ASSESSING THE PREVALENCE OF HYPERTENSION AND STRESS AMONG PEOPLE LIVING IN THE CAR NICOBAR ISLAND, INDIA.

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DECLARATION

I hereby declare that this dissertation titled 'Assessing the prevalence of hypertension and stress among people living in the Car Nicobar Island, India' is a bonafide record of my original 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 Information derived from the published or unpublished work of others been duly acknowledged in the text.

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CERTIFICATE

Certified that the dissertation titled 'Assessing the prevalence of hypertension and stress among people living in the Car Nicobar Island, India' is a record of the research work undertaken by Dr. Rohit in partial fulfilment of the requirements for the award of the degree of "Master of Public Health" under my guidance and supervision.

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Glossary of abbreviation

HTN	HYPERTENSION
CVD	CARDIO-VASCULAR DISEASES
PATA	PROTECTION OF ABORGINAL TRIBES ACT, 1956
HPA	HYPOTHALAMIC- PITUITARY ADRENAL AXIS
GAS	GENERAL ADAPTION SYNDROME
PSS	PERCEIVED STRESS SCALE
SRSS	SOCIAL READJUSTMENT RATING SCALE
BP	BLOOD PRESSURE
NNMB	NATIONAL NUTRITION MONITORING BOARD
GBD	GLOBAL BURDEN OF DISEASES
GHO	GLOBAL HEALTH OBSERVATORY
BMI	BODY MASS INDEX
SBP	SYSTOLIC BLOOD PRESSURE
DBP	DIASTOLIC BLODD PRESSURE
A&N	ANDAMAN AND NICOBAR ISLANDS
ST’s	SCHEDULED TRIBES
ICMR	INDIAN COUNCIL OF MEDICAL RESEARCH
JNC	JOINT NATIONAL COMMITTEE
MET	METABOLIC EQUIVALENT OF TASK
WHO	WORLD HEALTH ORGANIZATION
DALY’S	DISABILITY- ADJUSTED LIFE YEAR
NNMB	NATIONAL NUTRITION MONITORING BEUREAU
TTSC	TRANSACTIONAL THEORY OF STRESS AND COPING

ABSTRACT

Introduction: Hypertension is considered as an important public health challenge. A study model predicting future cases of hypertension, estimated approximately 1.5 billion to be hypertensive in 2025, globally. Stress, on the other hand if persists for a longer period, may cause ill-health outcomes.

Objectives: The study aims to estimate the prevalence of hypertension and stress among the people of Car Nicobar Island, India.

Method: A cross-sectional study was conducted between January 2020 and February 2020 in seven villages of the Car Nicobar Island. The study interviewed 250 participants aged 18- 69 years using the pre-designed WHO steps questionnaire (part -1 and part -2) and the Global measure of perceived stress scale developed by Sheldon Cohen. Blood pressure and basic anthropometrics were measured. Two-stage cluster sampling was done to draw participants. Descriptive statistics and bivariate analysis were applied to find out the determinants of hypertension and stress.

Results: The overall prevalence of hypertension among the participants was 62.4% (95% CI; 56.2 - 68.2). Out of 171 individuals, 167 had a moderate level of perceived stress. The average PSS score was 19.67 (SD-2.74) and the score ranged between + 12-30. Hypertension was significantly associated with older age (44-69), smoking and alcohol consumption. PSS score was high among younger age group (18-43yrs) as compared to older.

Conclusion: Hypertension prevalence was high among the adult tribal population of Car Nicobar Island. Perceived stress among the participant was at a moderate level. Since Nicobarese tribes are mostly confined to the Island and their population saw a decline after the Tsunami of 2004, it is important to protect them from lifestyle diseases which can be prevented with timely action.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

INTRODUCTION

1.1.1 Background

Hypertension as a condition has transformed into a potential risk factor for many diseases. It is a major cause of morbidity and mortality associated with heart, brain, kidney and other diseases. (Foëx and Sear, 2004)

There are 1.3 billion people worldwide with the condition of hypertension and also one in four men and one in five women had hypertension in 2015.While the symptoms of hypertension may not be noticeable, thus making it "The Silent killer", early detection may prevent the premature deaths associated with it. ("WHO | Blood Pressure," 2015)
Stress can simply be defined as our body's response to pressures from a situation or life event. The study from Mental Health foundation (United Kingdom) reveals almost 74 percent individuals have at some point, felt so stressed that they were unable to cope up with the situations. (Chiara samele et al, 2018)
Stress can also be seen as a major concern in today's growing world. Stress is a process where different intrinsic or extrinsic stimulus elicits the biologic responses, depending on the type, nature and duration. The response may range from alteration in biological equilibrium to even life-threatening diseases.(Brindley and Rolland, 1989; Michie, 2002)
Etiopathogenesis of hypertension is a complex process and includes both behavioral and genetic factors. Globalization and modernization have pushed people towards a rapid cultural and social change with an increase in the exposure to anxiety, stress and

depression. Sympathetic nervous system responds to acute stress by releasing catecholamine which in turn increases the blood pressure, heart rate and cardiac output.(Liu et al., 2017; McEwen, 1998)

More scientific research is needed on the distribution of different stressors present in the environment, which may vary with different communities living in different settings and practicing different methods, especially 'tribal groups' who are subjected to regular pacification and have modified their living in very recent times.

Nicobar Islands

The Nicobar Islands are a secluded archipelago situated 1,200 km off the east coast of India in the Bay of Bengal. The territory along with the Andaman Islands to the north, constitute the boundary between the Southern Bay of Bengal (west) and Andaman Sea (east). The Nicobar group includes the islands of Car Nicobar (North), kamorta and Nancowry (Central), and Great Nicobar (South). ("Nicobar Islands | islands, India," 2009)

The Car Nicobar is the administrative capital of the Nicobar group of Islands and serves as the point for various exchanges like administrative, economical, health care, shipping and cargo activities with Port Blair (Capital city of Andaman and Nicobar Islands,) which is situated approximately 250 km away.

Car Nicobar and its people

It acts as the only important town of the Nicobar group of Islands and is predominated by '*Nicobarese'*, who belong to one of the two ethnic groups which also includes the '*Shompen'* (reserved to The Great Nicobar). (UT profile, 2019)

Car Nicobar is flat with rich fertile soil and the Island is densely forested with coconut, betel-nuts palm and pandanus, mango, margosa, and beefwood (casuarinas tress). Agriculture to a small extent is the only principal occupation. Copra (dried coconut)

making and oil pressing are the chief industries. (“Nicobar Islands | islands, India,” 2009)

The Directorate of Shipping Services (DSS) and Civil Aviation (DGCA) runs the services between the two Islands for supplying food grains, vegetables, fruits and other essential commodities such as postal facilities, healthcare and medicines with the help of intermittent cargo or shipping services. People who are employed to these Islands, under the government of India, can travel only with appropriate documents. The emergency services like air ambulance and airlifting of serious patients between the Car Nicobar and Port Blair are carried by Pawan Hans helicopter service under the Government of India initiative to connect this group of Islands to the administrative capital, Port Blair. These factors are responsible for the intermittent supplies and thus make it a 'hard area' (self-used term by the locals).

The Nicobarese tribal population dwells in circular huts known as '*ma pati tuhet'* 'which is made up of indigenous material and vernacular architecture to form an eco-friendly abode. One ‘*tuhet'* generally comprises of 10 to 20 smaller huts or households with extended or close relatives.

