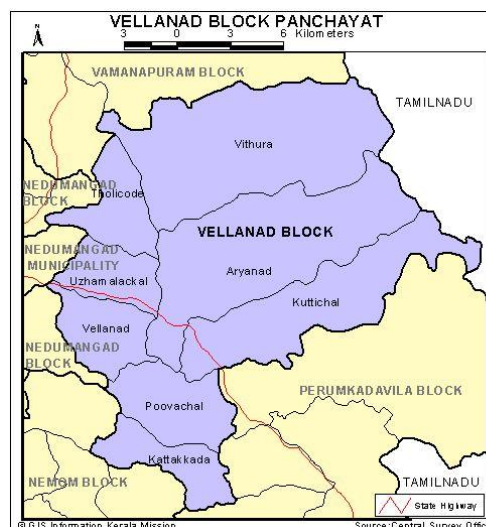
What is the prevalence of NCD risk factors among ‘Kani tribe’ in Thiruvananthapuram district?

2.3 STUDY DESIGN: Cross sectional survey

2.4 STUDY SETTING

The study was conducted in 12 Kani tribal settlements in Vithura panchayath, Vellanad block, Thiruvananthapuram district. Vithura panchayath was selected for the study, as it has got largest number of Kani settlements in Thiruvananthapuram district.

Figure 2. Map of Vellanad block panchayath showing Vithura panchayath.



Source: <http://sugkerala.in/vellanadblock/photo-gallery/map/>

2.5 STUDY POPULATION

Men and women of age group 25-64yrs who belongs to Kani tribe.

2.5.1 INCLUSION CRITERIA

1. Age group 25-64yrs
2. Who belongs to 'Kani tribe'

2.5.2 EXCLUSION CRITERIA

1. Debilitating illness and bed ridden

2.6 SAMPLING CRITERIA

Sampling was done using Cluster sampling. In this type of sampling method, the target population will be divided into clusters/groups and a subset of each cluster will be selected. Here in this study, tribal settlements in Vithura panchayath were taken as the cluster units.

2.7 SAMPLE SIZE ESTIMATION:

Sample size was calculated based on the prevalence of hypertension (40%), a leading NCD risk factor, from previous studies.¹²

With an anticipated prevalence of 40%¹² precision 8 percent and design effect of two, the required sample size is estimated as 289 which are rounded to 300. (Open Epi 3.01)

2.8 SAMPLE SELECTION PROCEDURE:

2.8.1 Cluster selection- There were 67 Kani settlements in Vithura panchayath as per the list obtained from Integrated Tribal Development Project (ITDP). On average there were 25 households in each settlement and they were taken as cluster units for the study. Total of twelve

settlements were randomly selected from the list of 67 Kani settlements in order to achieve the sample size of 300.

* One of the settlements, “Kallupara” was replaced due to practical reasons. It is sparsely populated, and has to be reached through a narrow mountain way, high mountains on one side and steep fall in the other side. It was substituted by another settlement that was selected at random from the list.

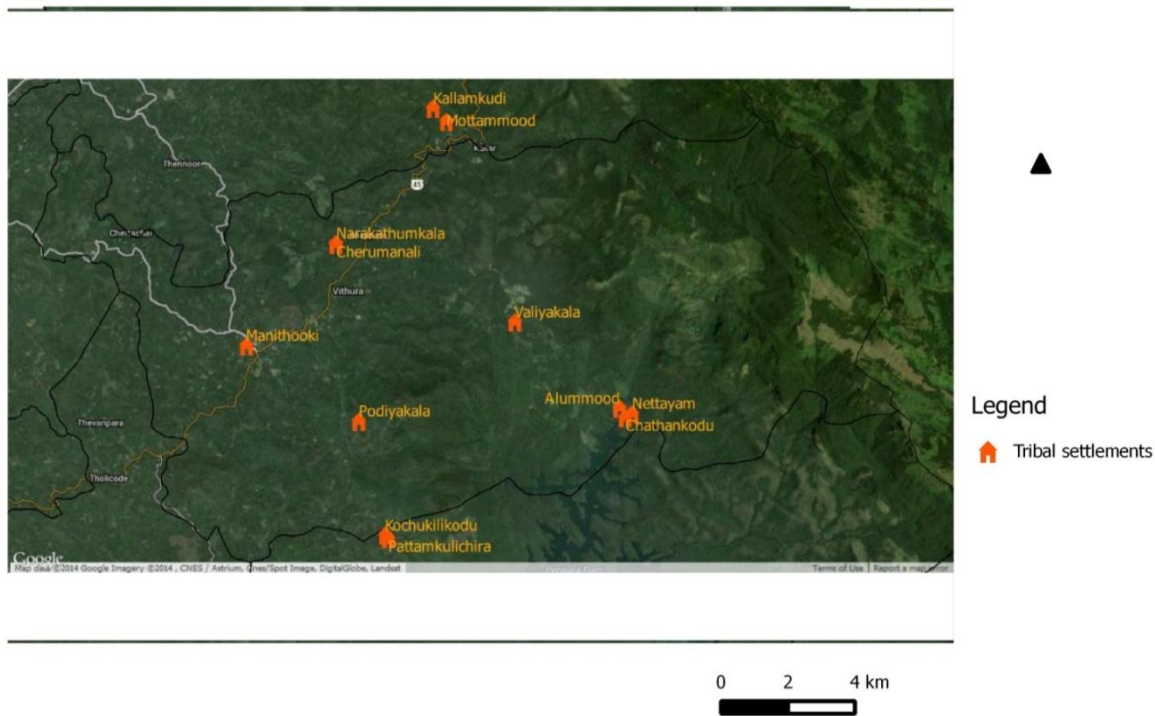
Table 1-List of 12 randomly selected Kani settlements

Sl No	Name of the settlement	Number of participants included
1	Kochukilikodu	26
2	Pattomkulichira	25
3	Manithooki	23
4	Narakathumkala	26
5	Chathankodu	26
6	Cherumanali	25
7	Mottammood	18
8	Kallamkudi	31
9	Podiyakala	26
10	*Nettayam	18
11	Valiyakala	28
12	Alummood	26
	TOTAL	300

*Kallupara was replaced by Nettayam.

Figure3: GIS map showing the settlements visited by the investigator.

Distribution of the selected Tribal settlements in Vithura GP



2.8.2 Household selection-The investigator went to the center of the selected settlement and selected the first household randomly by pen rotation method. Where ever there were two houses in front of the pen pointing direction, the house, which was on the right side, was selected. The investigator selected the subsequent houses by proceeding clockwise till the required sample size from each settlement was achieved.

2.8.3 Subject selection- One eligible subject from each household was selected using **KISH tables**. KISH method is a sampling method used for selecting an individual participant randomly from a household. It depends on the number of eligible individuals at the household.¹

KISH table was with the investigator during data collection. All the questionnaires were given serial numbers from 1-300. During the first household visit, the investigator listed out the age and sex of all eligible members in the households (men and women in the age group of 24-65 years) and ranked it based on decreasing age (oldest to youngest).

Eg:

Sex	Age	Rank
M	50	1
F	47	2
M	27	3
F	25	4

After that a questionnaire was selected randomly and noted the last digit of its serial number. Then by using the following KISH table, found out the digit matching last digit of the serial number (column) and the total number of eligible persons in the household (row). The person whose rank matched this number was the selected participant from that household.

Eg: If the serial number is 122 and total number of eligible persons in the household is 4, then

Last digit of the serial number=2

Total number of eligible persons in the household=4

Digit matching the column digit 2 and the row digit 4=3

The person ranked as 3 will be the selected participant from that household.

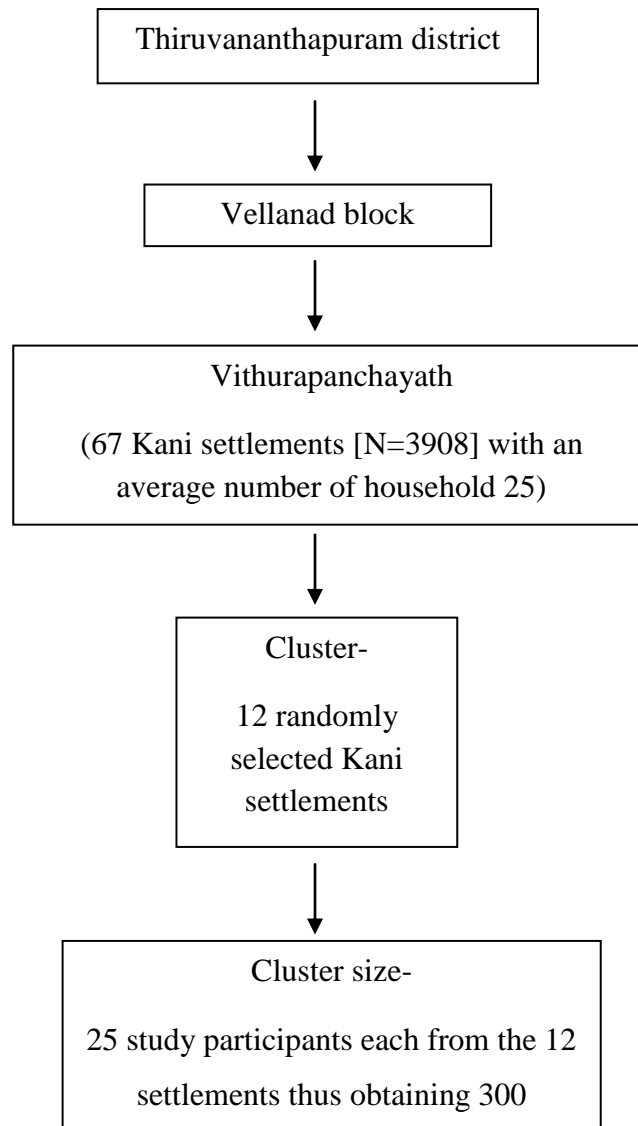
Table 2: Kish tables

Number of Eligible Persons in Household	Last Digit of the serial number in the questionnaire									
	0	1	2	3	4	5	6	7	8	9
1	1	1	1	1	1	1	1	1	1	1
2	1	2	1	2	1	2	1	2	1	2
3	3	1	2	3	1	2	3	1	2	3
4	1	2	3	4	1	2	3	4	1	2
5	1	2	3	4	5	1	2	3	4	5
6	6	1	2	3	4	5	6	1	2	3
7	5	6	7	1	2	3	4	5	6	7
8	1	2	3	4	5	6	7	8	1	2
9	8	9	1	2	3	4	5	6	7	8
10	9	10	1	2	3	4	5	6	7	8

WHO Kish tables¹

Thereafter from each house the ranking was done separate for male and female since the investigator's plan was to get equal number of men and women in her sample .The rest of the procedure was same as above. The investigator selected men and women alternatively from consequent household.

Figure4 - Schematic representation of sample selection.



2.9 DATA COLLECTION PROCESS

The data collection was done by the principal investigator over a period of 2^{1/2} months (15th June -31st August, 2014) assisted by the tribal promoters from ITDP. Structured interview schedule was employed using WHO “Step-wise approach for surveillance of NCD risk factors”. The questionnaire was administered in Malayalam, the local language of Kani tribes.

2.9.1 Data collection instrument

Structured interview schedule was employed using **WHO STEP-wise approach for surveillance of NCD risk factors (STEP 1 & STEP 2) Version 3.0**. This questionnaire included WHO Step 1 & 2 (core and some expanded) with items on family history of chronic diseases and socio economic status. STEP 1 and STEP 2 data were collected as per WHO guidelines.

Table 3- STEPS risk factors used for the study.

WHO STEP INSTRUMENT	CORE	EXPANDED
STEP 1 BEHAVIOURAL RISK FACTORS	Demographic information such as age, sex and highest level of education	Expanded demographic information like marital status and main work status.
	Tobacco use	Smokeless tobacco use
	Alcohol consumption	-----
	Fruit and vegetable consumption	Oil consumption
	Physical activity	Sedentary behavior
	History and treatment of raised blood pressure, diabetes and raised cholesterol History of cardio vascular disease, lifestyle advice and history of cervical cancer screening	-----
STEP 2 PHYSICAL MEASUREMENTS	Height ,weight, waist circumference and blood pressure	Heart rate

Instruments used for STEP 2 Physical Measurements:

- ❖ Height Measurement was done using:
 - ❖ TYLON non-stretchable height measuring tape. (Stanley 130656)
Accuracy-one millimeter
 - ❖ SECA 213 standalone stadiometer with accuracy of one millimeter.
- ❖ Weight Measurement was done using SECA 813 Electronic Flat weighing scale with accuracy of 100 grams.
- ❖ Waist circumference Measurement was taken using SECA constant tension tape (SECA 201) with accuracy of 0.1centimeter.
- ❖ Blood Pressure Measurement was taken using Digital sphygmomanometer. (OMRON HEM 7203).

2.9.2Procedures¹

2.9.2.1 Blood Pressure Measurement

Blood pressure measurement was done to find out the prevalence of hypertension among Kani tribe. As per WHO recommendation, the physical measurements (Step 2) were taken immediately after the Step 1 questionnaire. The participant was asked to sit for at least 15 minutes with his/her leg uncrossed. The blood pressure (BP) measurements were taken using OMRON digital sphygmomanometer. Medium size cuff was used because in pilot survey the investigator found it as suitable size for this tribal population. Left arm was used for BP measurement. BP was measured as per WHO guidelines. After obtaining first reading the investigator deflated the cuff fully and waited for other three minutes in between other two

readings. Thus total of three reading were recorded. The mean of second and third reading was calculated (Systolic blood pressure and diastolic blood pressure) during data analysis. **Heart rate** which was displayed along with blood pressure readings also was recorded along with this. During analysis the mean of second and third measurement of heart rate was calculated.

2.9.2.2. Height Measurement

The investigator at first started measuring height using SECA 213 standalone Stadiometer as per WHO guidelines .But found it difficult to carry all the way to each of the settlement due to the geographic constraints of the tribal settlements. Later investigator used TYLON non-stretchable height measuring tape (Stanley 130656) with accuracy one millimeter which is suitable for research purposes. The subject was asked to remove their footwear and cap if any. Then they were asked to stand straight on a flat surface, with feet together, knee straight and heels against the wall. The subject was then asked to look straight in such a way that eyes were in same level as ears. Using a hard board placed onto the head, marked the height against the wall. Then with the assistance of the tribal promoter measured the height in exact point (in centimeter) using TYLON non-stretchable height measuring tape.

2.9.2.3. Weight Measurement

The weight of the subject was measured after placing the scale on a flat and firm surface. The subject was asked to remove their foot wear, wear light clothing and step onto scale with one foot on each side of the scale. The subject was then asked to stand still, facing forward, placing arms on the side until asked to step off. Then the investigator recorded the weight in kilograms.

2.9.2.4. Waist-circumference

The procedure was explained to the subject prior to the measurement. Adequate privacy was provided during measurement. The measurement was taken over light clothing. The investigator located the last palpable rib and the top of the hipbone taking the participant's help to assist in locating these points on their body. Then the SECA constant tension tape was bound around themselves with their assistance. The tape was positioned at the midpoint of the last palpable rib and the top of the hipbone. It was made sure that the tape was horizontal across the back and front of the subject and was parallel with the floor as possible. Measurement was taken at the end of normal expiration.

2.11 DATA STORAGE AND ANALYSIS

After data entry, softcopy of the data were stored in the computer with password encryption of the file. The hard copy of the filled interview schedule and the consent form were strictly kept under lock and key with the principal investigator.