At the time of global interaction, these islanders had started bridging themselves with the external world with improvement in literacy level and following the concept of cooking, western attire, motor vehicle, and trading. The adaption of the prevailing culture is a strong evidence of the acculturation of the society and dilution of local tribal beliefs and culture. (Singh, 2003)

1.2 LITERATURE REVIEW

1.2.1 Definition of hypertension

WHO states that, “Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Blood is carried from the heart to all parts of the body in the vessels. Each time the heart beats, it pumps blood into the vessels. The heart continuously pumps the blood against the vessel walls and creates a force known as, ‘Blood pressure’. The higher the pressure, the harder the heart has to pump.” ('A global brief on hypertension,' 2013)

Hypertension is significantly affecting India as the prevalence shows an ascending trend. The major causes suggested are socio-demographic factors and lifestyle factors that are accelerating the hypertension epidemic currently in India. (Wang et al., 2014)

1.2.2 Burden and epidemiology of hypertension

Global picture

According to the global health observatory’s report on the current trends and situation; presently, hypertension is estimated to cause 7.5 million global deaths; it is almost 12.8 percent of the total deaths. Hypertension contributes to 57 million disability-adjusted life years (DALYs) or 3.7 percent of total DALYs. Globally, the overall prevalence of hypertension in adults aged 25 or more was around 40 percent in 2008. (Geldsetzer et al., 2019)

Due to the population explosion and aging factor, the number of hypertension cases, including uncontrolled and resistant cases, rose to more than one billion currently. (“WHO | Blood Pressure,” 2015)

The prevalence of hypertension was highest in the African region; it was 46 percent for overall sexes. Men had slightly more prevalence as compared to the women of the same region, globally. Across the income groups of countries, the prevalence of hypertension was consistently high in low, lower-middle, and upper-middle countries contributing to 40 percent. The prevalence in high-income countries was lower at 35 percent (Geldsetzer et al., 2019).

Indian scenario

In India hypertension is a major contributor as a potential risk factor of cardiovascular diseases (CVD's). According to the Global Burden of Disease (GBD) in 2016, "hypertension attributed to 1.63 million deaths in India in the year 2016 alone". (Gakidou et al., 2017)

In recent years, due to urbanization and migration, the disease has made place in rural regions of the country as well. The conjunction of urban-rural factors has led to a higher proportion of hypertensive young Indian men and women. In recent years, there is also a rise in the resistance of hypertension, where studies are preliminary and very less research has been done. (Anchala et al., 2014)

Hypertension in Nicobar context

One of the studies conducted in Car Nicobar Island demonstrated a high prevalence of hypertension, which was 50.5 percent [95% CI, 46.1- 54.9 (M: 50.7%; F: 50.3%)]

'among adults (18 and above age groups).This study further explored the prevalence of risk factors associated with hypertension such as tobacco, alcohol consumption, and overweight which was 88, 54, and 37 percent respectively. The study also mentioned a high prevalence of smokeless tobacco (almost 94% among the users) consumption and

that the majority of alcohol consumers used 'toddy', traditionally made from coconut palm sap. The alcohol and smokeless tobacco consumption as risk factors didn't add to the risk of hypertension in the above mentioned study because the total alcohol users (77%) fitted into a low risk to moderate category of less than eight, based on the AUDIT scale (Manimunda et al., 2011b). Whereas the association between smokeless tobacco usage and the risk of hypertension lacks evidence. (Westman, 1995)

‘Toddy’ is the only fermented alcohol present in the Island as the manufactured liquor sale is prohibited within the Island due to the implementation of Protection of Aboriginal Tribes Act (PATA, 1956) which was amended under *‘the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) regulation, 2012* includes stringent punishment including imprisonment for exploitation of tribal communities in the Andaman and Nicobar, Islands.

1.2.3 Diagnosis and classification of hypertension: The detection of hypertension is based on the amount of rise in threshold level of blood pressure (B.P) in any patient at or above 18 years of age. The classification for hypertension is drafted and reviewed by a committee called the "Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure." (Chobanian, 2003) Table 1.1 The JNC Seven guidelines and cutoff for the classification of hypertension

Blood pressure classification	SBP mm hg	DBP mm hg
Normal	<120	and <80
Pre-hypertension	120–139	or 80–89
Stage 1 Hypertension	140–159	or 90–99
Stage 2 Hypertension	>160	or >100

The classification is based on the average of two or more properly measured seated arterial blood pressure readings on each of the two or more office/home visits. In contrast to the classification provided in the JNC sixth report, a new category, designated as ‘pre-hypertension’ has been added and stages two and three of hypertension have been combined.(Chobanian, 2003)

Newer guidelines and recommendations

There was a long due for updating the new evidence-based guidelines and treatment recommendations for the categorization of hypertension. In the year 2014, the new guidelines stressed on the age groups and existing morbidities was to be taken in account for the classification and management of hypertension. If the subject is 60 years or older, the cutoff of SBP will be 150 mmHg or higher and that of DBP will be 90 mmHg or higher then subject will be classified as hypertensive.

The general hypertension classification based on the threshold blood pressure. (James et al., 2014)   Table 1.2 JNC eighth classifications (2014)

BP category	Systolic mmHg(upper number)		Diastolic mmHg(lower number)
Normal	Less than 120	and	Less than 80
Elevated	120-129	and	Less than 80
Hypertension stage 1	130-139	or	80-89
Hypertension stage 2	140 or higher	or	90 or higher
(*if you are younger than 60 years) / if you have diabetes or kidney disease at any age*			
Hypertensive crisis	Higher than 180	and/or	Higher than 120
(consult your doctor immediately)			

1.2.4 Risk factors associated with hypertension

The risk factors are classified as major and minor factors which increases the propensity of hypertension among the exposed population.

Overweight and Obesity

The hypertension risk is clearly associated with the increase in Body mass index (BMI) of the individuals. Study shows a worldwide 35 percent of adults aged 20 years and over were overweight, and 11 percent were obese. (Ravi et al., 2015)

A study was conducted on *'Kani'* tribe of Kerala in 2018 which revealed around 20 percent prevalence of abdominal obesity and 10 percent of overweight in the above said tribe. (Sajeev and Soman, 2018)

Alcohol

One recent study conducted in a rural population of Bangalore explores the other major risk factors such as alcohol consumption and reveals a significant association with hypertension. Among the rural Bangalore population, 14 percent had the habit of regular alcohol consumption, out of which more than a third (38.96%) had hypertension. The odds ratio between alcoholics and non-alcoholics was as high as 21, which means that there is 21 times more risk of getting hypertension among the alcoholics. (Ravi et al., 2015)

Physical Inactivity

A case-control study conducted in the rural township of Tasgaon in Maharashtra reported a significant association between hypertension and leisure-time physical

inactivity (p = 0.009). The odds of getting hypertension were found out to be 2.51 in the absence of physical activity. (Sagare M et al., 2011)

Age

A study conducted among rural tribal adults in a subdivision of Darjeeling showed that the middle-aged group (35-44 years) had 4.4 times higher odds (AOR 4.4, 95% CI: 1.1, 17.2) of hypertension compared to the young adults. On the other hand, 45-54 and 55-64 age groups showed raised odds of hypertension but it was not statistically significant. (Ditipriya Bhar et al., 2019)

Tobacco products

A cohort study was conducted in rural Kerala for seven years, with a sample size of 297 individuals aged between 15–64 years. Subjects were free of hypertension at the time of study enrolment and were followed-up from 2003 to 2010. Nearly 23.6 percent of the sample developed hypertension over a mean follow-up period of 7.1 (standard deviation 0.2) years. The current smokers were found to be at a higher risk (RR= 1.99, 95% CI 1.14 – 2.97), population attributable risk percent (PAR%) was 13.3. (Sathish et al., 2012)

Stress

It is a well-known factor and plays a very important role in hypertension. Generally, stress can be defined as our body's response to pressures from a situation or life event, where the body and brain are involved. The hypothalamic-pituitary-adrenal (HPA) axis is stimulated to produce stress hormones (cortisol and catecholamine) that trigger a 'fight' or 'flight' and sometimes 'fear' response. (Chiara Samele et al, 2018)

Conventional researchers believed in three schools of thought about the definition of stress.

a) Stress as a response: It was initially introduced by Hans Selye in1956; he mentioned stress as a physiological response pattern. He henceforth developed a General Adaptation Syndrome (GAS) model. His model describes stress as a dependent variable and includes alarm, resistance, and exhaustion (a process of non-specific responses).