After the data entry in Epidata manager V1.4.4.6, the data were analyzed using software R statistical package 3.1.1 (R Foundation for Statistical Computing, Vienna, Austria)^{55,56} by the principal investigator. The data were analyzed for the prevalence of non-communicable disease risk factors (Tobacco use, alcohol consumption, low fruit and vegetable consumption, physical inactivity, abdominal obesity, overweight, self reported diabetes and hypertension) among the Kani tribe. Descriptive statistics of all variables were done. Further bivariate and multivariate analyses were done to find out the significant association between STEP1 &STEP 2 variables. Multivariate logistic regression analysis was carried out for dependent variable (hypertension) after adjusti

ng for independent variables (socio demographic factors and STEP 1 variables). Significance was tested at 95% confidence level with P value<0.05.

2.12 VARIABLES UNDER STUDY

DEPENDENT VARIABLES-

Non Communicable Disease risk factors such as;

- Tobacco use
- Alcohol use
- Inadequate fruit and vegetable consumption
- Physical inactivity
- Self reported diabetes
- Abdominal obesity
- Overweight
- Hypertension

INDEPENDENT VARIABLES;

- Demographic variables such as; Age, sex, marital status
- Socio economic variables such as; educational status, occupational status

2.13 STUDY DEFINITIONS

1. STEP 1 VARIABLES

i. Tobacco use variables:

- Current tobacco smokers- Smoked beedi, cigarettes or others within the past 30 days.
- Current users of smokeless tobacco- Used smokeless tobacco products such as chewing tobacco and betel leaves, snuff, kaini or others within the past 30 days.
- Current use of both smoked and smokeless tobacco- Used both smoked and smokeless form of tobacco within the past 30 days.

- Current use of any form of tobacco products- Used smoked or smokeless form of tobacco within the past 30 days.

ii. Alcohol consumption variable

- Ever consumed alcohol- Ever consumed any alcoholic drink such as beer, whisky, rum, gin, brandy or local preparations. “*Aayal*” is the local preparation in that area.
- Current use of alcohol- Consumption of alcohol within the past 30 days.
- Binge drinkers- Binge drinker was defined as \geq five standard drinks for men and \geq four standard drinks for women in one occasion at least once during the past 30 days.¹
- Standard drink- A standard drink is the amount of ethanol contained in standard glasses of beer, wine, fortified wine such as sherry, and spirits. The net alcohol content of a standard drink is generally 10 grams of ethanol but can vary between eight and 13 grams of ethanol depending on the country/site.(One standard drink=30 ml of spirit or 285 ml of regular beer).¹

iii. Fruits and vegetable consumption variable

- Data on fruits and vegetable consumption was traced in terms of ‘**Number of servings**’. One serving=80 grams of fruit and vegetable.
- One serving= One medium piece of fruit (banana, apple, guava, orange etc). Tubers such as potato were not included in the vegetable.
- Show cards were used to collect the data on fruits and vegetable consumption in a typical day. Information on oil intake was traced by asking about the type of oil they are most often using for their meal preparation.

- It is recommended that one should eat more than or equal to five servings of fruits and vegetable per day.¹

iv. Physical activity variable

- **STEPS physical activity questions represents Global Physical Activity Questionnaire (GPAQ) V2.**¹
- Physical activity was calculated based on intensity, duration and frequency of physical activity at three different domains such as activity at work, travel to and from places and recreational settings. Data on number of days spent and the duration of physical activity of these three domains were used for analysis.
- Intensity can be classified as vigorous and moderate intensity activities.
- Vigorous intensity activity=Activities which take hard physical effort and cause large increase in breathing or heart rate for at least 10 minutes. (Eg: heavy lifting, digging, running or playing football)
- Moderate intensity activity= Activities which take moderate physical effort and cause small increase in breathing or heart rate for at least 10 minutes. (Eg: brisk walking, carrying light loads, cycling or swimming)
- Total physical activity was measured using *Metabolic Equivalent Time per week (MET-minutes /week) which is the sum of total MET minutes of activity for each domain such as ‘work’, ‘travel to and from places’ and ‘recreation’.

MET value for vigorous activity=8

MET value for moderate activity=4

MET value for travel=4

*MET- One MET is defined as the energy used by a body when one sits quietly and is equivalent to a caloric consumption of one kcal/kg/hour. This unit is used to estimate the amount of oxygen used by body for a specific type of physical activity.⁵⁷

Equation:
Physical activity in MET-minutes/week= [(P2*P3*8)+ (P5*P6*4)+(P8*P9*4)+(P11*P12*8)+(P14*P15*4)]

WHO GPAQ analysis guide¹

P2,P3,P5,P6,P8,P9,P11,P12,P14 and P15 were question codes for STEP 1 physical activity questionnaire.

- The levels of physical activity were classified into three groups such as High, Medium and Low physical activity¹.
 - High physical activity: >=3000 MET-minutes/week
 - Medium physical activity: 600-2999 MET-minutes/week
 - Low physical activity:<600 MET-minutes/week
- WHO recommendations: An adult should do physical activity; an equivalent combination of vigorous and moderate intensity physical activity achieving at least 600 MET minutes in a week. It includes physical activity during work, transport and recreation. Individuals who do not meet the criteria of at least 600 MET- minutes /week were considered as “physically inactive”.¹

2. STEP 2 VARIABLES

v. Abdominal obesity:

International cutoff- Waist circumference ≥ 102 cm for men and ≥ 88 cm for women.⁵⁸

Asian cutoff - Waist circumference ≥ 90 cm for men and ≥ 80 cm for women.⁵⁹

Indian cutoff- Waist circumference ≥ 85 cm for men and ≥ 80 cm for women.⁶⁰

vi. Overweight:

According to WHO, overweight is defined as, *Body Mass Index(BMI) ≥ 25 kg/m².

Indian cutoff for overweight is BMI ≥ 23 kg/m².⁶⁰

*BMI=weight (kg)/height (m²)

BMI classification (WHO)¹

Underweight : < 18.50 kg/m²

Normal : 18.50-24.99 kg/m²

Overweight : 25-29.99 kg/m²

Obesity : ≥ 30 kg/m²

vii. Hypertension: Hypertension is defined as systolic blood pressure ≥ 140 mm of Hg or diastolic blood pressure ≥ 90 mm of Hg or currently taking any medication for hypertension.¹

- a. Participants who were aware of their hypertension status= Participants who are having the history of hypertension.
- b. Participants whose hypertension under control is those who are on medication and are Normotensives. (Systolic blood pressure < 140 mm of Hg and diastolic blood pressure < 90 mm of Hg).⁵⁷

viii. Combined Risk Factors:⁵⁷

The risk factors used to estimate the combined risk are as follows;

- a. Current daily smokers
- b. Less than five servings of fruit and vegetables per day
- c. Low level of activity (< 600 METmts/week)

- d. Overweight or obese ($BMI \geq 25 \text{ kg/m}^2$)
- e. Raised Blood pressure (SBP ≥ 140 mm of Hg or DBP ≥ 90 mm of Hg or Hypertension on treatment)

If \geq **Three** above mentioned **risk factors** present, then the person is at **high risk**.

If \leq **Three** above mentioned **risk factors** present, then the person is at **low risk**.

2.14 ETHICAL CONSIDERATIONS

Ethical clearance was obtained from Institutional Ethics Committee, SCTIMST, Thiruvananthapuram (IEC RegnNo.ECR/189/Inst/KL/2013). The support and co-operation were obtained from Integrated Tribal Development Project (ITDP), Nedumangad, Thiruvananthapuram.

Consent

Informed written consent was obtained from the subject prior to the start of the interview (In local language Malayalam) after the doubt was being clarified to the subject. Participation in the study was voluntary. The subject had the freedom to refuse answering questions or opt out of the study at any stage of the research.

Privacy and confidentiality

Privacy and confidentiality of the subject was honored. During physical measurements, adequate privacy was provided. The personal information like name, address and contact number were separated and maintained strictly confidential under the investigator's custody. The soft copy and hard copy of the data were stored under safe custody of the

investigator. The data will be stored for two years for any further references and clarifications.

Individual's cultural and traditional autonomy was given due respect. The interview was conducted at house /work place, whichever the respondent chooses and as per their availability. The adverse findings detected (Raised blood pressure with Systolic blood pressure ≥ 140 mm of Hg or diastolic blood pressure ≥ 90 mm of Hg) were revealed to the respondent. After being given lifestyle advices for the same, the investigator advice them to visit the nearest PHC (Vithura PHC) for further management.

2.15 FUNDING

The study was funded by Kerala State Council for Science, Technology and Environment(KSCSTE), Department of science and technology, Government of Kerala, Thiruvananthapuram, Kerala.(File No. 80/SPS-52.2014/CSTE)

CHAPTER 3

RESULTS

The results of the data analysis are described in this chapter. Out of 311 selected study subjects contacted, 300 consented to participate in the study with a response rate of 96.4 percent. Two subjects were found to be outlier and were excluded from the general analysis as their anthropometric parameters like weight, height and blood pressure measurements were higher by more than two standard deviations from the rest. The non responders were not different from the study subjects in their demographic characteristics.

3.1 BASELINE CHARACTERISTICS

Baseline characteristics are described under following domains.

1. Socio demographic profile
2. Prevalence of NCD risk factors among the Kani tribe.
3. Tobacco consumption
4. Alcohol consumption
5. Fruit and vegetable consumption
6. Physical activity
7. Sedentary behavior
8. Height ,weight, waist circumference and BMI
9. Systolic blood pressure and diastolic blood pressure
10. Hypertension
11. Abdominal obesity
12. Overweight

13. Treatment history of chronic diseases among the Kani tribe
14. Awareness, treatment and control of hypertension
15. History of chest pain on exertion and history of cervical cancer screening
16. Combined risk factors

3.1.1 SOCIO DEMOGRAPHIC PROFILE

Equal number of men and women were studied. The mean and the standard deviation (SD) of age of the study participants were 42.21 and 11.47 years respectively. The age sex distribution is given in table 4.

Table 4- Age and sex distribution among the tribal participants

VARIABLE	MALE N=149 (%)	FEMALE N=149 (%)	TOTAL N=298 (%)
AGEGROUP			
25-34 yrs	50 (33.6)	44 (29.5)	94 (31.5)
35-44 yrs	36 (24.2)	42 (28.2)	78 (26.2)
45-54 yrs	35 (23.5)	33 (22.1)	68 (22.8)
55-64 yrs	28 (18.8)	30 (20.1)	58 (19.5)

Educational status- Among the tribals, 25.5 percent had completed primary school and 50percent their high school. Only 11.4 percent had education above high school level. Only 13.1 percent were having no formal education. (Table 5) There was not much difference between men and women in their education level.

Socioeconomic status- In the total sample, 89.3 percent were belonged to below poverty level. (Table 5)

Table 5- Education and socio economic status among the Kani tribe

VARIABLE	TOTAL
	N=298 (%)
EDUCATION	
No formal education	39 (13.1)
Primary school	76 (25.5)
High school	149 (50)
Higher secondary	26 (8.7)
Diploma after higher secondary/graduate	8 (2.7)
SOCIO ECONOMIC STATUS	
Below Poverty Level(BPL)	266 (89.3)
Above Poverty Level (APL)	32 (10.7)

Context specific Work status-

Among the study subjects, 29.53 percent were daily wage earners doing labor works .One forth (25.17%) attended domestic duties and 14.4 percent were doing Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). More men were involved in labor works and rubber tapping than women. Similarly more women were engaged in domestic works than men.

The percentages of farmers were only four percent and those who are doing traditional handicrafts (“Eera works”) are only 1.34 percent. (Table 6)

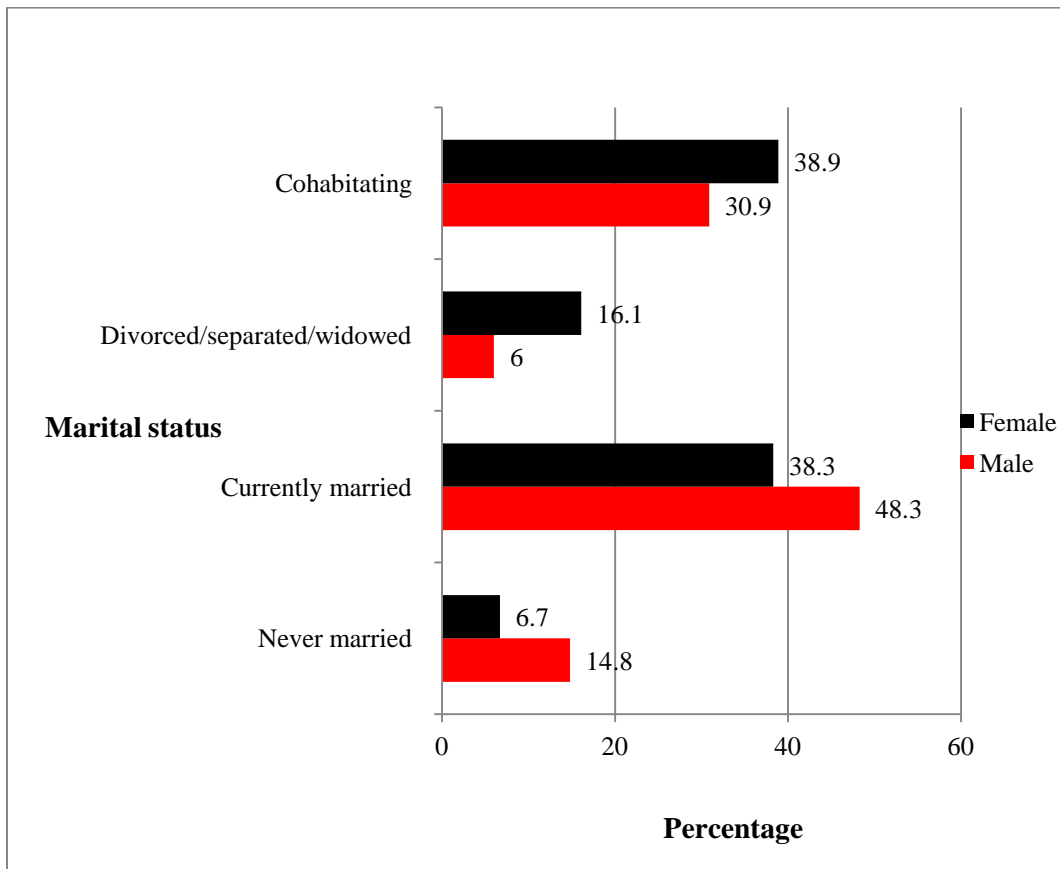
Table 6- Context specific work status of the Kani Tribe

VARIABLE	MALE N=149 (%)	FEMALE N=149 (%)	TOTAL N=298 (%)
CONTEXT SPECIFIC OCCUPATION			
Labor works	70 (46.98)	18 (12.1)	88 (29.53)
Attended domestic duties	7 (4.6)	68 (45.6)	75 (25.17)
Mahatma Gandhi National Rural Employment Guarantee Act(MGNREGA)	7 (4.6)	36 (24.2)	43 (14.4)
Rubber tapping	22 (14.77)	0	22 (7.38)
Regular wage employee	7 (4.6)	7 (4.6)	14 (4.7)
Engaged in free collection of goods(minor forest product collection)	2 (1.3)	11(7.4)	13 (4.36)
Farmers	11 (7.4)	1 (0.6)	12 (4)
Available for work	6 (4)	3 (2)	9 (3)
Unpaid family worker	6 (4)	2 (1.34)	8 (2.7)
Traditional handicrafts	4 (2.68)	0	4 (1.34)
Others	10 (6.66)	0	10 (3.28)