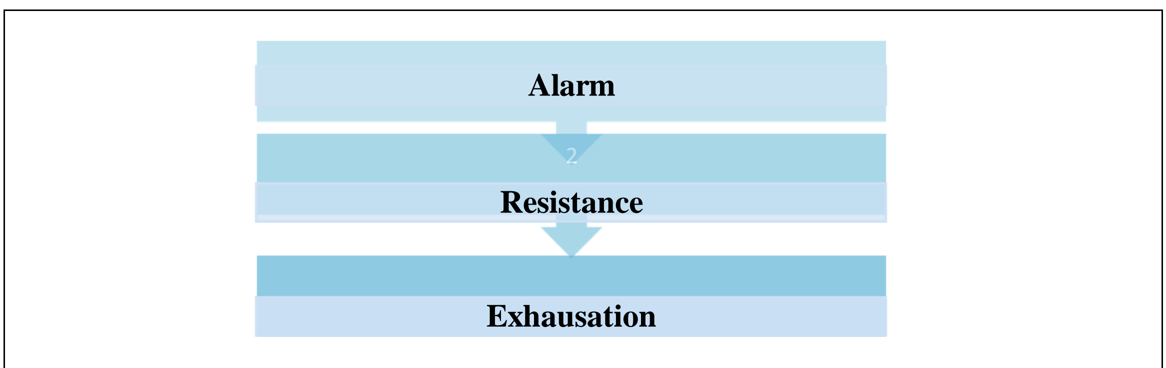

Figure 1.1 -- Hans's GAS model for Stress

b) Stress as a stimulus

Introduced in the 1960s, it viewed stress as a significant change or life event that demands a response, adjustment, or adaptation. Holmes and Rahe in 1967 created a Social Readjustment Rating Scale (SRRS) which consists of 42 life events. Here, they tried measuring the degree of adjustment people would demand of their experiences (e.g. family loss, financial loss, or any other life event). The main limitations of this study are listed below:-

The theory assumes that change is inherently stressful which may not be always appropriate.

Life events demand the same levels of adjustment across the population but it may vary.

It also assumes that there is a common threshold of adjustment beyond which illness results.

The whole concept viewed the human subject as a passive recipient of stress, not as active participation in determining the degree, intensity and valence of the stressors. (Holmes and Rahe, 1967)

c) ***Stress as a Transaction/dynamic process***

Lazarus in 1966 and Folkman in 1984 developed the Transactional Theory of Stress and Coping (TTSC). Interestingly, this theory presents stress as a product of a transaction between a person and his/her complex environment. (Lazarus and Folkman, 1999)

Nixon in the year 1982, proposed the human function curve, which shows that the relationship between stress arousal at different time phases results in different health outcomes depending upon one's load-bearing capacity against the different stressors from real-life situations. He further categorized stress as the ‘eustress’ and ‘bad stress’. Bad stressors often lead to ill health events(Nixon, 1982).

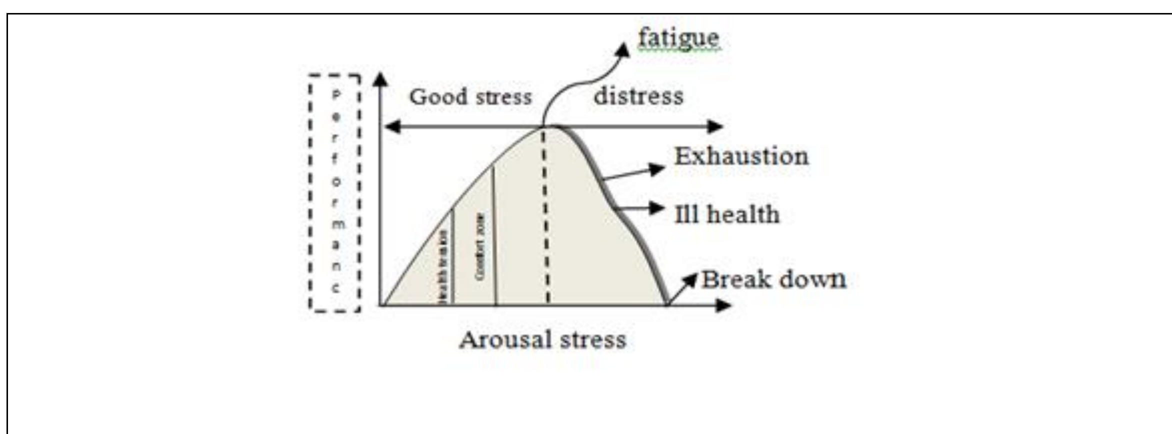

Figure 1.2-- Human function curve (Nixon, 1982)

Psychological stress has recently emerged as one of the major risk factors for Cardio-vascular disease (CVD). In 2004, the INTERHEART study was conducted involving 30,000 participants in 52 different countries. This study identified the top six modifiable risk factors: cigarette smoking, poor lipid profile, hypertension, diabetes, abdominal obesity and an index of psychosocial stress. (Rosengren et al., 2004)

The life style diseases including hypertension, is depend on the structural and social changes like changes in eating habits, consumption of alcohol and tobacco products, reduced physical activity due to nature of work and mental health conditions arising from long working hours. The risk factors are widely distributed to the large population and thus making majority at risk. (Gaziano, 2005)

Modernization

Many tribes in different parts of the world have been subjected to acculturation and pacification and some tribes and nomads face stress and anxiety due to this concept of 'modernization' and integration within the existing systems.

The acculturation not only drives Nicobarese society towards the concept of 'modernity' but also exposes them to regular pacification and lifestyle modified diseases. (Thangaraj et al., 2003)

These primitive tribes are no longer regarded as 'primitives' or 'backwards' which had been a notion about them for several years. At present, Nicobarese are coming forward in every field, including education in medical, engineering, nursing and what not. I have myself encountered young professionals from this island.

One of the studies included meta-analysis from 2003 to 2004 which concludes that acculturation to western society is associated with higher blood pressure and that the distress associated with cultural changes appears to be more influential than changes in

diet or physical activity. This particular analysis also seeks further studies to look beyond the usual risk factors of hypertension among different ethnic and tribal groups around the world. (Steffen et al., 2006)

Another such study was done on autochthonous people of Siberia – the *'Khanty'* and '*Mansi* 'tribe which stated that "modernization" and "urbanization" has resulted in some serious stressing influence on the native of Northern Siberia. (Kozlov et al., 2003)

1.2.5 Relationship between stress and hypertension

According to Andrew S, psychosocial stress is a potential contributor to the risk of hypertension, with other factors such as reduced physical activity, unhealthy diet, obesity and addictions. There are evident changes in the life style in present era, due to population explosion, causing unhealthy competition among peers; feeling of left out, and recurrent demands may add up to accumulate psychosocial stress. (Steptoe, 2008)

In 2018, a case-control study was conducted at a tertiary care hospital from June 2014 to October 2015(Maharashtra), which shows a significant association between perceived stress and hypertension. Stress was found to be an independent risk factor for hypertension.(Bhelkar S et al., 2018). If stress is persistent and is severe in nature then it could result in diseases of adaptation or even death. (Gross and Seebaß, 2016)

1.2.6 Perceived stress scale

Sheldon Cohen in his work has defined Perceived stress as "the feelings or thoughts that an individual has about how much stress they are under at a given point in time or over a given time period" and subsequently he developed the perceived stress scale (PSS) to measure the distribution of stressors among individuals. PSS can be used as an outcome variable, measuring people's experienced levels of stress as a function of objective stressful events, coping resources, personality factors, and so on. The study gives

evidence from three different settings- two of college students and one of a more heterogeneous community group; for the concurrent and predictive validities and the internal and test-retest reliabilities of the new scale. The paper also examines the relative predictive validity of the PSS and two life-event instruments. The scale also includes several direct queries about current levels of perceived stress. It is also an economical scale that can be administered in only a few minutes and its inference is easy. The PSS was designed for use in community samples with at least a junior high school education. (Cohen et al., 1983)

1.2.7 Rationale and Objectives of the study

The proposed study aims to assess the prevalence of hypertension and perceived stress levels among the Nicobarese tribe as, the exploration of any kind of relationship between hypertension and underlying minor risk factors such as perceived stress, due to the course of time and change in lifestyle of tribal population will be unknown unless scientific research is conducted.

There are research gaps, with very few studies available on tribal health, which implies the scope of exploring the association of hypertension with minor risk factors such as perceived stress, dietary salt, change in dietary habits and lifestyle modification. These underlying risk factors like the psychosocial stress and dietary salt intake were not analyzed in same population, thus requires more scientific research to demystify present knowledge.

Objectives of the study are divided into (i) major and (ii) minor risk factors

(i) To assess the prevalence of hypertension and to measure perceived stress level among the Nicobarese tribes of Car Nicobar. **(ii)** To explore any relationship between hypertension and stress, if present.

Chapter 2

Methodology

2.1 Study design

The proposed study was a community-based cross-sectional survey.

2.2 Study setting

15 villages in the Car Nicobar Islands which is the administrative headquarter for the Nicobar group of Islands.

2.3 Study population

Men and women of age group 18-69, belonging to Nicobarese tribe.

The total population as per the census 2011 is 14027.

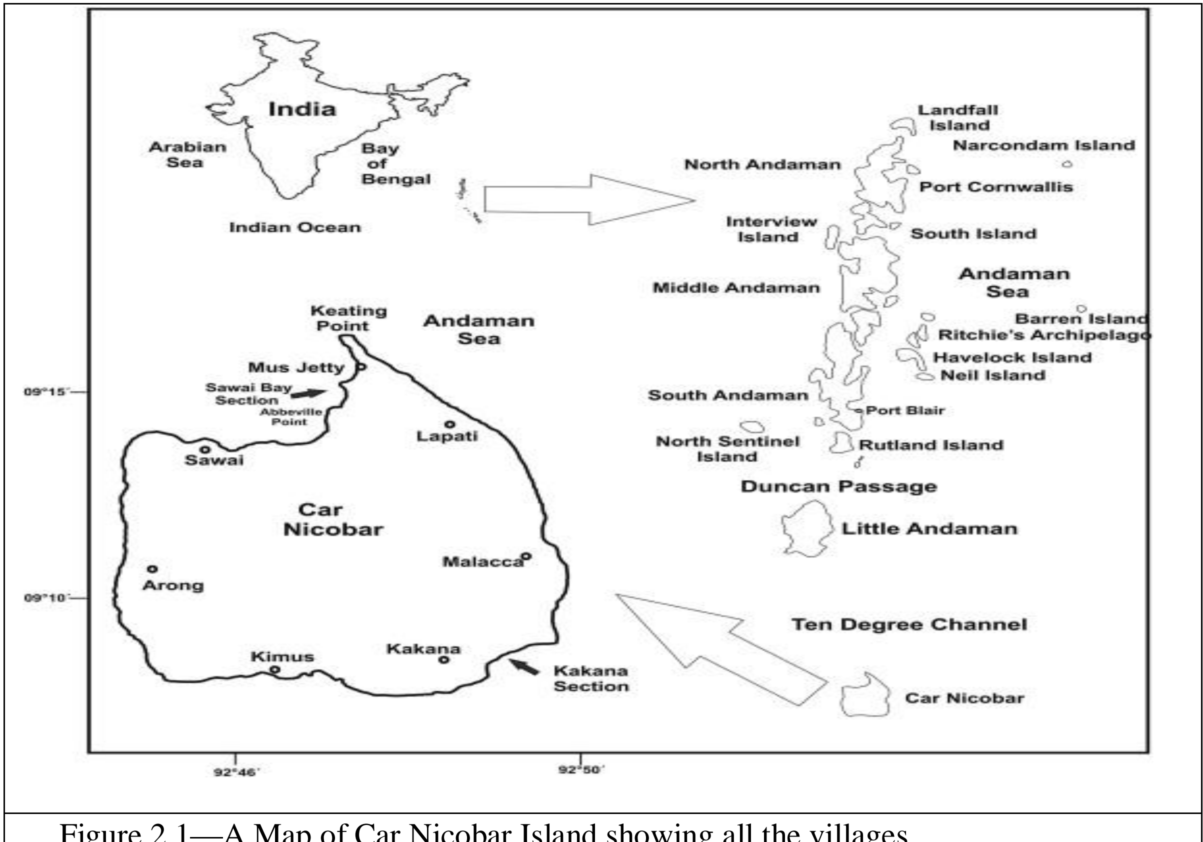

Figure 2.1—A Map of Car Nicobar Island showing all the villages.

2.4 Inclusion criteria

The Nicobarese of Car Nicobar Island whose age ranging from 18 to 69 years on Christian calendar.

2.5 Exclusion criteria

1. Debilitating illness and bedridden individuals.

2.6 Sampling criteria

Sampling was done using Cluster sampling. In this type of sampling method, the target population is divided into clusters/groups and a subset of each cluster is selected. Here in this study, tribal settlements in 15 villages of the Car Nicobar Tehsil were taken as the cluster units.

2.7 Sample size estimation

The sample size was calculated based on the prevalence of hypertension (50.5%), precision eight percent, setting significance level of five percent, design effect of 1.5, and by substituting a 10 percent drop-out rate. Final sample size was 250 participants (calculated using Open Epi 3.01).

2.8 Sample selection procedure

Cluster selection

There were 15 villages as per the list obtained from census data, 2011(part-B) excluding the Indian Air Force village (a non- Nicobarese settlement). The proposed plan was to take subjects from all the 15 villages of Car Nicobar Island but later it was modified due to time constraint as only one month permit was provided (all work were done using offline modes caused a delay in all the stages) from the Andaman and Nicobar administration due to travel restrictions present in the Car Nicobar Island under the

Protection of Aboriginal Tribes (PATA 1956, amendment 2014), under Article 240 of the Constitution of India.(Appendix IX) .Thus, clusters were reduced to seven villages which were randomly selected and 36 subjects were selected from these seven villages.

Step – 1: 15 villages (excluding IAF) were selected.

Table 2.1 List of all the villages excluding IAF villages

village code	village name	Population	Households
645012	MUS	1481	365
645013	TEETOP	518	135
645014	SAWAI	1212	286
645015	ARONG	117	233
645016	KIMOIS	382	92
645017	KAKNA	838	231
645018	IAF CAMP	731	31
645019	MALACCA	1362	368
645020	PERKA	1709	711
645021	TAMALOO	1481	379
645022	KINYUKA	1073	309
645023	CHUCKCHUCHA	485	231
645024	TAPOIMING	851	214
645025	BIG LAPATI	1057	271
645026	SMALL LAPATI	920	242
645027	KINMAI	541	152
Total		14758	4250
Nicobarese	excluding IAF	14027	4219

Step -2: 15 villages were divided into two different groups, based on its population size, namely, a) large villages b) small villages respectively.

Table 2.2 List the villages divided into two groups

Large Villages	645020	6450212	645021	645019	645022	645025	645026
Small villages	645024	645017	645027	645013	645023	645016	645015

Step-3: To maintain equal representation among the two different village groups and the randomness of cluster selection, interviewer decided to take at least 50 percent representation from two village groups; which were four out of eight from the group of the big village and three out of seven from small village group respectively.