Marital status-

Just less than half (43.3%) were currently married and 34.9% were cohabiting. More women were cohabiting than men (38.9%). (Figure 5)

Figure5: Marital status among the Kani tribe



Family history

Among the total sample, 23.5 percent had history of hypertension and 17.8 percent had history of respiratory problems. (Table 7)

Table7-Family history of chronic diseases among the Kani tribe

VARIABLE	TOTAL N=298 (%)
Hypertension	70 (23.5)
Heart attack	29 (9.7)
Diabetes	23 (7.7)
Respiratory problems	53 (17.8)
Cancer	17 (5.7)

3.2 PREVALENCE OF NCD RISK FACTORS AMONG THE KANI TRIBE

The prevalence of hypertension among Kani tribe was 48.3 percent. The prevalence of abdominal obesity was 22.1 percent. Among the Kani tribe, 37.9 percent were current users of tobacco and 81.5 percent were using any form of tobacco. Among the Kani tribe, 32.2 percent were current alcohol users. The proportion of those who were involved in high physical activity was 77.2 percent. There is no sufficient intake of fruits and vegetables among the Kani tribe. All of them were consuming less than five servings per day. Among the whole subjects, 15.4 percent were not at all consuming at least one serving of fruit and vegetable. (Table 8)

Table 8- Prevalence of NCD risk factors among the Kani tribe

VARIABLE	PREVALENCE(N=298)	CONFIDENCE INTERVAL
HYPERTENSION	144 (48.3%)	46-57.3
OVERWEIGHT	32 (10.7%)	7.7-14.8
ABDOMINAL OBESITY	66 (22.1%)	17.8-27.2
COMBINED RISK FACTORS -HIGH RISK	84 (28.2%)	23.4-33.5
CURRENT TOBACCO USE	113 (37.9%)	32.6-43.5
CURRENT SMOKELESS TOBACCO USERS	226 (75.8%)	70.7-80.4
CONSUMPTION OF ANY FORM OF TOBACCO	243 (81.5%)	76.7-85.5
CONSUMPTION OF BOTH FORM OF TOBACCO	96 (32.2%)	27.2-37.7

VARIABLE		PREVALENCE(N=298)	CONFIDENCE INTERVAL
CURRENT ALCOHOL USERS		108 (36.2%)	31-41.8
PHYSICAL ACTIVITY	HIGH	230 (77.2%)	72.1-81.6
	MEDIUM	39 (13.1%)	9.7-17.4
	LOW	29 (9.7%)	6.9-13.6
BMI	UNDERWEIGHT	67 (22.5%)	18.1-27.6
	NORMAL	199 (66.8%)	61.2-71.9
	OVERWEIGHT	30 (10.1%)	7.1-14.0
	OBESE	2 (0.7%)	0.2-2.4
FRUIT AND VEGETABLE CONSUMPTION	>=FIVE SERVINGS	0	---
N=252	<FIVE SERVINGS	252 (100%)	98.5-100

3.2.1 Tobacco use

Among the total sample, 37.9 percent were current smokers. Current smokers among men and women were 69.1 percent and 6.7 percent respectively. Of the total sample, 32.6 percent were current daily smokers.

Of the total study participants, 75.8 percent were current users of smokeless tobacco. The prevalence of current use of smokeless tobacco among men and women were 81.9 percent and 69.8 percent respectively. It was found that 61.7 percent among men and 58.4 percent among women were using smokeless tobacco daily. Among total sample, 81.5 percent used any form of tobacco and 32.2 percent consumed both forms of tobacco. Predominant form of tobacco smoking was *beedi*. But a few were using *Kanjavu* for smoking. The main smokeless form of tobacco in this tribal area was betel leaves along with tobacco leaves. But some were using *sambhu*, *chukka churut* and *thambak* as smokeless form of tobacco. (Table 9)

Table 9- Tobacco use among the Kani tribe

VARIABLE	MALE	FEMALE	TOTAL
	N=149 (%)	N=149 (%)	N=298 (%)
Current smokers (tobacco use within past 30 days)	103(69.1)	10(6.7)	113(37.9)
Current daily smokers	90(60.4)	7(4.7)	97(32.6)
Current users of smokeless tobacco products(smokeless tobacco use within past 30 days)	122(81.9)	104(69.8)	226(75.8)
Current daily users of smokeless tobacco	92(61.7)	87 (58.4)	179(60.1)
Current users of both smoked and smokeless tobacco	87(58.4)	9(6)	96(32.2)
Current users of any form of tobacco	138(92.6)	105(70.5)	243(81.5)

Age of initiation of tobacco

Mean and standard deviation (SD) age of initiation of tobacco smoking was 20 years and six years respectively with a range of 5-40 years. Mean and standard deviation (SD) age of initiation of smokeless tobacco use was 24.4 years and 10.75 years respectively with a range of 4-60 years.

In India, legal age of purchase of tobacco products is 18 years. Percentage of initiation of tobacco products among Kani tribe before and after legal age of purchase was shown below in the table10.

Table 10- Age of initiation of tobacco among the Kani tribe

AGE OF INITIATION(TOBACCO)	FREQUENCY (%)
Tobacco smoking	
<18yrs	34 (30.4)
≥18 yrs	78 (69.6)
All	112 (100)
Smokeless tobacco	
<18 yrs	52 (23.1)
≥18 yrs	173 (76.9)
All	225 (100)

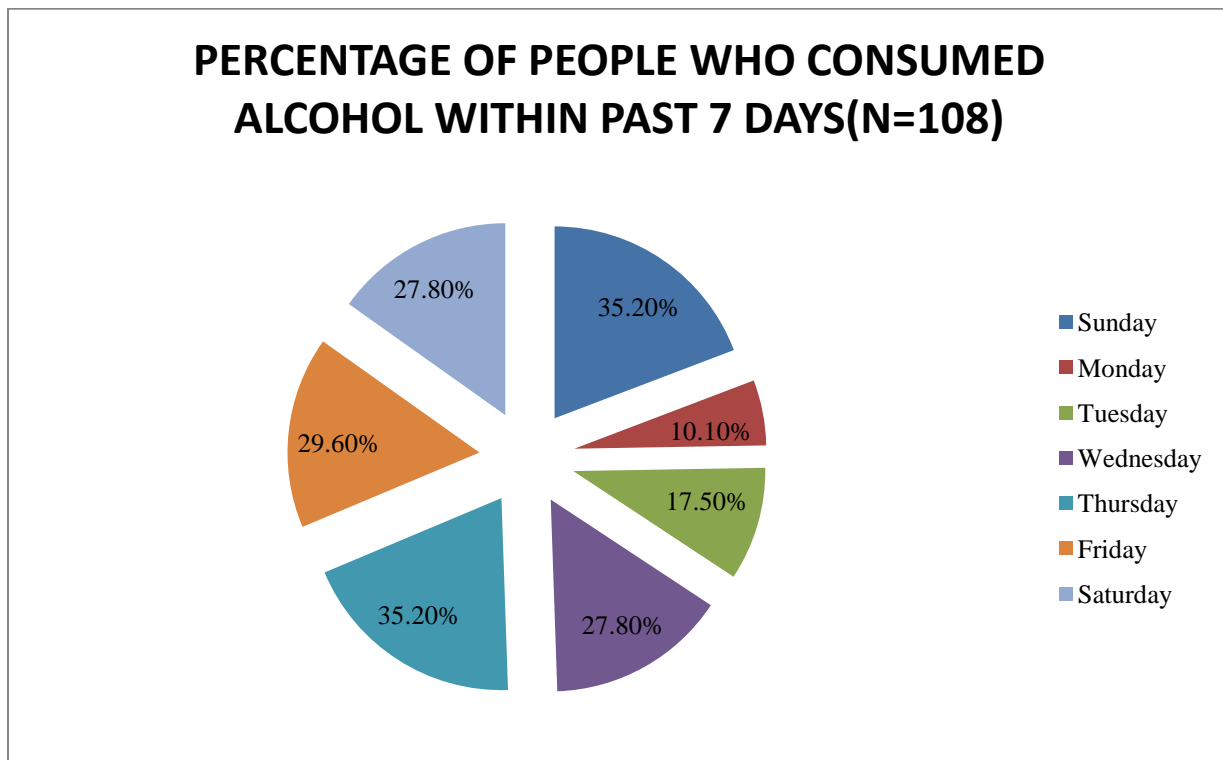
3.2.2 Alcohol consumption

The prevalence of current alcohol users among total study participants were found to be 36.2 percent. Among men the prevalence of current use of alcohol was 66.4 percent and among women it was six percent. Among the sample 82.6 percent of men and 27.5 percent of women had ever consumed alcohol. There were no binge drinkers among women but among men 13.4 percent were binge drinkers as per the study definition of binge drinking. (Table 11) Most of the tribals were using foreign beverages like brandy, rum and beer. Only a few people were using their local preparation of alcohol (“*Aayal*”). Mean and standard deviation (SD) years of alcohol consumption among tribals were 18 years and 10.36 years respectively with a range of 1-50 years.

Table 11- Alcohol consumption among the Kani tribe

VARIABLE	MALE	FEMALE	TOTAL
	N=149 (%)	N=149 (%)	N=298 (%)
Ever consumed alcohol	123 (82.6)	41 (27.5)	164 (55)
Current alcohol users (Alcohol consumption within past 30 days)	99 (66.4)	9 (6)	108 (36.2)
Binge drinkers(≥ 5 standard drinks for male and ≥ 4 standard drinks for female in one occasion at least once during past 30 days)¹	20 (13.4)	0	20 (6.7)

Figure 6-Percentage of people who consumed alcohol within past seven days.



Percentage of people who consumed alcohol within past one week was more on Sunday and Thursday. And percentage of people who consumed alcohol was least on Monday.

3.2.3 Fruits and vegetable consumption-

Among the total tribal participants, no one was consuming at least five servings of fruits and vegetables per day. Among the total sample 15.4 percent were not at all consuming fruits and vegetables. All others (84.6%) were consuming less than five servings of fruits and vegetables per day. (Table 12)

Table 12- Fruit and vegetable consumption among the Kani tribe

	MALE	FEMALE	TOTAL
VARIABLE	N=149 (%)	N=149 (%)	N=298 (%)
≥ 5 servings per day*	0	0	0
<5 servings per day*	125 (83.9)	127 (85.2)	252 (84.6)
Non users	24 (16.1)	22 (14.8)	46 (15.4)

Mean and standard deviation, number of servings of fruit consumption per day was 1.38 and 0.55 respectively. Mean and standard deviation number of servings of vegetable consumption per day was 1.97 and 0.28 respectively. (Table 13)

Table 13- Mean values for fruits and vegetable consumption

VARIABLE	MEAN(SD)	RANGE
Mean number of days fruit consumed	2.52 ± 1.95	0-7
Mean number of servings of fruit consumption per day	1.38 ± 0.55	1-3
Mean number of days vegetables consumed	4.76 ± 2.16	0-7
Mean number of servings of vegetable consumption per day	1.97 ± 0.28	1-4

Oil consumption among Kani tribe was as follows. Among total tribals, 81.2 percent were using only coconut oil for their cooking purpose and 17.1 percent were using both coconut oil and palm oil. (Table 14)

Table 14- Oil consumption among the Kani tribe

VARIABLE	TOTAL N=298 (%)
TYPE OF OIL	
Coconut oil only	242 (81.2)
Coconut oil and palm oil	51 (17.1)
Others(none and vegetable oil)	5 (1.7)

3.2.4 Physical activity-

Mean and standard deviation physical activity among the tribals were 8913.1 and 7581.3 MET minutes/week respectively. Among the total tribals, 77.7 percent were involved in high physical activity and 13.1 percent in moderate physical activity. Among the whole study subjects, 9.7 percent were physically inactive or not meeting the WHO criteria of at least 600 MET minutes/week. The proportion of men involved in high physical activity (83.2%) was more than women (71.1%). The proportion of women involved in moderate physical activities was (18.8%) more than men (7.4%). There were not much difference between men and women who were physically inactive. (Table 15)

Table 15- Physical activity among the Kani tribe

VARIABLE	MALE	FEMALE	TOTAL
	N=149 (%)	N=149 (%)	N=298 (%)
High Physical activity(>=3000METmts/week)	124 (83.2)	106 (71.1)	230 (77.2)
Medium Physical activity (600-2999METmts/week)	11 (7.4)	28 (18.8)	39 (13.1)
Low Physical activity (<600METmts/week)	14 (9.4)	15 (10.1)	29 (9.7)

Sedentary behavior

The mean and standard deviation (SD) time spent sitting or reclining per day among the whole sample was 4 hour 52 minutes 11 seconds and 2 hour 42 minutes 14 seconds respectively with a range of 15 minutes -12 hours. (Table 16)

Table 16- Sedentary behavior

VARIABLE	MEAN(SD)	RANGE
Sedentary behavior(time spent sitting or reclining on a typical day)(in hr)	4:52:11 ± 2:42:14	00:15:00 - 12:00:00

3.2.5 Height, weight, waist circumference and BMI

Mean \pm Standard deviation, height and weight among Kani tribe was 153.25 ± 9.38 and 48.86 ± 9.12 respectively. Mean and standard deviation, waist circumference was 75.13 and 10.29 respectively. Mean and standard deviation BMI in the whole sample was 20.76 and 3.20 respectively. (Table 17)

Table 17- Mean values of height, weight, waist circumference and BMI among the Kani tribe

VARIABLE	MEAN(SD)	RANGE
Height(cm)	153.25 ± 9.38	129-182
Weight(kg)	48.86 ± 9.12	26.90-77.50
Waist circumference(cm)	75.13 ± 10.29	50-114
BMI(kg/m²)	20.76 ± 3.20	14.27-33.74

3.2.6 Systolic blood pressure, diastolic blood pressure

Mean \pm standard deviation systolic blood pressure (SBP) and diastolic blood pressure (DBP) among Kani tribe was 134.54 ± 20.73 and 82.94 ± 11 respectively. (Table 18)

Table 18- Mean values of SBP and DBP among the Kani tribe

VARIABLE	MEAN(SD)	RANGE
SBP(mm of Hg)	134.54 ± 20.73	91.50-221.50
DBP(mm of Hg)	82.94 ± 11	49.50-118

3.2.7 Hypertension

The prevalence of hypertension among Kani tribe was found out to be 48.3 percent. Among men the prevalence was 55 percent and among women it was 41.6 percent. (Table 19)

Table 19-Hypertension among the Kani tribe

VARIABLE	MALE	FEMALE	TOTAL
	N=149 (%)	N=149 (%)	N=298 (%)
Hypertensive	82 (55)	62 (41.6)	144 (48.3)
Non hypertensive	67 (45)	87 (58.4)	154 (51.7)

3.2.8 Overweight

As per the WHO cut off of overweight ($BMI \geq 25\text{kg/m}^2$), the prevalence of overweight among Kani tribe was 10.8 percent. Among men and women, it was 1.3 percent and 14.8 percent respectively. The proportion of underweight was 22.5 percent and it was almost the same for both men and women. (Table 20) According to Indian cutoff of 23 kg/m^2 , the prevalence of overweight among Kani tribe was 20.1 percent. Here also, the prevalence is more among women (28.2%) than men (12.1%).

Table 20- Classification of BMI among the Kani tribe

VARIABLE	MALE	FEMALE	TOTAL
	N=149 (%)	N=149 (%)	N=298 (%)
BMI(kg/m²)			
Underweight(<18.50kg/m²)	33 (22.1)	34 (22.8)	67 (22.5)
Normal (18.5-24.99kg/m²)	106 (71.1)	93 (62.4)	199 (66.8)
Overweight(25-29.99kg/m²)	9 (6)	21 (14.1)	30 (10.1)
Obesity(≥30 kg/m²)	1 (0.7)	1 (0.7)	2 (0.7)

3.2.9 Abdominal obesity

The prevalence of abdominal obesity was 22.1 percent among the Kani tribe as per Asian cut off value for waist circumference (90 cm for men and 80 cm for women). The prevalence as per Indian cut off value for waist circumference (85cm for men and 80 cm for women) was 27.9 percent. The prevalence of abdominal obesity was more among women than men throughout all the cutoffs. (Table 21)

Table 21- Abdominal obesity among the Kani tribe

VARIABLE	MALE	FEMALE	TOTAL
	N=149 (%)	N=149 (%)	N=298 (%)
International cutoff (*wc-102 cm for male and 88 cm for female)	2 (1.3)	22 (14.77)	24 (8.05)
Asian cutoff(wc-90 cm for male and 80 cm for female)	9 (6)	57 (38.26)	66 (22.1)
Indian cutoff(wc-85 cm for male and 80 cm for female)	26 (17.44)	57 (38.26)	83 (27.9)

*wc-waist circumference

3.3 Treatment history of chronic diseases among the Kani tribe

Among the Kani tribe, 77.5 percent had ever measured blood pressure, 19.1 percent were aware of their hypertension, 7.4 percent were on treatment and six percent were on herbal remedies for their increased blood pressure levels. Only two percent were consulted a traditional healer for their hypertension. Among the Kani tribe, only five percent and 12.5 percent were aware of their diabetes and high cholesterol level respectively. (Table 22)

Table 22- Treatment history of chronic diseases among the Kani tribe

	History of blood pressure N=298(%)	History of diabetes N=298(%)	History of cholesterol N=298(%)
Ever measured	231 (77.5)	195 (65.4)	146 (49)
Ever told(Aware)	57 (19.1)	15 (5)	37 (12.4)
On treatment	22 (7.4)	6 (2)	12 (4)
Seen traditional healer	7 (2.3)	4 (1.3)	3 (1)
On herbal remedy	18 (6)	7 (2.3)	9 (3)

3.4 Awareness treatment and control of hypertension

This study revealed that 57 subjects (19.1%) were aware of their hypertension status and only 22 subjects (7.4%) were on treatment for the same. Among those who were on treatment for hypertension, those who were on allopathic medicine and herbal medicine were 13 and 18 respectively in number. Those who were taking both allopathic and herbal medicine were nine in number. Only two person among those who were on treatment of hypertension were controlled their hypertension. (Table 23)

Table 23- Awareness, treatment and control of hypertension

Variable	Aware	*Treated			**Controlled
		22			
Hypertension	57	Allopathic	Herbal	Both	2
				13	
Total	298	22	22	22	22

*Those that are on treatment.
 **Controlled-Normotensives among those who are on treatment.

Table 24 - Hypertensives on treatment, normotensives on treatment and hypertensives not on treatment among the Kani tribe.

VARIABLE	MALE	FEMALE	TOTAL
Elevated BP and not on treatment (SBP >=140 or DBP >=90 and BP on treatment =0)	79(53)	58(38.9)	137(46)
Normotensive and on treatment (SBP<140 and DBP <90 and BP on treatment =1)	0	3(2)	3(1)
Elevated BP and on treatment (SBP >=140 or DBP >=90 and BP on treatment =1)	69(46.3)	52(34.9)	121(40.6)

3.5 History of chest pain on exertion

Among the tribals, 30.2 percent reported history of chest pain on exertion. More women were having history of chest pain on exertion (34.2%) than men (26.2%).

3.6 History of cervical cancer screening

Only one person had done cervical cancer screening (6.7%) among tribals.

3.7 COMBINED RISK

Among the tribals, 28.2 percent were at high risk for developing NCDs. Men were found to be at higher risk than women. All the study subjects had at least one of the risk factors present. (Table 25)

Table 25-Combined risk* among the Kani tribe

VARIABLE	MALE	FEMALE	TOTAL
	N=149 (%)	N=149 (%)	N=298 (%)
High risk(≥ 3 risk factors)	63(42.3)	21(14.1)	84(28.2)
Low risk(< 3 risk factors)	86(57.7)	128(85.9)	214(71.8)
Presence of none of the risk factors	0	0	0

*Risk factors used to estimate combined risk are current daily smokers, less than five servings of fruit and vegetables per day, low level of activity(< 600 MET minutes/week), overweight or obesity($BMI \geq 25$ kg/m²) and raised blood pressure($SBP \geq 140$ mm of Hg or $DBP \geq 90$ mm of Hg or Hypertension on treatment)⁵⁷

3.8 RESULTS OF BIVARIATE ANALYSIS

Bivariate analysis (Chi square test) was done using hypertension, abdominal obesity, over weight and combined risk factors as outcome variable. Association between dependent variables and independent variables were done using R statistical package 3.1.1.^{55,56} (Table 26)

HYPERTENSION-

Bivariate analysis showed that the prevalence of hypertension was significantly different among different age groups ($p < 0.001$). Prevalence of hypertension increases with age. The prevalence of hypertension was significantly different between men and women; current tobacco users and non-users; current smokeless tobacco users and non-users; current users of both forms of tobacco and non-users; current users of any form of tobacco and non-users; current users of alcohol and non-users. (Table 26)

ABDOMINAL OBESITY-

The risk of abdominal obesity was significantly different between men and women; all categories of tobacco users and non-users; current users of alcohol and non-users. (Table 26)

OVERWEIGHT-

Prevalence of overweight was significantly different between men and women; current users of any form of tobacco and non-users. (Table 26)

COMBINED RISK FACTORS-HIGH RISK

High risk for developing NCDs (High risk ≥ 3 risk factors) was significantly different between men and women; current tobacco users and non-users; current users of both forms of

tobacco and non-users; current users of any form of tobacco and non-users; current users of alcohol and non- users and among physical inactivity groups. (Table 26)

Table 26-Results of Bivariate analysis

		HYPERTENSION	ABDOMINAL OBESITY	OVERWEIGHT	COMBINED RISK FACTORS-HIGH RISK
Age group	25-34 yrs (N=94)	21(22.3)	19(20.2)	9(9.6)	12(12.8)
	35-44 yrs (N=78)	38(48.7)	20(25.6)	11(14.1)	20(25.6)
	45-54 yrs (N=68)	39(57.4)	15(22.1)	7(10.3)	22(32.4)
	55-64 yrs (N=58)	46(79.3)	12(20.7)	5(8.6)	30(51.7)
	P value	<0.001	0.8	0.7	<0.001
Sex	Male (N=149)	82(55)	9(6)	10(6.7)	63(42.3)
	Female (N=149)	62(41.6)	57(38.3)	22(14.8)	21 (14.1)
P value		0.02*	<0.001	0.02*	<0.001
Current tobacco use	Users (N=113)	66(58.4)	8(7.1)	9(8)	64(56.6)
	Non-users (N=185)	78(42.2)	58(31.4)	23(12.4)	20(10.8)
P value		0.01**	<0.001	0.2	<0.001
Current smokeless tobacco use	Users (N=226)	116(51.3)	42(18.6)	20(8.8)	64(28.3)
	Non-users (N=72)	28(39.9)	24(33.3)	12(16.7)	20(27.8)
P value		0.06	0.008**	0.06	0.92
Current use of both forms of tobacco	Users (N=96)	56(58.3)	7(7.3)	8(8.3)	52(54.2)
	Non-users (N=202)	88(43.6)	59(29.2)	24(11.9)	32(15.8)
P value		0.02*	<0.001	0.36	<0.001
Current use of any form of tobacco	Users (N=243)	126(51.9)	43(17.7)	21(8.6)	76(31.3)
	Non-users (N=55)	18(32.7)	23(41.8)	11(20)	8(14.5)
P value		0.01**	<0.001	0.01**	0.01**

		HYPERTENSION	ABDOMINAL OBESITY	OVERWEIGHT	COMBINED RISK FACTORS
Current use of alcohol	Users (N=108)	60(55.6)	6(5.6)	6(5.6)	48(44.4)
	Non-users (N=56)	31(55.4)	11(19.6)	8(14.3)	15(26.8)
P value		0.02*	<0.001	0.09	<0.001
Physical activity	High Physical activity(N=230)	108(47)	47(20.4)	25(10.9)	57(24.8)
	Medium Physical activity(N=39)	19(48.7)	13(33.3)	5(12.8)	7(17.9)
	Low Physical activity(N=29)	17(58.6)	6(20.7)	2(6.9)	20(69)
P value		0.5	0.2	0.7	<0.001

***p<0.05, **p<0.01**

3.9 RESULTS OF MULTIVARIATE ANALYSIS FOR HYPERTENSION

To find out the individual factors associated with hypertension, multivariate regression analysis (Logistic Regression analysis) was performed using age group, sex, education, socioeconomic status, current tobacco smoking, current smokeless tobacco use, current use of both forms of tobacco, current use of alcohol and physical activity groups as independent variable and hypertension as dependent variable. After adjusting for the above variables, it was found that age group and current alcohol consumption were positively associated with hypertension and education was negatively associated with hypertension.

As compared to 25-42 yrs age group, the risk of developing hypertension was 2.28 (OR=2.28, CI=1.03-5.03) times higher among 42-65 years and this association was significant at five percent level.

The risk of developing hypertension was 9.43 (OR=9.43, CI=1.11-80.28) times higher among users of alcohol as compared to non-users and this association was significant at five percent level.

Those with higher education (\geq High school level) had lower odds of having hypertension (OR=0.27 CI=0.08-0.87) when compared to those with education less than high school level. This association was significant at five percent level. (Table 27)

Table 27- Results of multivariate logistic regression (Hypertension as outcome variable)

VARIABLES		CRUDE OR(95%CI)	ADJUSTED OR(95%CI)
(DEMOGRAPHIC AND STEP 1 VARIABLES)			
Age group	<Mean Age#	1	1
	>Mean age	2.48 (1.31,4.69)	2.28 (1.03,5.03)*
Sex	Female	1	1
	Male	1.09 (0.37,3.21)	0.52 (0.08,3.45)
Education	<High school level	1	1
	≥High school level	0.38 (0.19,0.79)	0.27 (0.08,0.87)*
Socio economic status	BPL	1	1
	APL	0.86 (0.17,4.26)	1.96 (0.21,18.3)
Current tobacco consumption	Non-users	1	1
	Users	1.76 (0.6,5.15)	1.19 (0.03,45.8)
Current use of smokeless tobacco	Non-users	1	1
	Users	1.67 (0.42,6.56)	0.46 (0.01,14.12)
Current use of both forms of tobacco	Non-users	1	1
	Users	1.85 (0.63,5.38)	1.42 (0.03,71.29)
Current alcohol consumption	Non-users	1	1
	Users	1.54 (0.54,4.45)	9.43 (1.11,80.28)*

***p<0.05, **p<0.01. #Mean age=42years**

CHAPTER 4

DISCUSSION AND CONCLUSION

The present study has revealed high prevalence of NCD risk factors among the Kani tribe in Thiruvananthapuram district, Kerala. Among the 298 subjects, the prevalence of hypertension was found to be much higher (48.3%) than the general population. This is one of the first studies using the WHO step-wise approach to find out the prevalence of NCD risk factors among tribes in Kerala.

4.1 Characteristics of the sample and the Kani tribal context:

Same number of men and women were enrolled in the study. The age group chosen for the study was 25-64 years as per WHO recommendation. Most of the Kani settlements were difficult to access areas with mountains and steep terrain.

There is an apparent shift from food crops to cash crops among the Kani tribe. Earlier they were mainly engaged in agriculture and traditional handicrafts (“Eera” works) for their livelihood. Now the proportion of farmers and “Eera” workers have come down to four percent and 1.34 percent respectively and most of the men undertake daily wage labor and rubber tapping for the livelihood. More women were engaged in Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) than men. However most women were homemakers doing their household chores. Most of them were living in huts made of “Eera” leaves and mud bricks. People from settlements such as “Chathankodu” and “Podiyakala” were unable to cultivate any vegetables because of nuisance of wild animals such as wild elephant, wild pig, monkey and tiger.

Though Kani tribe is the most educated tribal group in Kerala, only 11.4 percent had education above high school level. One tenth (13.1%) have no formal education.

Most of the Kani children quit schooling at the high school level and go for labor works to earn livelihood to support their family.

Among the Kani tribe, 34.9 percent were cohabiting. Some of the participants mentioned money constraint as the reason for cohabitation. On exploration it was found that there exists a “Dowry system” (“Penpanam/Athyarapanam”) among the Kani tribe, wherein the bridegroom has to give money to the bride’s family.⁶⁴

Practical difficulties:

Due to some logistic issues the investigator couldn’t strictly adhere to the KISH tables (Availability of men in the households was less due to their work schedule). The investigator had to go to the concerned work places in each settlement or had to wait for them to arrive after work to get the male participants for the study. Men and women were selected alternatively from consequent households at first as per the plan but couldn’t strictly adhere to that also due to lack of men at the households.

4.2 Profile of NCD risk factors

4.2.1 Tobacco use

The prevalence of current tobacco smoking among the Kani tribe was 37.9 percent, which is higher than the reported figures for the overall rural and urban population of Kerala (24.3% and 22.6% respectively) but comparable to the slum population (37.3%).⁶ The prevalence of current smoking among the Kani men (69.1%) were almost double the national average among the men (37%).⁶¹ The prevalence is also much higher than the general male population of Kerala (40%).²⁶ Main form of smoking tobacco among men was *beedi*. But some were using *Kanjavu*. Most of the tribals reported peer influence as the major factor that influenced the tobacco initiation.

Prevalence of current smoking among the Kani women (6.7%) was also higher than the national average among women (1.4%).⁶¹ Similar to general population, the prevalence of current smoking was more among men than women. In nutshell, prevalence of tobacco smoking among Kani tribe was much higher when compared to the non-tribal population of India.

The prevalence of smokeless tobacco use was 75.8 percent and is much higher than the national average for the same (38%).⁶¹ However the prevalence is closer to that of the Mishing tribe of Assam (78.9%).³⁰ As per NFHS3, only eight percent women and 37 percent men were using smokeless tobacco. But among the Kani tribe it was much more (69.8% and 81.9% among men and women respectively). Since past years, they have a habit of chewing tobacco irrespective of age and sex. Some men were using *sambhu*, *chukka churut* and *thambak* as smokeless form of tobacco. Most women reported cultural influence and the influence of peer during MGNREGA works as reasons for starting smokeless tobacco.

The study also revealed a high prevalence of current use of tobacco in any form among the Kani tribe (92.6% among men, 70.5% among women and 81.5% among both men and women). It was much higher than ever use of tobacco among primitive tribes in Kerala (76.3% among men, 47.2% among women), as revealed in the study by NIN, ICMR.¹²

Among those who consume tobacco products, one third started their smoking habit and a quarter started their tobacco chewing habit much before attaining the legal age for purchase of tobacco products.