Step- 4: Four villages from a larger population and three villages with a relatively smaller population (Table 5) were selected using a lot method. In total seven villages were used as the cluster units to draw 36 participants from each of these clusters to full fill the calculated sample size of 250.

Table 5: Final list of seven selected villages for the study

Village	Perka (HQ)	Malacca	Kinyuka	Big Lapati	Kakna	Tapoiming	Teetop
Population	1709	1362	1073	1057	838	851	518

2.9 Household selection-The interviewer visited the center of the selected settlement and selected the first household randomly by pen rotation method, thereafter selecting consecutive households, proceeding clockwise till the required sample size from each settlement was achieved.

2.10 Subject selection- One eligible subject from each household was selected using the KISH table. KISH method is a sampling method used for selecting an individual participant randomly from a household. It depends on the number of eligible individuals in the household. (Appendix V)

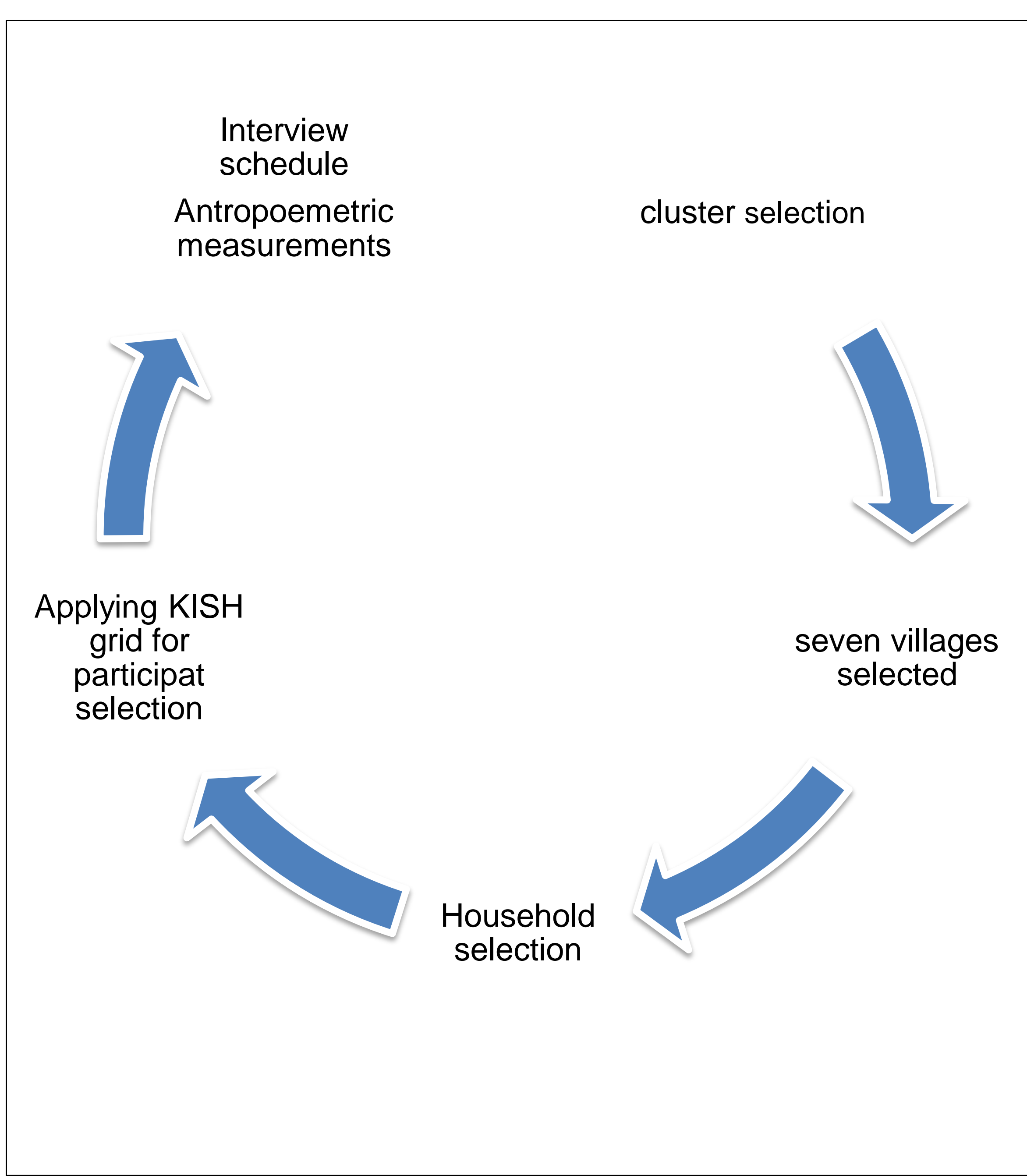

Figure 2.2 --Systematic representation of subject selection procedure

2.11 Data collection procedure

The data collection was deployed over a period of one month (January2020 – February 2020) due to the restriction as stated in the sample selection procedure. The structured interview schedule was administered by the primary interviewer and was accompanied by two ASHA workers or voluntary health workers appointed for finding an active case of tuberculosis, under the RNTCP unit of Bishop John Richardson Hospital, Car Nicobar.

The RNTCP protocol for collecting information was different and the health workers screened every household of the village and carried a survey for at least three to four days in a single village. In this study, individuals were selected based on KISH grid and the total number was set to be 36 from each cluster. The local AHSA/ Voluntary health workers provided help in terms of logistics, entry to the village, locating the central point of each village and in holding a meeting between the interviewer and the captain of the villages if needed.

Due to its constrained small geographical area, it was not difficult to survey 36 individuals in one or two days.

WHO "Step-wise approach for surveillance of NCD risk factors" and measurement of the prevalence of stress among the said tribes was assessed by perceived stress scale (given by S. Cohen, a 10item inventory).The questionnaire was administered in English, which is the widely accepted language after their own dialect of '*Nicobarese origin'*.

2.11.1 Tools used for data collection

A structured interview schedule in the form of the paperback was employed using the 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).

STEP 1 and STEP 2 data was collected as per WHO guidelines. (Appendix III)

Secondly, perceived stress scale which is a 10 item inventory was used to assess the perceived stress levels among the Nicobarese. (Appendix IV)

Items included from the WHO STEP wise surveillance instrument are as follows,

Step- 1 Behavioral risk factors

Core:

- Demographic information such as age, sex and the highest level of education
- Tobacco use
- History and treatment of hypertension
- Dietary habits
- Physical activity

Extended

- Main work status
- Smokeless tobacco consumption
- Oil consumption
- Salt intake practice

Step- 2 Physical measurements

- Height, weight, blood pressure measurements

The rationale for selection of the study tools

WHO STEP-wise approach for the surveillance of Non-Communicable Disease risk factors: The WHO step was first initialized by Armstrong and Bonitainin the year 2003. The step methodology is flexible and adaptable so that it can be used in the majority of resource-constrained settings. STEP 1 and STEP 2 are more flexible and suitable for developing countries as reported in the WHO consultation report 2009. (Riley et al., 2016)

The rationale for the usage of 'English' as the medium of communication:-

The Nicobar group contains ten inhabited islands predominated by 'Nicobarese' tribes (large population) followed by ***'Shompen'***, who resides in the Great Nicobar and speak their dialect of Nicobarese origin known as *kalay* (west) and *keyet* (east).

The Nicobarese (Austro-Asiatic language) dialect which is widely spoken in Nicobar is the 'Car Nicobarese'.

The present information about this Austro-Asiatic language is very limited, also the in - capabilities such as not being able to understand or speak their dialect have resulted in the usage of the English language as the medium of communication.