4.2.2 Alcohol consumption

The prevalence of current alcohol consumption among the Kani tribe was 36.2 percent which is slightly higher than national prevalence (32%) as stated by NFHS3.⁶¹ Prevalence is much higher than rural, urban or slum population of Kerala, as revealed in the work of Thankappan et al.⁶ The prevalence of current alcohol use among Kani men (66.4%) was higher than the prevalence among primitive tribal men in Kerala (53.1%).¹²

The work by IIPS states that alcohol consumption among women in India is only two percent.⁶¹ But among the Kani tribe current users of alcohol among women were six percent. Among the Kani tribes, 27.5 percent women had consumed alcohol at least once in their lifetime. Among primitive tribe in Kerala, the alcohol consumption among women were only 0.7 percent, as reported by Meshram et al.¹² And in general population of Kerala, alcohol consumption among women were only 0.9%.²⁶ Thus among the Kani tribes, prevalence of alcohol consumption among men and women were markedly higher than general population of Kerala.⁶

As per this study, there were no binge drinkers among women. Binge drinkers among men were 13.4 percent. According to a study among the tribes of Andhra Pradesh, a predominant use of locally prepared alcoholic beverages were found to be preferred by the tribes rather than harmless beverages such as hot milk and tea were found.³² Most of the Kani tribals were using foreign beverages like brandy, rum and beer. Only a few people were using their local preparation of alcohol (“*Aayal*”). Consumption of milk and milk tea which is common among general population was not there among the Kani tribes. Most of them consume black tea without sugar.

Proportions of people who consumed alcohol within the past one week of the study were more on Sunday and Thursday. And percentage of people who consumed

alcohol was least on Monday. The reason for this could be the fact that the tribals purchase alcohol when they go out on market days, those being Thursdays. On Mondays everyone would be busy with their work after the no wage day on Sundays.

4.2.3 Fruits and vegetable consumption

Among the Kani tribe, the percentage of people who were consuming at least five servings of fruits and vegetables were found out to be zero. Among the total sample, 84.6 percent were consuming less than five servings of fruits and vegetables per day. It is comparable to an earlier study by Shah B and Mathur P whose figures for men and women were 82.1 percent and 87.2 percent respectively.⁶² Fruits and vegetable intake among this tribes are much less compared to even the slum population in Kerala as revealed in the study by Thankappan et al.⁶ There were many people in among the Kani tribe who were not at all consuming even a single serving of fruits and vegetables per day (15.4%). In most of the settlements, rubber and acacia plantations have now replaced the agricultural land. So the tribals living in those settlements were hardly having space to cultivate the fruits and vegetables for themselves. And those who were having the space to cultivate were neither cultivating anything nor taking adequate servings of fruits and vegetables. Most of them now started buying fruits and vegetables from the market. This may be a perfect reflection of influence of urban lifestyle onto this tribal population. More than 3/4th of the tribals were using coconut oil for their cooking purpose.

4.2.4 Physical activity:

Among the Kani tribe, 77.2 percent were involved in high physical activity and 13.1 percent in moderate physical activity. Prevalence of high physical activity among the tribals was very high when compared to general population of Kerala. Moderate physical activity among the tribals were much lesser when compared to general population of

Kerala.⁶ Higher physical activity was less prevalent among women. More exploration is needed to find out the cultural influence on physical activity among women.

This study revealed 9.7 percent physical inactivity among the Kani tribe that is comparable to the urban population of Kerala (9.5%). But the prevalence is much higher than rural and slum populations of Kerala⁶ and tribes of Assam.³⁰ There were not much differences among the proportions of men and women who were physically inactive among the Kani tribe.

The sedentary behavior (Mean time spent sitting or reclining per day) among the Kani tribe (292.11 minutes) was also higher when compared to *Mishing* tribe (127.44 minutes) from Assam³⁰.

It is heartening to see that overall physical activity was still high among the Kani tribe even though physical inactivity is prevalent among many. This higher prevalence of physical inactivity warrants rapid attention.

4.2.5 Overweight and abdominal obesity

Prevalence of abdominal obesity among the Kani tribe (22.1%) is almost double when compared to *Mishing* tribes of Assam (11.4%).³⁰ It is much less compared to urban(41.9%), rural(33.9%) and slum population(42.4%) of Kerala.⁶ This may be because of high level of physical activity among them. However one in five (20.4%) men and women were having abdominal obesity among the Kani tribe.

The prevalence of overweight among the Kani tribe was 10.8 percent which is lesser than *Mishing* tribe from Assam.³⁰ As in general population the prevalence of abdominal obesity and overweight were higher among women than in men in this tribal

community.²⁶ Among the Kani tribe, underweight was also prevalent(22.5%) and is much higher than general population of Kerala.⁶³

4.2.6 Hypertension

The prevalence of hypertension among the Kani tribe is much higher than the primitive tribes of Kerala(40%)¹² and Assam (25.6%).³⁰ The prevalence was closer to urban population of Kabul City, Afghanistan (46%).¹⁹ The prevalence was more among men than women as in New Delhi Birth cohort study.²² Prevalence of hypertension was much higher when compared to rural, urban and slum population of Kerala.⁶ But the prevalence of hypertension among the Kani tribe was less when compared to *Langia Saora*, one of the primitive tribes of Orissa.⁸

The prevalence of hypertension among the Kani tribe was significantly associated with age, education and alcohol consumption as per multivariate logistic regression analysis using the R statistical package.^{55, 56} Increasing age was associated with increased likelihood of developing hypertension. Older age group (42-64 years) was 2.28 times more likely to have hypertension than younger age group (25-42 years). Those with higher education (\geq High school level) had lower odds of having hypertension when compared to those with education less than high school level. Alcohol consumption was associated with higher odds of hypertension. Multivariate results from this study is comparable to the findings of the study done among primitive tribes in Kerala by Meshram et al.¹²

This study revealed that 19.1 percent of the hypertensives were aware of their hypertension status although only 7.4 percent (N=22) were on treatment for the same. Majority among those who are on treatment were depending on herbal medicines (N=18) than allopathic medicine (N=13) among the Kani tribe. Nine among those who are on treatment for hypertension was taking allopathic and herbal medicine together. Only two

persons among those who were on treatment had their hypertension under control. Awareness and treatment of other NCDs such as diabetes and high cholesterol level were also very low among the Kani tribe.

Kani tribe was famous for their traditional knowledge on medicinal plants. But only a small percentage was consulting the traditional healer (“*Plathy*”) for their chronic diseases. Most of them were aware of the home remedies to manage and prevent different ailments.^{52, 54} But only six percent were on herbal remedy to manage their high blood pressures. Even now the most preferred treatment option for any disease among them is their own herbal medicine. Unfortunately the transfer of traditional knowledge to the next generation is endangered now. This may be the reason behind less utilization of herbal remedies among them. This might be one of the reasons for higher burden of NCD risk factors among the Kani tribe.

Awareness, treatment and control of hypertension were much less among the Kani tribe when compared to general population of Kerala.⁶ Though they had access to mass media in most of these tribal settlements, their levels of awareness on treatment and control of hypertension were very low. Most of the tribals were not utilizing the health system properly because of difficulty in access, increased waiting time to see the doctor, lack of medicines in the primary health centre, lack of facilities in the primary health centre and the transportation cost. A study among the tribal groups of Rajasthan says that the tribals have lost their trust in the health system.⁴⁵ Most of the Kani tribal people had also lost their trust in the health system as far as they are concerned.

So the Kani tribes were not utilizing the health system nor do they use their own traditional knowledge to prevent the diseases. There is an urgent need for the health sector to take appropriate action to safeguard their health.

4.2.7 Combined risk:

The risk factors that were used to estimate the combined risk are as follows.⁵⁷

- a. Current daily smokers
- b. Less than five servings of fruit and vegetables per day
- c. Low level of activity(<600MET minutes/week)
- d. Overweight or obesity(BMI \geq 25kg/m²)
- e. Raised Blood pressure(SBP \geq 140 mm of Hg or DBP \geq 90 mm of Hg or Hypertension on treatment)

Those having three or more risk factors were included in high risk category. Among the Kani tribe, 28.2 percent were having high risk of developing NCD. Our estimate of high risk category is slightly more than the Mangolian people (27%) as stated by Mangolian STEPS Survey on the prevalence of non communicable disease and injury risk factors-2009.⁵⁷ The proportion of men with high risk for developing NCD was more when compared to females. Everyone in the study subjects had at least one risk factor present. This is a clear evidence of mounting NCD burden among the Kani tribes.

4.3 History of cervical cancer screening

This study revealed that only one person had done cervical cancer screening (6.7%) among tribals.

4.4 STRENGTHS OF THE STUDY

- a. There are limited studies on NCD risk factors among tribes from India especially from Kerala using a standard tool like WHO step wise approach for surveillance of NCD risk factors.
- b. To my knowledge this is the first study from Kerala and second study from India to assess the prevalence of NCD risk factors among tribes using a standard tool like WHO step wise approach for surveillance of NCD risk factors.
- c. Data collection was done by a single investigator. So the chance of inter observer bias was eliminated.
- d. Good response rate (96.4%).
- e. Male participation was adequate (50%) in this study.
- f. Adoption of Kish method avoided the chance of random error.

4.5 LIMITATIONS OF THE STUDY

- a. Self reported information on diet and physical activity might have resulted in overestimation of the results.
- b. Occupation categories in WHO questionnaire were not sufficient to capture Kani tribe's vocational activities.
- c. Qualitative aspects were not covered. So the exact contextual story might be missing.

4.6 CONCLUSION

- a. Prevalence of hypertension was higher (48.3%) among Kani tribe when compared to general population. Prevalence of hypertension was higher among the elder age group, less educated groups and alcohol users.
- b. Among the Kani tribe, the fruits and vegetable consumption was found totally insufficient. This will be a perfect reflection of impact of urbanization and adoption of urban lifestyles in this literate tribal community.
- c. Tobacco use in any form (81.5%), alcohol use (36.2%) and physical inactivity (9.7%) were high among Kani tribe in Thiruvananthapuram district when compared to general population.
- d. The overall physical activity is still high among this tribal group. However abdominal obesity (22.1%) and overweight (10.1%) were also present at significant levels.
- e. Awareness, treatment and control of hypertension were very low among Kani tribe. Even now the most preferred treatment option for any disease among them is their own herbal medicine. Unfortunately the transfer of traditional knowledge to the next generation is endangered now. Only six percent were on herbal remedy to manage their high blood pressures.
- f. There is an apparent shift from cultivation of food crops to cash crops (agricultural work to rubber tapping) among the Kani tribe as earlier they were solely depending on agriculture and traditional handicrafts for their livelihood.

4.7 IMPLICATIONS

- a. This study calls for focused intervention to address the mounting NCD risk factors among the Kani tribes in Kerala.
- b. Concerted action for the documentation of traditional knowledge should be undertaken to safeguard traditional medicinal capabilities of the tribal people, before it get endangered.
- c. Efforts should be undertaken to establish the tribal people's trust in the health care delivery system.
- d. Exploratory ethnographic research is needed to understand the contextual and behavioral aspects of tribal life in the state for meaningful healthcare intervention.

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APPENDICES

APPENDIX I

CONSENT FORM

Namaskaram, I am *****, currently doing Masters in Public Health(MPH) at Achutha Menon Centre for Health Science Studies(AMCHSS), Sree Chitra Tirunal Institute of Medical Sciences and Technology, Thiruvananthapuram, Kerala. As a part of my course curriculum, I am conducting a study titled “Prevalence of non-communicable disease risk factors among Kani tribe in Thiruvananthapuram district, Kerala”, under the guidance of *****. I plan to do this study to find out the prevalence of non-communicable-disease risk factors among Kani tribe in Thiruvananthapuram district, Kerala. The potential risk factors include tobacco use, alcoholism, unhealthy diet, obesity, sedentary behavior, raised blood pressure and diabetes.

I would like to ask you some questions related to this study regarding some behaviors like smoking/chewing tobacco, drinking alcohol, diet, physical activities which are related to increased risk of developing chronic diseases. I will take measurement of your height, weight, waist circumference and blood pressure. I will also ask questions inquiring about diabetes and hypertension. The whole procedure will take 30-45 minutes. Although there is no immediate benefit for you from the study except measuring your blood pressure, height, weight and waist circumference, I sincerely hope that, in the long run this exploration will help in better planning for health interventions in Kani tribal community and other tribes living in the state. As a whole this will benefit the public health programs.

The information obtained from you will be kept confidential and will be used only for research purpose. Your participation in this study will be voluntary. You are free to withdraw from the interview at any point of time. Also you can refuse to answer any question without giving any explanations.

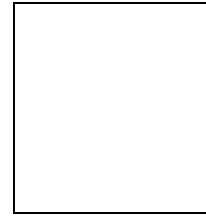
Are you willing to take part in this study? Yes No

If you are not willing to take part in this study, thank you for your time.

If you are willing to take part in this study, please sign/or give your thumb impression over the specified space.

Signature of the respondent:

OR



Thumb impression of the respondent

Time:

Date:

If you have any queries you can contact,

- *****

MPH 2013, AMCHSS,

SCTIMST,

Thiruvananthapuram.

Mobile Number: *****

- *****

Member Secretary, Institutional Ethics Committee,

SCTIMST,

Thiruvananthapuram.

Contact Number:*****

APPENDIX II

INTERVIEW SCHEDULE-WHO STEP WISE APPROACH FOR SURVEILLANCE OF NCD RISK FACTORS- V.3.0

RESPONDENT ID No:

IDENTIFICATION INFORMATION				
CODE	SI no:	QUESTIONS	OPTIONS	RESPONSE
I1	1	Cluster name(Tribal settlement)		
I2	2	House number		
I3	3	Date of interview		<input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Day/Month/Year
I4	4	Name of the respondent		
I5	5	Residential address		
I6	6	Contact phone number	Landline/mobile number	

RESPONDENT ID No:

DEMOGRAPHIC INFORMATION				
CODE	SI No:	QUESTION	RESPONSE	CODING COLUMN
C1	7	How old are you? (Age in completed years)	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
C2	8	Sex(Record male or female as observed)	Male-01 Female-02	<input type="text"/> <input type="text"/>
C3	9	What is the highest level of education you have completed?	<ul style="list-style-type: none"> • No formal schooling-01 • Primary school level(1-7)-03 • High school level (8-10)-04 • Higher secondary level (11-12)-05 • Diploma after higher secondary(13-14)-06 • Graduate level(13-15)-07 • Postgraduate degree(16 and above)-08 • Others (specify)..... 	<input type="text"/> <input type="text"/> Others (specify).....
C4	10	Which of the following best describes your main work status over the last 12 months?	(***ILO selected occupational categories)	<input type="text"/> <input type="text"/> Others (specify).....
C5	11	What is your current marital status?	<ul style="list-style-type: none"> • Never married-01 • Currently married-02 • Divorced/separated-03 • Widowed-04 • Cohabiting-05 	<input type="text"/> <input type="text"/>
C6	12	Under which category you belong to?(APL/BPL)	APL-01 BPL-02	<input type="text"/> <input type="text"/>

(***)Worked in household enterprise (self-employed): own account worker –01,Employer –02,Worked as helper in household enterprise (unpaid family worker) – 03;Worked as regular salaried/wage employee – 04;Worked as casual wage laborer;In public works –05;In other types of work – 06;Did not work but was seeking and/or available for work –07;Attended educational institution –08;Attended domestic duties only – 09;Attended domestic duties and was also engaged in free collection of goods (vegetables, roots, firewood, cattle feed, forest products etc.), sewing, tailoring, weaving, etc. for household use –10;Pensioners– 11;Not able to work due to disability -12;Others -13