English is alternatively spoken throughout the Car Nicobar and it is a fast-growing language in this part of the country, where 98 percent population are Christian and prefers English for communicating with the outside world.

2.11.2 Procedures

Blood Pressure Measurement

Blood pressure measurements were made using OMRON HEM – 7120 battery operated automatic blood pressure monitors.

Participants were seated upright comfortably and relaxed, with feet uncrossed and feet flat on the floor. The Cuff used was of appropriate size and was wrapped around the left arm of the participant after rolling up of his/her sleeves.

The cuff was placed such that the bottom end of the cuff was 1-2 cm above the elbow and the indicator arrow was aligned with the center of Cubital fossa. A small table was kept perpendicular to the ground so that the cuff was at the level of the participant's heart.

Three readings of blood pressure were taken. The first reading was recorded after the participant had rested for 15 minutes. The second reading was done after three minutes of the first reading followed by the third reading after three minutes of the previous reading. The machine was switched off between the readings, after recording the systolic and diastolic blood pressure (mmHg). The mean of three measurements of blood pressure was used for analysis. The participant was informed of the blood pressure reading only after the last reading was obtained.

Height Measurement

The height of the study participants was measured using a SECA 213 stand-alone stadiometer. This device is portable with a measuring range from 20 to 205 cm, up to the

accuracy of one millimeter. The measuring rod is detachable. So, it was unlocked from the footplate of the measuring board and placed in the correct order. The stadiometer was placed on a flat firm surface against the wall and the spacer was used to maintain rod stable and straight. The participant was asked to remove any footwear, or headgear to avoid any effect in recording the height. The participant was asked to stand on the board facing the interviewer, keeping his/her feet together and heels placed against the back of the footplate. The interviewer noted the height in centimeters, corrected to the nearest millimeter, taking care to avoid parallax error, and then asked the participant to step away from the stadiometer.

Weight Measurement

A portable SECA 803 battery-enabled electronic weighing scale was used for measuring the weight of the participants. The weighing scale was set on a firm and flat surface. But, since it was difficult to avoid uneven and sloping surfaces because very fewer huts had cemented and uniform floor, the interviewer used the footpath connecting the huts. Participants were requested to remove footwear and remove heavy objects from their hands or pockets. The interviewer turned on the scale, waited for display to show 0.0, and then made the participant mount on the scale. The participant was asked to stand still with his/her face looking forwards, arms and hands relaxed on the sides, one foot on each side of the scale, and requested to maintain the same until requested to step off. The weight reading was recorded in kilograms (corrected up to one decimal point).

Perceived stress scale by Sheldon Cohen

Items and Instructions for the Perceived Stress Scale

The questions in this scale ask about the feelings and thoughts during the last month from the participants enrolled in the study. In each case, the participant was asked to indicate how often he/she felt or thought a certain way. The PSS questionnaire was attached to the last section of the interview schedule and it was the only section which was self-administrated. After the first few interviews, the administrator found men and women under the influence of alcohol, and because it wasn't anticipated before, so the interviewer decided not to include the PSS score of such individuals for analysis along with who were unable to read or write. (Appendix IV)

2.12 Outcome variables

The outcome variable of this study was hypertension and perceived stress level.

2.13 Independent Variables

The independent variables of this study were age, gender, education, occupation, tobacco use, alcohol consumption, physical inactivity, perceived stress level, BMI (overweight/obesity), unhealthy diet (low intake of fruits and vegetables), salt adding practice with rice/meals, oil consumption.

2.14 Operational definitions

Hypertension was defined as systolic (SBP) and/or diastolic blood pressure (DBP) > 140/90 mmHg and/or history of intake of anti-hypertensive medication in the past two weeks.

The cutoff for the identification of hypertensive subjects was made using the Seventh Joint National Committee report (JNC Seventh report).

Current tobacco use was defined as a history of smoking or the use of smokeless tobacco products within the past 30 days.

Current alcohol consumption was defined as the consumption of alcohol within the past 30 days.

Physical inactivity was self-reported in this study with two broad categories: vigorous-intensity and moderate-intensity physical activity. There was no attempt to calculate the MET score because the activities were very contextual and participants were unable to recall the duration of activities such as climbing trees, making rafts and fishing, etc.

The unhealthy diet was defined as consuming less than two servings of fruits and/or vegetables per day.

Overweight was defined as body mass index (BMI) > 25 kg/m^2

Perceived stress score

The score obtained from the scale was used to infer three pre-determined categories namely, (i) Low stress [0-13], (ii) Moderate stress [14-26], and (iii) High-stress level [27-40].

2.15 Statistical Analysis

Data was double-checked for consistency and completeness before leaving each household. It was entered into the Microsoft Excel sheet. Data were organized and presented using the principles of descriptive statistics. Categorical data expressed in proportions and mean with standard deviation was calculated for continuous data. The

chi-square and independent t-test were applied as a test of significance for categorical and continuous data respectively. Bivariate analysis entry method was applied for identifying factors associated with hypertension and perceived stress among the participants respectively.

A two-sided p-value of < 0.05 was considered statistically significant. Dataset was analyzed in IBM SPSS statistics for windows version 22.0 (Armonk, NY-IBM corp).

2.16 Ethical consideration

Ethical clearance was obtained from the Institutional Ethics Committee of Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum. Participants were informed about the purpose and process of the study and an informed concern was taken in written after the briefing.

Chapter- 3

Results

The results of the data analysis are described in this chapter. 250 individuals were surveyed and consented to participate in the study. The general analysis was done using anthropometric parameters like weight, height, and blood pressure measurements for all the participants.

3.1 Baseline characteristics are described under the following domains:

1. Socio-demographic characteristics of participants
2. Tobacco consumption
3. Alcohol consumption
4. Intake of vegetables and fruits
5. Type of oil/fat use for cooking
6. Practice related to salt consumption
7. Self-reported physical activities
8. Anthropometric measurements
9. Body mass index(BMI) categories

3.2 Description of outcome variables

1. Hypertension prevalence
2. Prevalence of perceived stress

3.3 Factors Related to Hypertension among study participants

1. Socio-Demographic Factors and hypertension
2. Tobacco, alcohol use and hypertension
3. Self-reported physical activity and hypertension
4. BMI and hypertension

3.4 Factors related to PSS level among study participants

1. Tobacco, alcohol use and PSS Score
2. Self-reported Physical activity and PSS score
3. BMI and PSS score
4. Hypertension and PSS Score

3.1 Description of the background of participants

3.1.1 Socio-demographic factors

In total, 250 adult individuals in the age group of 18-69 years were interviewed (Table 3.1). Survey includes 118 (47.2%) males and 132(52.8%) females.

Age

The participants' age ranged between 18 and 67, with a mean and SD of 42.75 and 13.32. For males, the Mean (SD) of age was 42.08(13.8) and for females 43.13(12.8).

Educational status

Among the total participants, 23 percent were reported with no formal education; around 30 percent had attained education up to high school level, whereas 45 percent had received a higher secondary or an above education.

Work status

In total, 46 percent were unemployed and 38.8 percent of them were able to work.

Table 3.1 Socio-demographic factors among the participants

Socio-Demographic Factors		Male		Female		Total	
		N=118	%	N=132	%	N=250	%
Age group	18-43	62	52.5	71	53.8	133	53.2
	44-69	56	47.5	61	46.2	117	46.8
Education	No formal schooling	21	17.8	38	28.8	59	23.6
	Up to High school	40	33.9	37	28	77	30.8
	Higher secondary and above	57	48.3	57	43.2	114	45.6
Work Status	Government Employee	18	15.3	10	7.6	28	11.2
	Private employee	15	12.7	6	4.5	21	8.4
	Student	9	7.6	9	6.8	18	7.2
	Homemaker	0	0	60	45.5	60	24
	Retired	5	4.2	3	2.3	8	3.2
	Unemployed- able to work	64	54.2	33	25	97	38.8
	Unemployed- unable to work	7	5.9	11	8.3	18	7.2

3.1.2 Tobacco consumption

Among the total participants, 21.2 percent were current smokers. Current smokers among men and women were 24.5 percent and 18.1 percent respectively. Of the total participants, 12.8 percent were current daily smokers and 79.2 percent were current users of smokeless tobacco. The prevalence of the current use of smokeless tobacco among men and women was 82.2 percent and 76.5 percent respectively. It was found that 55 percent among men and 51.5 percent among women used smokeless tobacco daily (Table 3.2).

3.1.3 Alcohol consumption

Current alcohol users among total study participants were found to be 41.6 percent (Table 3.3). Among men, the prevalence of current use of alcohol was 39 percent and among women, it was 44 percent. Around 61 percent of men and 58.3 percent of women had ever consumed alcohol. Most of the tribes were using their local preparation of alcohol from coconut sap ("toddy").

Table 3.2 Tobacco consumption among the participants

Tobacco consumption	Male	Female	Total
	N=118(%)	N=132(%)	N=250(%)
Current smokers	29 (24.5)	24 (18.1)	53(21.2)
Daily smokers	18 (15.2)	14 (10.6)	32 (12.8)
Current use of smokeless tobacco	97 (82.2)	101 (76.5)	198 (79.2)
Daily use of smokeless Tobacco	65 (55.0)	68 (51.5)	133(53.2)

Table 3.3 Alcohol consumption among the participants by sex

Alcohol consumption	Male N = 118(%)	Female N = 132(%)	Total N = 250(%)
Ever consumed alcohol	72 (61.01)	77 (58.33)	149 (59.6)
Current alcohol use	46 (38.98)	58 (43.93)	104 (41.6)

3.1.4 Pattern of consumption of fruits and vegetables

Among the total tribal participants, no one consumed at least five servings of fruits and vegetables per day. 85.2 percent of the total consumed less than two servings of fruits and vegetables per day. (Table 3.4)

Mean and standard deviation of the number of servings of fruit consumption per day was 1.02 and 0.24 respectively. The mean and standard deviation of the number of servings of vegetable and fruits consumption per day was 1.10 and 0.36 respectively. (Table 3.5)

Geographical isolation and less agriculture force resulted in scarcity of fresh fruits and vegetables in the Nicobar group of Islands. All vegetables and other raw materials have been supplied from Port Blair (250 km away from Car Nicobar).

The average consumption days of vegetables on a typical week was 2.5 days and average consumption days of fruit was 1.6 days. Almost 85 percent of the population reported intake of less than or equal to 2 servings of vegetables and fruits whereas only 15 percent reported consuming at least 3 servings or more of vegetables and fruits per day on a typical week.

Table 3.4 Mean values for fruits and vegetable consumption among the participants

Intake of fruits and vegetables/day	Male N = 118(%)	Female N = 132(%)	Total N= 250(%)
≤ 2 servings of fruit and vegetables/day	100 (84.8)	112 (84.9)	212 (84.8)
≥ 3 servings of fruit and vegetables/day	18 (15.2)	20 (15.1)	38 (15.2)

Table 3.5 Mean and SD of fruits and vegetables intake among the participants

	Male	Female	Total
Vegetables and fruit intakes	Mean ± SD	Mean ± SD	Mean ± SD
Number of days of vegetable intake in a week	2.53 ± 1.45	2.56 ± 1.29	2.58 ± 1.37
Number of servings of vegetables on those days	1.10 ± 0.37	1.10 ± 0.35	1.10 ± 0.36
Number of days of fruit intake in a week	1.74 ± 1.0	1.53 ± 0.82	1.63 ± 0.91
Number of servings of fruits on those days	1.03 ± 0.25	1.0 ± 0.23	1.02 ± 0.24

3.1.5 Pattern of consumption of cooking oil/fat

Among total participants, 54.4 percent used only vegetable oil for their cooking purpose, followed by palm oil in 26.4 percent of participants. 14.4 percent used both vegetable oil and palm oil. (Table 3.6)

Table 3.6 Oil consumption among the participants

The main type of oil used	Male N=118(%)	Female N=132(%)	Total N=250(%)
Vegetable oil	59 (50.0)	77 (58.3)	136 (54.4)
Coconut oil	1 (0.8)	9 (6.8)	10 (4.0)
Palm oil	38 (32.2)	28 (21.2)	66 (26.4)
Vegetable and palm oil	20 (16.9)	16 (12.1)	36 (14.4)
Coconut and palm oil	0	2 (1.5)	1 (0.8)

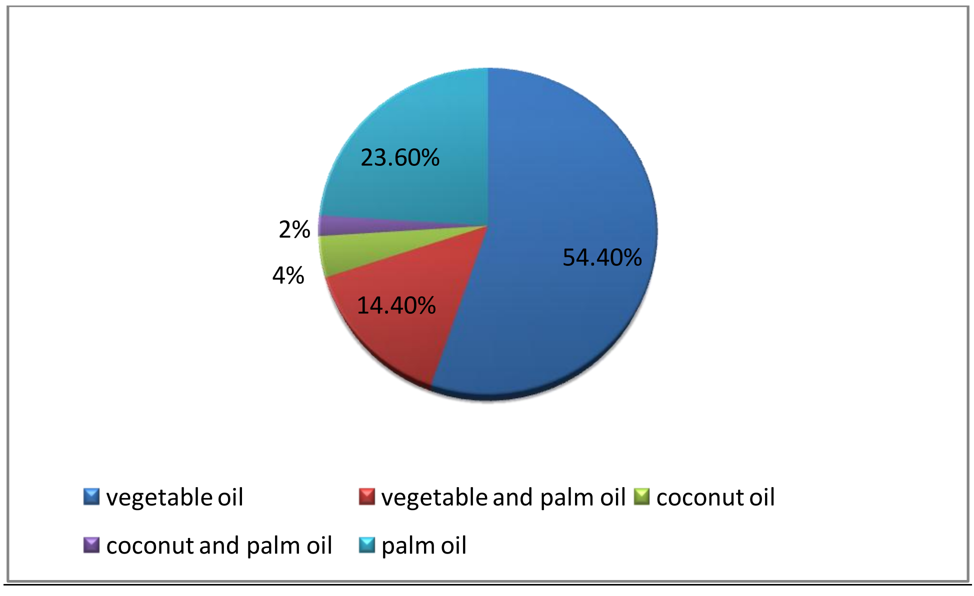

Figure 3.1 – the percentage of the usage of cooking oil

3.1.6 Practice of adding salt to rice while cooking/serving

The practice of adding salt to the rice while cooking or serving it with raw fish meat is a traditional practice and can be witness easily.