PERSONAL AND FAMILY HISTORY OF CHRONIC DISEASES				
C7	13	Does any of your family member have any of the given chronic diseases(Diabetes, Hypertension, Heart disease, Stroke, COPD, Cancer, Asthma)? (Self reported/Medically diagnosed/On medication)	Yes-01 No-02 Don't know-77	<input type="checkbox"/> <input type="checkbox"/>
NCD RISK FACTORS				
STEP 1-BEHAVIOURAL MEASURES				
TOBACCO USE (SECTION S)				
Now I am going to ask you some questions about tobacco use.				
Tobacco smoking				
CODE	SI No	QUESTION	RESPONSE	CODING COLUMN
S1	14	Do you currently smoke any tobacco products such as cigarettes, beedior others?	Yes-1 No-2	<input type="checkbox"/> <i>If No, go to S5</i>
S2	15	Do you currently smoke tobacco products daily ?	Yes-1 No-2	<input type="checkbox"/>
S3	16	How old were you when you first started smoking daily?	Age in year Don't remember-88	<input type="checkbox"/> <input type="checkbox"/>
S4	17	On average, how many of the following do you smoke each day ?	Manufactured Cigarettes Cheroots Beedi Others (specify).....	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (specify)
Smokeless tobacco use				
CODE	SI No	QUESTION	RESPONSE	CODING COLUMN
S5	18	Do you currently use any smokeless tobacco products such as chewing tobacco and betel leaves;snuff ,kainior others?	Yes-1 No-0	<input type="checkbox"/> <i>If no, go to A1</i>
S6	19	Do you currently use any smokeless tobacco products daily ?	Yes-1 No-0	<input type="checkbox"/>
S7	20	How old were you when you first started using smokeless tobacco products daily?	Age in years Don't remember-88	<input type="checkbox"/> <input type="checkbox"/>

ALCOHOL CONSUMPTION (SECTION A)				
The next questions ask about the consumption of alcohol.				
CODE	SI No:	QUESTION	RESPONSE	CODING COLUMN
A1	21	Have you ever consumed any alcohol such as beer, whisky, rum, gin, brandy, other local purchases or local preparations (Aayal)?	Yes-1 No-0	<input type="checkbox"/> <i>If no, go to D1</i>
A2	22	Have you consumed any alcohol {beer, whisky, rum, wine, brandy, other local purchases or local preparations (Aayal) within the past 30 days ?	Yes-1 No-0	<input type="checkbox"/>
A3	23	In the past 30 days, how frequently have you had at least one standard alcoholic drink? <i>A “standard drink” is the amount of ethanol contained in standard glasses of beer, wine, fortified wine such as sherry, and spirits. Depending on the country, these amounts will vary between 8 and 13 grams of ethanol.</i>	Five or more days a week-01 1-4 days/week-02 1-3 days a month-03 Less than once a month-04	<input type="checkbox"/> <input type="checkbox"/>
A4	24	During the past 30 days, when you drank alcohol, on average, how many standard drinks do you have during one drinking occasion?	Number	<input type="checkbox"/> <input type="checkbox"/>
A5	25	For how many years you have been taking alcohol?	Number Don't know-77	<input type="checkbox"/> <input type="checkbox"/>
A6	26	During each of the past 7 days , how many standard drinks of any alcoholic drink did you have each day? <i>Standard bottle of various alcoholic drinks Regular beer=285ml Single measure of spirit=30ml Medium glass of wine=120ml 1 measure of aperitif=60ml</i>	Monday Tuesday Wednesday Thursday Friday Saturday Sunday	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

DIET (SECTION D)				
The next questions ask about the fruits and vegetables that you usually eat. I have a nutrition card here that shows you some examples of local fruits and vegetables. Each picture represents the size of a serving. As you answer these questions please think of a typical week in the last year.				
CODE	SI No:	QUESTION	RESPONSE	CODING COLUMN
D1	27	In a typical week, how many days do you eat fruits ?	Number of days	<input type="checkbox"/> <i>if zero days, go to D3</i>
D2	28	How many servings of fruit do you eat on one of those days? <i>(Servings- WHS nutrition card)</i>	Number of servings	<input type="checkbox"/>
D3	29	In a typical week, how many days do you eat vegetables ?	Number of days	<input type="checkbox"/> <i>If zero days, go to D5</i>
D4	30	How many servings of vegetables do you eat on one of those days?	Number of servings	<input type="checkbox"/>
D5	31	What type of oil or fat is most often used for meal preparation in your household?	Vegetable oil.....-01 Butter or ghee.....-02 Coconut oil.....-03 Others (specify)...04 None in particular-05 None used-06	<input type="checkbox"/> <input type="checkbox"/>
PHYSICAL ACTIVITY (SECTION P)				
Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. [Insert other examples if needed]. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.				
WORK				
P1	32	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate, like (heavy lifting, digging or other work) for at least 10 minutes continuously?	Yes-1 No-0	<input type="checkbox"/> <i>If no, go to P4</i>

P2	33	In a typical week, how many days do you do vigorous-intensity activities as part of your work?	Days per week	<input type="checkbox"/> <input type="checkbox"/>
P3	34	On a typical day, how much time do you spend doing vigorous – intensity activities at work?	In hours and minutes Or In minutes	<input type="checkbox"/> <input type="checkbox"/> : <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
P4	35	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate, like (brisk walking or carrying light loads) for at least 10 minutes continuously?	Yes-1 No-0	<input type="checkbox"/> <i>If no, go to P7</i>
P5	36	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Days per week	<input type="checkbox"/>
P6	37	On a typical day, how much time do you spend doing moderate – intensity activities at work?	In hours Or In minutes	<input type="checkbox"/> <input type="checkbox"/> : <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
P7	38	How much time do you usually spend sitting or reclining on a typical day?	In hours	<input type="checkbox"/> <input type="checkbox"/> : <input type="checkbox"/> <input type="checkbox"/>

TRAVEL TO AND FROM PLACES

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

P8	39	Do you walk or use a bicycle for at least 10 minutes continuously to get to and from places?	Yes-1 No-0	<input type="checkbox"/> <i>If no, go to P9</i>
P9	40	How do you travel from one place to another?	Specify..... <i>Next go to P12</i>
P10	41	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Days a week	<input type="checkbox"/>
P11	42	On a typical day, how much time would you spend walking or bicycling for travel?	In hours	<input type="checkbox"/> <input type="checkbox"/> : <input type="checkbox"/> <input type="checkbox"/>

RECREATIONAL ACTIVITIES

The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure)

P12	43	Do you do any vigorous-intensity sports, fitness or recreational	Yes-1 No-0	<input type="checkbox"/>
-----	----	--	---------------	--------------------------

		(leisure) activities that cause large increases in breathing or heart rate like [running] for at least 10 minutes continuously? [INSERT EXAMPLES] (USE SHOWCARD)	If yes,----- days/week & -----hour:---- minutes/day	<i>If no, go to P13</i>
P13	44	Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, swimming] for at least 10 minutes continuously? [INSERT EXAMPLES] (USE SHOWCARD)	Yes-1 No-0 If yes,----- days/week & -----hour:---- minutes/day	<input type="checkbox"/> <i>If no, go to H1</i>
TREATMENT HISTORY (SECTION-H)				
HISTORY OF RAISED BLOOD PRESSURE				
H1	45	Have you ever had your Blood Pressure measured by a doctor or other health worker?	Yes-1 No-0	<input type="checkbox"/> <i>If no, go to H6</i>
H2	46	Have you ever been told by a doctor or other health worker that you have elevated blood pressure or hypertension?	Yes-1 No-0	<input type="checkbox"/>
H3	47	Are you currently receiving any treatment for high blood pressure prescribed by a doctor or other health worker?	Yes-1 No-0	<input type="checkbox"/>
H4	48	During the past 12 months, have you seen a traditional healer for elevated blood pressure or hypertension?	Yes-1 No-0	<input type="checkbox"/>
H5	49	Are you currently taking any herbal or traditional remedy for your high blood pressure?	Yes-1 No-0	<input type="checkbox"/>
HISTORY OF DIABETES				
H6	50	Have you ever had your Blood Sugar measured by a doctor or other health worker?	Yes-1 No-0	<input type="checkbox"/> <i>If no, go to H11</i>
H7	51	Have you ever been told by a doctor or other health worker that you have diabetes (sugar disease)?	Yes-1 No-0	<input type="checkbox"/>

H8	52	Are you currently receiving any treatment for diabetes prescribed by a doctor or other health worker?	Yes-1 No-0	<input type="checkbox"/>
H9	53	During the past 12 months, have you seen a traditional healer for diabetes?	Yes-1 No-0	<input type="checkbox"/>
H10	54	Are you currently taking any herbal or traditional remedy for your diabetes?	Yes-1 No-0	<input type="checkbox"/>
HISTORY OF CHOLESTEROL				
H11	55	Have you ever had your cholesterol (fat levels in your blood) measured by a doctor or other health worker?	Yes-1 No-0	<input type="checkbox"/> <i>If no, go to H16</i>
H12	56	Have you ever been told by a doctor or other health worker that you have raised cholesterol?	Yes-1 No-0	<input type="checkbox"/>
H13	57	Are you currently receiving any treatment for high cholesterol prescribed by a doctor or other health worker?	Yes-1 No-0	<input type="checkbox"/>
H14	58	During the past 12 months, have you seen a traditional healer for high cholesterol level?	Yes-1 No-0	<input type="checkbox"/>
H15	59	Are you currently taking any herbal or traditional remedy for your cholesterol?	Yes-1 No-0	<input type="checkbox"/>
HISTORY OF CARDIO VASCULAR DISEASES				
H16	60	Have you ever had a heart attack or chest pain from heart disease (angina) or a stroke (cerebrovascular accident or incident)?	Yes-1 No-0	<input type="checkbox"/>
HISTORY OF LIFESTYLE ADVICE				
During the past three years, has a doctor or other health worker advised you to do any of the following?(RECORD FOR EACH)				
H17	61	Quit using tobacco or don't start using any tobacco products	Yes-1 No-0	<input type="checkbox"/>
H18	62	Reduce salt in your diet	Yes-1 No-0	<input type="checkbox"/>
H19	63	Eat at least five servings of fruit and/or vegetables each day	Yes-1 No-0	<input type="checkbox"/>
H20	64	Reduce fat in your diet	Yes-1 No-0	<input type="checkbox"/>
H21	65	Start or do more physical activity	Yes-1 No-0	<input type="checkbox"/>
H22	66	Maintain a healthy body weight or lose weight	Yes-1 No-0	<input type="checkbox"/>
CERVICAL CANCER SCREENING(For women only)				

The next question asks about cervical cancer prevention. Screening tests for cervical cancer prevention can be done in different ways, including Visual Inspection with Acetic Acid/vinegar (VIA), pap smear and Human Papilloma virus (HPV) test.

CX1	67	Have you ever had a screening test for cervical cancer? (<i>VIA is an inspection of the surface of the uterine cervix after acetic acid (or vinegar) has been applied to it. For both pap smear and HPV test, a doctor or nurse uses a swab to wipe from inside your vagina, take a sample and send it to a laboratory. It is even possible that you were given the swab yourself and asked to swab the inside of your vagina.</i>)	Yes-1 No-0	<input type="checkbox"/>

STEP 2-PHYSICAL MEASUREMENT(CODE M)

Height and weight

M1	68	For women: Are you pregnant?	Yes1 No 0	<input type="checkbox"/> <i>If yes, go to M5</i>
M2	69	Height	In centimeters(cm)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> . <input type="checkbox"/>
M3	70	Weight	In kilograms(kg) <i>If too large for the scale 666.6</i>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> . <input type="checkbox"/>

Waist

M4	71	Waist circumference	In centimeters(cm)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> . <input type="checkbox"/>
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Blood Pressure

M5a	72	Reading 1 <i>Record first measurement after the participant has rested for 15 minutes. Wait 3 minutes before taking second measurement</i>	systolic	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
			diastolic	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M5b	73	Reading 2 <i>Ask the participant to rest for another 3 minutes before taking the third measurement</i>	systolic	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
			diastolic	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M5c	74	Reading 3	systolic	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
			diastolic	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

INTERVIEW	COMPLETE/INCOMPLETE
SIGNATURE OF THE INVESTIGATOR	
ANY OTHER COMMENT	

APPENDIX III

k½-X-]-{Xhpw

]T-\s kw_Ön¨ hnh-c-§fpw

\a-kv\m-cw. Rm³ ***** ANyp-X-ta-t\m³ skâÄ t^mÄ slÄv kb³kv ÌUo-knÄ (io Nn{X Xncp-
 \mÄ C³\ñ-äyq«v t^mÄ saUn-jÄ kb³kv Bâv sSlvt\m-f-Pn)]»nIv slÄv (s]m-Xp-P\ BtcmKy kwc-£-
 Ww) _ncp-Zm-\c _ncpZ hnZymÄ°n\ñ BWv. Fsâ A²y-b-\-nsâ `mambn F\ñjv Hcp]T\w \S-t---
 Xp--v. Cu]T\w ANyp-X-ta-t\m³ skâ-dnse s]m^kdpw Fsâ ssKUp-amb ***** \oco-£-W-ñ-
 emhpw Rm³ sNçp-l. tlc-f-ñse Xncp-h-\-]pcw PnÄ-bnse lmWn kap-Zm-b-ñÄ DÄs,-Sp-¶-h-cnÄ
]IÄt-Xc tcmK-§Ä _m[n-jm-\p-ff km[yXm LS-l-§Ä Af-jpl F¶-XmWv Fsâ]T-t\m--t±-iw.]pl-bne
 D]-tbm-Kw, aZy-]m-\w, hymbma;pdhv Nn«-bn-Äm- Blm-c-co-Xn-lÄ, s]m®-ñ-Sn, càmxn-k-
 ½Ä±w, cà-ñse DbÄ¶ slmgp,v, {]talw F¶n-h-bmWv]IÄt-Xc tcmK-§Äjv t\Xp-hm-lp¶ LS-l-§Ä.

Cu]T-\-nsâ `mK-ambn]IÄtX-c-tcm-K-§Äjv lmc-W-am-lm-hp¶ Ccw LS-l-§-sf-jp-dn¨v
 tNmZy-§Ä tNmZn-jp-¶-Xm-bn-cn-jpw Xm!-fjps Db-cw, ico-c-`m-cw, Ac-sj-«nsâ Npä-f-hv, cà-k-
 ½Ä±w (3 Xh-W) F¶n-hbpw Cu]T-\-m-K-ambn Af¶v tcj-s,-Sp-p-¶-Xm-bn-cn-jpw. {]talw (]-©-
 km-c-bps Akp-jw), càmxn-k-½Ä±w ({]-j-dv), cà-ñse slmgp,v lqSp¶ AhØ (slm-
 gp,v/slmfkt{SmÄ) F¶o tcmK-§-sf-jp-dn¨pw Rm³ tNmZn-jp-¶-Xm-bn-cn-jpw. Cu \S-]-Sn-{l-a-
 §Ä FÄmw lqSn 30p45 an\ñ«v FSp-jp-¶-Xm-bn-cn-jpw.

Cu]T-\-ñÄ]si-Sp-jp-¶-Xp-aqew Xm!-fjps Db-cw, ico-c-`m-cw, Ac-sl«nsâ Npä-f-hv, cà-
 k-½Ä±w F¶o Af-hp-lÄ Adn-bm-sa-¶-Xn-ep-]cn ääv t\«-§-sfm¶pw Ct,mÄ \n§Äjv D-m-lp-¶-X-Ä.

Finepw Cu]T-\-nsâ ^e-am-bn, `mhn-bnÂ lmWn kap-Zmbw DÄs,-sS-bp-ff BZn-hmkn kap-Zm-
 b-S-fpsS Btcm-Ky-kw-c-£-W-cw-Kv sa¨-s,« CS-s]-S-ep-lÄ kÄ;m-cnsâ `mK-̄p-\nGv D-m-lp-saGv
 Rm³ BßmÀ°-ambn {}Xo-£n-;p-Gp. Cu]T\w s]mXp-P-\m-tcmKy kwc-£-W-cw-Ks̄]²-Xn-lÄ;v
 klm-b-l-am-lpw.

Cu]T-\-nÂ]si-Sp-;p-G-Xn-eqsS Xm!Ä;v Hcp Btcm-Ky-{}-iv\-\\$fpw D-m-lp-G-X-Ä.

FmÂ Fsâ Nne tNmZy-\\$fpw Af-hp-lÄ FSp-;epw Xm!Ä;v p²n-ap-«mbn A\p-`-h-s,-t«-;mw.

Xm!Ä \ÄlpG kzmIm-cy-hn-h-c-ŠÄ cl-ky-ambn kq£n-;p-G-XmWv hyàn-hn-h-c-ŠÄ Hfpw
 aa-pf-f-hÄ;v shfp-s,-Sp-̄p-G-X-Ä. Cu]T-\-hp-ambn t\cn«v _Ô-s,-«n-«p-f-fhÄ;v am{Xta Cu tc]-lÄ
 e`y-am-hp-l-bp-f-fq. Cu]T-\-n-ep-ff]!m-fn̄w Xm!Ä kza-\-Êmse FSp-t;---Xm-Wv.]T-\-n-\n-S-
 bnÂ GXv thf-bnepw Xm!Ä;v CXnÂ \nGpw Hcp]ngbpw lqSmsX]n-m-dm-hp-G-Xm-Wv. lqSmsX
 Xm!Ä;v GXv tNmZy-nsâ D̄cw]d-bp-G-XnÂ \nGpw]n-m-dm-hp-G-Xpam-Wv.

Xm!Ä;v Cu]T-\-nÂ]!m-fn-bm-lm³ k½-X-amtWm?

AÄ (Xm-i-fpsS ka-b-̄n\ v \µn)

AsX {}Xn-lǞ-m-hnsâ H,v /hnc-e-S-bmfw:

t]cv:

hnc-e-S-bmfw:

Cu]T-\-s̄-;p-dn̄v lqSp-XÂ Adn-bp-G-Xn-\mbn NphsS XGn-cn-;pG t^m-̄-\¼-dp-l-fnÂ _Ô-s,-Sm-
 hp-G-Xm-Wv.

***** ,t^m-: *****

]T\~nsâ B[n-lm-cn-l-X-sb-jp-dnïv Adn-bm³:-p

C³ln-äyq-j-WÂ F~nlvkv l/znän

{io Nn{X Xncp-\mÄ C³ln-äyq<v

t^mÄ salln-jÂ kb³kkv Bâv sSlt\m--fpn ,Xncp-h-\-'-

]pcw.

APPENDIX IV

**PREVALENCE OF NCD RISK FACTORS AMONG KANI TRIBE
IN THIRUVANANTHAPURAM, KERALA**

A`n-ap] tNmZym-hen

RESPONDENT ID No: □□□

ASn-Øm-\-hn-h-c-§Ä (hn`mKw p sF)				
Code No.	Sl. No	QUESTIONS	OPTIONS	RESPONSE
I1	1	BZn-hm-kn- Ducnsâ t]cv		
I2	2	ho«p \¼Ä		
I3	3	A`n-ap]w \S-jp¶ XobXn		□□/ □□/ □□□□ Znhkw/amkw/hÄjw

I4	4	{]Xn-lÄ-m-hnsâ t]cv		
I5	5	taÄ hnemkw		
I6	6	t^m- \¼Ä		

DEMOGRAPHIC INFORMATION (SECTION C) / hyàn-KX hnh-c-ŞÄ

C 1	7	\nŞÄjv F{X hb-Êp-v?	<input type="checkbox"/>	<input type="checkbox"/>
C 2	8	kv{Xo/]pcp-j³		<input type="checkbox"/>
C 3	9	Xm!-fpsS]qÄ-n-bm-jnb DbÄg hnzym- 'ymk tbmKyX F'mWv?	<ul style="list-style-type: none"> • Hu]Nm-cn-l-hn-Zym-'ymkw CÄ • ss{]adn sehÄ (1p7) • sslkv]qÄ sehÄ (8p10) • lbÄsk-jâdn (11p12) • Unt'ma (13p14) • _ncpZw (13p15) • _ncp-Zm-\-'c _ncpZw (16 Dw apl-fn-epw) • aäp-ffh p-p-p-p <p>hyà-am-jp]p-p-p-p-p-p-p-p</p>	<input type="checkbox"/>
C 4	10	Xm!-fpsS \ne-hn-ep-ff sXmgnÄ GXv hn`m-K-`nÄs,Spw? (1-gn ^a 12 amk-am- bn)	¹ * p-p-p-p-p-p-p-p-p-p-p-p-p-p-p-p-p-p	<input type="checkbox"/>
C 5	11	Xm!-fpsS \ne-hn-ep-ff hnhm-l-ØnXn F'mWv?	<ul style="list-style-type: none"> • hnhmlw]gn-`n-«nÄ • hnhm-ln-X³/hnhm-lnX • _Ôw thÄ]n-cn^ap/ thÄ]n-cn^ap 	<input type="checkbox"/>

¹ ILO selected classification of occupation

			Xma-kn-ipp • hn[h • Hcp-an'v Xma-kn-ipp	
SOCIO ECONOMIC STATUS / kmaq[n] km¼-nl (Øn-Xn)				
C 6	12	XmiÄ Ch-bn-teXv hn`m-K-nÂ DÄs,Spw?	F.]n.-FÂ _n.]n. FÂ	<input type="checkbox"/>
PERSONAL & FAMILY HISTORY OF CHRONIC DISEASES				
C 7	13	Xmi-fpsS]pSpw-_-nÂ BÄs;-lnepw ChnsS]d³n-cn-ipp GsX-lnepw tcmKm-hØIÄ Df-f-Xmbn Adn-hpt-m?/ acp-pp-lÄ lgn-ipp-pt-m?	{]talw càmXn-k-½Ä±w lrZ-bm-LmXw]£m-LmXw izmk-tlm-i-kw_-Ô-am-bXv lm³kÄ, Bkva	<input type="checkbox"/>
NCD RISK FACTORS – STEP 1 BEHAVIOURAL MEASURES				
TOBACCO USE (S SECTIONS)/]plbne D]-t`mKw (Fkv . hn`m-Kw)				
C\n Rm³ Xmi-tfmSv]pl-bne D]-tbm-K-s-ipp-dn'v]pd'v tNmZy-ŠÄ tNmZn-;m³ t]mlp-l-bmWv				
]pl-bne D]-tbmKw				
Code No.	Sl. No	Questions	Options	Coding column
S 1	14	XmiÄ Ct,mÄ]pl-h-en-;m-dpt-m? (kn-K-d-äv, Npcp-«v, _oUn, aäp-f-f-h)	D-v CÄ	<input type="checkbox"/>
S2	15	AsX FlnÄ XmiÄ]pl-bne DÄ,-p-ŠÄ F]pw D]-tbm-Kn-;m-dpt-m?	D-v CÄ	<input type="checkbox"/>
S3	16	BZy-ambn]pl-h-en'v XpS-Šn-b-t,mÄ XmiÄ;v F{X {]mbw D-m-bn-cp]p?	pp-b-b-bb hbÊv	<input type="checkbox"/>

S4	17	Ch-bnÂ GsXm-sj, icm-icn F{X F®w hoXw Xm!Ä Hcp Znhkw D]-tbm- Kn;pw? (Hm-tcmƒpw tcj-s,-Sp-p-l)	knK-cäv p-p-p-p Npcp«v p-p-p-p-p-p _oUn p-p-p-p-p-p-p aäp-f-fh p-p-p-p-p (hyà-am-jpl)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
SMOKE LESS TOBACCO USE /]pl-bn-Äm-]pl-bne D]-tbmKw				
S5	18]pl-bn-Äm-]pl-bne DÄ,-ƒ-ŠÄ Xm!Ä Ct,mÄ D]t-bm-Kn-jm-dpt-m? (s)m-Sn, apdp-jm³,]-p-l-bn-e, aäp-f-f-h)	D-v CÄ	<input type="checkbox"/>
S6	19]pl-bn-Äm-]pl-bne DÄ,-ƒ-ŠÄ Xm!Ä Znh-khpw D]-tbm-Kn-jm-dpt-m?	D-v CÄ	<input type="checkbox"/>
S7	20	GXv {]mb-n-emWv]pl-bn-Äm-]pl- bne DÄ,-ƒ-ŠÄ Znh-khpw D]-tbm-Kn-p XpS-Šn-bXv ?	p-p-p-p-p hbÊv	<input type="checkbox"/> <input type="checkbox"/>
ALCOHOL CONSUMPTION (SECTION A)/ aZy-nsâ D]-t'mKw (F p hn'mKw)				
A1	21	Xm!Ä Ft,m-sg-lnepw aZyw D]-tbm- Kn-n-«pt-m? (B-bÄ, nbÄ, hnkvlñ, lffv aäp-f-f-h)	D-v CÄ	<input type="checkbox"/>
A2	22	Xm!Ä lgnª 3o Znh-k-n-p-f-fnÄ Ft,m- sg-lnepw aZyw D]-tbm-Kn-n-«pt-m? (n-bÄ, BbÄ, lffv, hnkvlñ, aäp-f-f-h)	D-v CÄ	<input type="checkbox"/>
A3	23	AsX F!nÄ, lgnª 3o Znh-k-n-p-f-fnÄ, F{X-mÄ CS-hn«v Xm!Ä aZyw D]-tbm- Kn-jp-ƒp-v? (lp-d-ªXv Hcp Znhkw Hcp	•BgvN-bnÄ 5 Znh-k-nÄ lqSp- XÄ • 1p 4 Znhkw /BgvN	<input type="checkbox"/> <input type="checkbox"/>

		{Un:ivkv F n-epw)	<ul style="list-style-type: none"> • 1p 3 Znhkw / amkw • <1/amkw 	
A4	24	Ign ^a 3o Znh-k ⁻ n-\p-f-fn ^Â aZy-]n-]p- t¼m ^Ä Hcp aZy-]m-\-th-f-bn ^Â icm-icn F{X {Un:ivkv FSp-]m-dp-v?	bb-b-bb F [®] w	□□
A5	25	F{X h ^Ä j-]fmbn Xm! ^Ä aZyw D]-tbn- Kn-]p-]p-v?	bb-b-b-bb h ^Ä jw	□□
A6	26	Ign ^a Hcm-gvN-bn ^Â Hmtcm Znh-khpw Xm! ^Ä F{X Af-hn ^Â aZy-]n [·] p? (Hmtcm Znh-k-s ⁻ bpw {Un:ivknsâ Afhv {}tXylw tc]-s,-Sp ⁻ p-l)	Xn! ^Ä bb-b-b-b-b-b-b sNm/Ebb-b-b-b-b-b-b p[³ bb-b-b-b-b-b-b hymgwbb-b-b-b-b-b-b-b-b shffnbb-b-b-b-b-b-b-b-b i\ n bb-b-b-b-b-b-b-b-b-b-b Rmb ^Ä bb-b-b-b-b-b-b-b-b	□□ □□ □□ □□ □□ □□ □□

DIET (SECTION D)/ Blm-c-coXn (Un hn`mKw)

ASp⁻ `mKw \nS^Ä Ign-]p[¶]]⁻-j-dn-l-sfbpw]g-h^Äα-S-sfbpw]pdn⁻p-f-f-Xm-Wv. Fsâ]jn^Â Ah-bpsS DZm-l-cWw ImWn-
]p[¶] Nn{X-S^Ä D-v. Hmtcm Nn{Xhpw Hcp t\cw Ign-]p[¶]]g⁻nsâ Af-hmWv ImWn-]p-]p-Xv. Cu tNmZy-S^Äjv D⁻cw \Ä]p-
t¼m^Ä Ign^a h^Äjs⁻ km[m-cW HcmgvN Hm^Ä]p-l.

D1	27	km[m-cW Hcp BgvN-bn ^Â Xm! ^Ä F{X Znhkw]g-h ^Ä α-S ^Ä Ign]pw ?	bb-b-b-b-b-b-b-b-b	□
D2	28	Ign-]p [¶] Znh-kS-fn ^Â , F{X-am{Xw]g- h ^Ä α-S ^Ä Hcp Znhkw Ign]pw?	..-b-b-b-b-b-b-b-b --	□
D3	29	Hcp km[m-cW BgvN-bn ^Â Xm! ^Ä F{X Znhkw] ⁻ -j-dn-l ^Ä Ign-]pw?	bb-b-b-b-b-b-b-bb	□
D4	30	Ign-]p [¶] Znh-k-S-fn ^Â , Hcp Znhkw F{X-		□

		am{Xw } ;dn-lÄ lgn;pw?	----p-p-p-p-p----p-p	
D5	31	GXv Xcw F®-bmWv km[m-c-W-bmbn ho«nÂ]mN-l-n\ v D]-tbn-Kn-;p-ŒXv? (Afhv tc]-s,-Sp- p-lp F{X kv}q-)	<ul style="list-style-type: none"> • kkyF® • s\;v/ sh® • shfns® • aäpf-fh {}tXy-ln'v Hsc®bpw D]-tbn-Kn- ;p-ŒnÄ	

PHYSICAL ACTIVITY (SECTION P)/ imco-cnl A²zm\w (]n.-hn-`m-Kw)

Hcp km[m-cW BgvN-bnÂ Xm!Ä sN;pg Imbn-lm-²zm-\-s-;p-dn-`mWv C\n-bp-ff tNmZy-ŠÄ. \nŠÄ tPmen sN;mg³
 Nne-h-gn-;pŒ ka-b-s-`än Nn'n-;pl (h\DA,-Œ-ŠÄ tij-cn-;Ä, l;jn, thX-\-ap-ff tPmen, ho«p-tPm-en, ao³]n-Sp-`w,]T-\w,
 tPm-en, At\z-jWw apX-em-b-h.) NphsS]d-²n-cn-;p-Œ-XnÄ ITn-\m-[zm\w FŒmÄ izmk-K-Xnbpw \mUn CSp,pw lq«pŒ
 ITn-\-amb Imbnl]-hr-`n-l-fm-Wv. anXm-[zm-\w]p izmk-K-Xn-bnepw \mUn CSp-,nepw sNdnb tXmXnÄ hÄ²-\-hp-m-
 ;pŒ anX-amb Imbnl]]hr-`n-lÄ

Work

P1	32	lpdªXv io an\n-s«-!nepw XpSÄ-`bmbn ITn-\m-²zm\w DÄs,-«-XmtWm Xm!- fpsS tPmen? (D-Zm. `mcw Npa;pl, `mcw DbÄ`p-l, lpgn-;p-l, \nÄ½mW {}hÄ`w apX-em-b-h)	AsX AÄ	□
P2	33	Hcp km[m-cW BgvN-benÄ, ITn-\m-		

		[zm\w DÄs,« tPmen F{X Znhkw D-m]pw?	þþ-þ-þþ Znhkw/ BgvN	□□
P3	34	Hcp km[m-cW Znhkw F{X kabw Xm!Ä ITn-\m-²zm\w DÄs,« tPmen sN¿m- dpt-v?	þþ-þ-þ-þþ aWn-;qÄ þþ-þ-þ-þ-þþan\n«v:	□□:□□ □□□
P4	35	Xm!-fpsS tPmen lpd-ªXv io an\n-s«- !nepw anX-amb A²zm\w th-p¶XmtWm" (D-Zm. thK-ñÄ \S-jp-l, sNdnb `mcw Npa-jpl)	AsX AÄ	□
P5	36	Hcp km[m-cW BgvN-bnÄ F{X Znhkw \nSÄ anX-amb A²zm\wDÄs,« tPmen sN¿pw	þþ-þ-þ-þ-þ-Zn-hkw /-BgvN	□
P6	37	Hcp km[m-cW Znh-kw, F{X t\cw \nSÄ anX-amb A²zm\w DÄs,« tPmen sN¿pw?	þþ-þ-þ-þþ aWn-;qÄ þþ-þ-þ-þ-þþan\n«v:	□
P7	38	km[m-cW Hcp Znhkw F{X kabw Ccn- jp-ltbn Nmcn-jn-S-jp-ltbn sN¿pw ?	þþ-þ-þ-þþ aWn-;qÄ þþ-þ-þ-þ-þþan\n«v:	□□:□□
TRAVEL TO AND FROM PLACES				
C\n-bp-ff tNmZy-SÄ Xm!-fpsS Hcp Øe-þ-\n¶pw ääv Øe-S-fn-te-jp-ff bm{X-sb-,än-bm-Wv. (D-Zm-l-c-W-ñ\n tPmen;v t]m]p-l. km[\SÄ hmSm³ t]m]p-l, N'bnÄ t]m]p-l. {]mÄ°-\m-e-b-S-fnÄ/ Bcm[-\m-e-b-S-fnÄ t]m]p-l)				
P8	39	lpd-ªXv io an\n-s«-!nepw ssk;nÄ Nhn- «p-ltbn lmÄ\S-bm-{Xtbn sN¿m- dpt-m?	D-v CÄ	□
P9	40	\n-SÄ Hcp Øe-þ-\n¶pw ääv Øe-S-fn- te;v bm{X sN¿p-¶Xv F§-s\ -bmWv?	þþ-þ-þ-þ-þþ □
P10	41	Hcp km[m-cW BgvN-bnÄ F{X Znhkw lpd-ªXv io an\n-s«-!nepw ssk;nÄ Nhn- «p-ltbn lmÄ\S-bm{X sN¿p-ltbn	þþ-þþ Znhkw/BgvN	□

		sN _ç pw?		
P11	42	Hcp km[m-cW Znhkw F{X kabw Xm!Ä ssk;nÄ Nhn-«p-lt _m \S-jp-lt _m sN _ç pw?	bb-b-b-b-b aWn-jqÄ bb-b-b-b-bpan\n«v:	□□:□□ □□□
P12	43	hnt\m-Z-th-f-l-fnÄ io an\n-s«-l-nepw ITn-\-amb imco-cn1 A ² zm\w Xm!Ä sN _ç m-dpt-m? (Hm-Sp-l, `mcw Npa-jp- l)	D-v CÄ Ds--l nÄ F{X Znhkw/ BgvN bb-b-b-b-b-b-b-b F{X aWn-jqÄ AsÄ-l nÄ an\n«v/ Znhkwbb-b-b-b-b-b-b-b	
P13	44	hnt\m-Z-th-f-l-fnÄ lpd- ^a Xv io an\n-s«- l-nepw anX-amb imco-cn1 A ² zm\w sN _ç m-dpt-m? (anX-amb thK ⁻ n-ep-ff \S,v \o'Ä, ssk;nÄ khm-cn)	D-v CÄ Ds--l nÄ F{X Znhkw/ BgvN bb-b-b-b-b-b-b-b F{X aWn-jqÄ AsÄ-l nÄ an\n«v/ Znhkwbb-b-b-b-b-b-b-b	
TREATMENT HISTORY (SECTION H)/ NnlnÖm Ncn{Xw (F-^v. hn`m-Kw)				
HISTORY OF RAISED BLOOD PRESSURE				
H1	45	Ft,m-sg-l-nepw Hcp Btcm-Ky-{}-hÄ- lt\m tUmlvStdm Xm!-f _{ps} S cà-k-½Ä±w]cn-tim-[n- ^ˆ n-«pt-m?	D-v CÄ	□
H2	46	Ft,m-sg-l-nepw AhÄ (tUmlvSÄ/B-tcm- Ky-{}-hÄ-lÄ)]cn-tim-Z-\-bnÄ Xm!Äjv càm-Xn-k-½Ä±w Df-f-Xmbn]d- ^a n«pt-m?	D-v CÄ	□
H3	47	càm-Xn-k-½Ä±-n-\mbn Xm!Ä tUmlvS-d _{ps} S \nÄt±-i-{}-lmcw Fs'- l-nepw Nnln-Öt _m acpt _ç m FSp-jp-	D-v CÄ	□

		ᄀpt-m?		
H4	48	lgn ^a 12 amk ⁻ n-\p-f-fn ^Å (1 h ^Å jw) cà- Xn-k-1/2 ^{Å±} -n\ v Xm ⁱ Ä GsX ⁻ i-nepw]mc- 1/4cy sshZys\ l-n-cptᄀm? (1m ⁻ n)	D-v C ^Å	<input type="checkbox"/>
H5	49	càmXn k1/2 ^{Å±} -n-\mbn Ct,m ^Ä Xm ⁱ Ä GsX ⁻ i-nepw]mc-1/4-cy-Nn-l-n-Ötbm {l}rXn Nnln-Ötbm acp-ᄀp-ltfm lgn- ⁱ p- ᄀpt-m cà- ^m -Xn-k-1/2 ^{Å±} -n\ v?	D-v C ^Å	<input type="checkbox"/>
HISTORY OF DIABETES				
H6	50	BtcmKy{h ^Å -l ^Å / tUmlvS ^Å Ft,m-sg- i-nepw cà-nse]©-km-c-bpsS Afhv]cn- tim-[n ⁻ n-ᄀpt-m?	D-v C ^Å	<input type="checkbox"/>
H7	51	sshZy]-cn-tim-[-\bn ^Å Ft,m-sg-i-nepw {l}talw Df-f-Xmbn tUmlvS ^Å / Btcm-Ky- {l}-h ^Å -l ^Å]d ^a n-ᄀpt-m?	D-v C ^Å	<input type="checkbox"/>
H8	52	.tUmlvS-dpsS \n ^Å t [±] -i-]-lmcw {l}ta-l- n\ v Xm ⁱ Ä ^j v Fs'-i-nepw Nnln-Ötbm acptᄀm sN ⁱ p-ᄀpt-m?	D-v C ^Å	<input type="checkbox"/>
H9	53	lgn ^a Hcp h ^Å j ⁻ n-\p-f-fn ^Å Xm ⁱ Ä GsX ⁻ - i-nepw]mc-1/4-cy-ssh-Zys\ {l}ta-l-Nn-l-n- Öbv ^j v l-n-cptᄀm?	D-v C ^Å	<input type="checkbox"/>
H10	54	Ct,m ^Ä Xm ⁱ Ä Fs'-i-nepw {l}r-Xn-Nn-l-n- Ötbm]mc-1/4cy acp-ᄀp-ltfm {l}tal Nnln- Ö-bpsS `mK-ambn D]-tbm-Kn- ⁱ p- ᄀpt-m?	D-v C ^Å	<input type="checkbox"/>
HISTORY OF CHOLESTEROL				
H11	55	Ft,m-sg-i-nepw Xm ⁱ -f ⁱ psS cà-nse slmgp-,ns ^a Afhv tUmlvS ^Å / Btcm-Ky-	D-v	<input type="checkbox"/>

		{]-hÀ-ÌÀ]cn-tim-[n-ñ-«pt-m?	CÃ	
H12	56	.ssh-Zy-]-cn-tim-[-\-bnÂ Ft,m-sg- !nepw Xm!Ä;v cà-ñÂ slmgp-,nsâ Afhv !qSp-X-em-sWĜv tUmlvÀ /B-tcm-Ky- {]-hÀ-ÌÀ]d-ªn-«pt-m?	D-v CÃ	<input type="checkbox"/>
H13	57	.tUm-lvS-dpsS \nÂt±-i-]-lmcw CXn\ v Xm!Ä Fs'-!nepw Nnln-Õtbn acptĜm sN; p-Ĝpt-m?	D-v CÃ	<input type="checkbox"/>
H14	58	!gnª Hcp hÄj-ñ-\p-f-fnÂ Xm!Ä GsX- !nepw]mc-¼-cy-ssh-Zys\ CXnsâ Nnln- Õbv;v kao-]n-ñ-cptĜm?	D-v CÃ	<input type="checkbox"/>
H15	59	Ct,mÄ Xm!Ä Fs'-!nepw {]lr-Xn-Nn- lnÕtbn]mc-¼cy acp-Ĝp-lfm slmgp- ,nsâ Afhv !pd-bv;v-\mbn D]-tbn-Kn- ;m-dpt-m?	D-v CÃ	<input type="checkbox"/>
HISTORY OF CARDIOVASCULAR DISEASES				
H 16	60	\nŠÄ;v Ft,m-sg-!nepw lrZ-bm-Lm- Xtam lrZ-b-kw-_-Ô-amb Akp]w aqe-ap- ffs\©p-th-Z-\-tbn,]£m-Lm-Xtam hĜn-«pt-m?	D-v CÃ	<input type="checkbox"/>
HISTORY OF LIFESTYLE ADVICE				
!gnª 3 hÀ-ñ-\p-f-fnÂ Hcp tUmlvtdm Btcm-Ky-]-hÀ-Ìt\m Ch-bnÂ GsX-!nepw sN; m³ Xm!sf D]-tZ-in-ñ-cptĜm? (Hm-tcmĜpw AS-bm-f-s,-Sp-̄p-l)				
H 17	61]pl-hen Dt]-£n-;p-l.]pl-h-en-ioew BhÀ-ñ-;m-Xn-cn-;pl	D-v CÃ	<input type="checkbox"/>
H18	62	Blm-c-ñÂ D,nsâ D]-tbnKw !pd-bv;vpl	D-v CÃ	<input type="checkbox"/>
H19	63	Znh-k-ñÂ 5 Xh-W-sb-!nepw]g-Šfpw	D-v	<input type="checkbox"/>

]̄-j-dn-lfpw lgn-jpl	CÃ	
H20	64	Blm-c-nÂ slmgp-,nsâ Afhv lpd-bv;jpl	D-v CÃ	<input type="checkbox"/>
H21	65	lmbnl {}hr-n-l-fnÂ GÃs,-Spl	D-v CÃ	<input type="checkbox"/>
H22	66	Btcm-Ky-l-c-amb ico-c-`mcw \ne- \nÃ-pl AsÃ-!nÂ ico-c-`mcw lpd-bv;jpl	D-v CÃ	<input type="checkbox"/>
CERVICAL CANCER SCREENING (Women only)				
ASp- tNmZyw skÃhn-jÂ lm³kÃ XS-bp-Œ-Xn-s\ -jp-dn-`mWv				
CX1	67	\nŠÄ;jv Ft,m-sg-!nepw skÃhn-jÂ lm³k- dnsâ]cn-tim-Hm-[\ \S-`n-bn-«pt-m? (]m-]vkvan-bÃ)	D-v CÃ	<input type="checkbox"/>
PHYSICAL MEASUREMENT (SECTION M)				
HEIGHT & WEIGHT				
M1	68	Xm!Ã KÃ`nWn BtWmb	D-v CÃ	<input type="checkbox"/> <input type="checkbox"/>
M2	69	Dbcw		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M3	70	ico-c-`mcw		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M4	71	Ac-sl-«nsâ Npä-fhv		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
BLOOD PRESSURE				
M5 a	72	Reading 1		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M 5b	73	Reading 2		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M5c	74	Reading 3		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Interview : Complete/ Incomplete

Signature of the investigation

Any other comment


Date & Time of interview


APPENDIX V

Diet (Typical Fruit and Vegetables and Serving Sizes)

For use with This show card relates to:

Step	Section	Items
Step 1, diet	D	D1 to D4

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

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

Serving size One standard serving = 80 grams (translated into different units of cups depending on type of vegetable and standard cup measures available in the country).





Note: Tubers such as potatoes and cassava should not be included.

Q4010-Q4017:

Appendix A4.2: Alcohol Card

Alcohol Use

1 standard drink =

			
1 standard bottle of regular beer (285ml)	1 single measure of spirits (30ml)	1 medium size glass of wine (120ml)	1 measure of aperitif (50ml)

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

ALCOHOL EQUIVALENTS:

Wine:

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

Beer:

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

Hard Liquor:

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

APPENDIX VI

श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान
तिरुवनन्तपुरम - 695 011, केरल, भारत
SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY
THIRUVANANTHAPURAM - 695 011, INDIA
(An Institute of National importance under Govt. of India)



Institutional Ethics Committee (IEC Regn No. ECR/189/Inst/KL/2013)

SCT/IEC/608/JUNE -2014

16-06-2014

Ms. Priyanka .S
MPH Student
AMCHSS, SCTIMST.

Dear Ms. Priyanka .S,

The Institutional Ethics Committee reviewed and discussed your application to conduct the study entitled "PREVALENCE OF NON COMMUNICABLE DISEASE RISK FACTORS AMONG KANI TRIBE IN THIRUVANANTHAPURAM DISTRICT, KERALA" (IEC/608) on 7th June, 2014.

The following documents were reviewed:

- 1) Cover page.
- 2) Principal investigator's short curriculum vitae.
- 3) Research proposal.
- 4) Informed consent - English.
- 5) Interview schedule - English.
- 6) Translated informed consent - Malayalam.
- 7) Translated interview schedule - Malayalam.
- 8) Show cards - WHO.
- 9) Covering letter addressed to the Chairman, IEC, SCTIMST dated 13.06.2014 agreeing to the requirement of providing a summary of the findings to the Department of Tribal Welfare on completion of the study.

Page 1 of 2

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The following members of the Ethics Committee were present at the meeting held on 7th June, 2014 at G. Parthasarathi Board Room, AMCHSS, SCTIMST.

SL. No.	Member Name	Highest Degree	Gender	Scientific /Non Scientific	Affiliation with Institution(s)
1.	Justice Gopinathan, P.S	BSc. LLB	Male	Legal Expert (Chairperson)	No
2.	Dr. Meenu Hariharan	DM	Female	Clinician (Gastro-Enterologist)	No
3.	Dr. M.D. Gupte	MD. DPH	Male	Public Health	No
4.	Dr. R.V.G. Menon	PhD	Male	Lay Person	No
5.	Dr. Mala Ramanathan	MSc, PhD, MA	Female	Ethicist/Social Scientist (Member Secretary)	Yes

IEC Decision

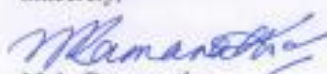
1. The IEC approved the conduct of the study in the present form.

Remarks:

The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

There was no member of the study team /guide who participated in voting / decision making process. The ethics committee is organized and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council of Medical Research (ICMR).

Sincerely,



Mala Ramanathan
Member Secretary, IEC