Among total participants, almost 75 percent reported adding salt to the prepared or served rice during meal time. (Table 3.7)

Table 3.7 Practice of adding salt

	Male	Female	Total
Adding salt to rice when being cooked or served	N=118(%)	N=132(%)	N=250 (%)
Yes	87 (73.7)	100 (75.8)	187 (74.8)
No	31 (26.3)	32(24.2)	63(25.2)

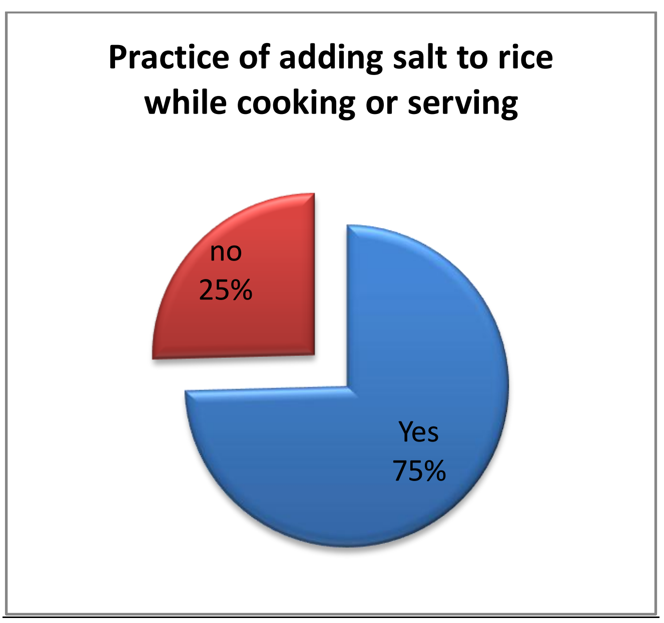

Figure 3.2 –Percentage of participants adding salt to the rice

3.1.7 Self-reported physical, recreational, sports and fitness activities

The study participants were asked to self-report about doing any physical activity. Based on the various activities such as running, brisk walking, swimming, tree climbing, boat racing, and cycling, the physical activities were categorized in three groups namely:- (i) *Moderate intensit*y = sports, fitness activities that cause a small increase in breathing or heart rate like (walking, cycling, and swimming). (ii) *Vigorous-intensity*: - sports, fitness activities that cause an increase in large breathing or heart rate (running) for at least 10 minutes continuously. (iii) *No physical activity*: - people who reported none of the above mentioned from two categories of physical activities. In total, 159 (63.6%) reported doing no physical activity, 91(36.4%) individuals reported doing physical activity, out of which nearly 20 percent had moderate-intensity physical activity, and remaining had vigorous fitness activities. (Table 3.8)

Table 3.8 Self-reported physical activities

	Male	Female	Total
Self-reported physical activity	N=118(%)	N=132(%)	N=250 (%)
No physical activity	72 (61)	87 (66)	159 (63.6)
Moderate intensity	24 (21)	25 (19)	49 (19.6)
Vigorous-intensity	22 (18)	20 (15)	42 (16.8)

3.1.8 Basic anthropometric measurements

Mean ± Standard deviation, height, and weight among participants were 1.57 ± 0.93 and 63.09 ± 13.11 respectively. Mean and standard deviation of BMI in the whole sample was 25.52 and 4.94 respectively (Table 3.9). In table 3.10, it is reported that only a small proportion was underweight and 48 percent were either overweight or obese.

Table 3.9 -- Mean values of height, weight, BP, and BMI among the participants

Measurements	Male Mean ± SD	Female Mean ± SD	Total Mean ± SD
Height(meters)	1.58 ± 0.93	1.57 ± 0.94	1.57 ±0.93
Weight(kg)	63.38 ± 13.21	62.87 ±13.06)	63.09 ± 13.11
BMI(kg/m^2)	25.48 ± 5.01	25.56 ± 4.89	25.52 ± 4.94
SBP (mmHg)	131.43 ± 22.86	135.29 ± 20.71	133.47 ± 21.79
DBP (mmHg)	81.63 ±13.52	82.26 ± 12.88	81.96 ± 13.16

Table 3.10-- Body mass index (BMI) of the participants

BMI Categories	Male N=118(%)	Female N=132(%)	Total N=250(%)
Underweight	4 (3.4)	4 (3.0)	8 (3.2)
Normal	57 (48.3)	65 (49.3)	122 (48.8)
Overweight	39 (33)	40 (30.3)	79 (31.6)
Obese	18 (15.3)	23 (17.4)	41 (16.4)

3.2 Description of Outcome variables

3.2.1 Hypertension prevalence

The prevalence of hypertension among the Nicobarese tribe was found out to be 62.4 percent. (Table 3.11)

Mean ± standard deviation of systolic blood pressure (SBP) and diastolic blood pressure (DBP) among Nicobarese tribe was 133.47 ± 21.79 and 81.96 ± 13.16 respectively (Table 3.9).

Table 3.11 Prevalence of hypertension among the participants

Variable	N= 250	%
Hypertensive	156	62.4
Normotensive	94	37.6

3.2.2 Perceived stress prevalence

PSS score was calculated and categorized for low, medium, and high-stress levels among the study population. Total 171 individuals (68.4%) took up the scale measurement and remaining did not answer because of the following reasons:-

Unable to read or write- as this section was for self-scoring, it excluded those who were unable to read or write and people who were under the influence of alcohol during the time of the interview.

Out of 171 individuals taken up the self-scoring scale, 167 (66.8%) individuals reported a moderate level of stress, and rest were percent including low and high-stress level

respectively (Table 3.12). The average PSS score among participants was 19.6 (Table 3.13).

Table 3.12 Distribution of PSS level among the participants

PSS categories	Frequency and percentage N=250 (%)
Low (0-13)	2 (0.8)
Moderate(14-26)	167 (66.8)
High(27-40)	2 (0.8)
Score not available	79 (31.6)

Table 3.13 Average value, quartiles (25th, median, 75th), range, and standard deviation for PSS score.

Perceived Stress Score	Min	Q1	Q2	Mean	SD	Q3	Max
	12	18	20	19.67	2.74	21	30

3.3 Factors related to hypertension among study participants

3.3.1 Socio-Demographic Factors and Hypertension

Table 3.14 Socio-Demographic Factors and hypertension

Socio-Demographic factors	Total participants	Hypertensive n (%)	Non-hypertensive n (%)	P-value
Sex				
Male	118	68 (57.6)	50 (42.4)	0.141
Female	132	88 (66.6)	44 (33.4)	
Age group				
18- 43	133	61 (45.8)	72 (54.2)	***<0.01***
44-69	117	95 (81.2)	22 (18.8)	
Education				
Up to high school level	136	84 (61.8)	52 (38.2)	
				0.821
Higher sec. And above	114	72 (63.1)	42 (36.9)	

3.2 Tobacco and alcohol consumption and hypertension

Table 3.15 Tobacco, alcohol use and hypertension

Variables		Total participants	Hypertensive (n=156)	Non-hypertensive (n=94)	P-value
Current smoking					
	yes	53	37 (69.8)	16 (30.2)	
	no	197	119 (60.4)	78 (39.6)	0.210
Daily smoking					
	yes	32	23(71.9)	9 (28.1)	
	no	218	133(61)	85 (39)	0.236
Current smokeless tobacco products					
	yes	198	129 (65.2)	69(34.8)	
	no	52	27 (52)	25(48)	0.080
Daily smokeless tobacco products					
	yes	133	93(70)	40 (30)	
	no	117	63 (54)	54 (46)	***<0.01***
Ever consumed alcohol					
	yes	149	102 (69)	47 (31)	
	no	101	54 (53)	47 (46)	***<0.05***
Current alcohol use					
	yes	104	72 (69.2)	32 (30.8)	
	no	146	84 (57.5)	62 (42.5)	0.060

3.3.3 Self-reported physical activity and hypertension

Table 3.16 Self-reported physical activity and hypertension

Variables	Total participants	Hypertensive n(%)	Non hypertensive n(%)	P-value
No physical activity	159	106 (66.7)	53 (33.3)	
Moderate intensity	49	24 (49)	25 (51)	0.082
Vigorous-intensity	42	26(62)	16 (38)	

3.3.4 BMI and hypertension

Table 3.17 BMI and Hypertension

Variables	Total participants	Hypertensive n (%)	Non-hypertensive n (%)	P-value
Underweight	8	4 (50)	4 (50)	
Normal	122	74 (60.7)	48 (39.3)	0.725
overweight	79	50 (63.3)	29 (36.7)	
Obese	41	28 (68.3)	13 (31.7)	

3.4 Factors related to PSS score among study participants

Table 3.18-- Average value, range, standard deviation, and p-value for PSS score

Variables	Total participants	PSS Score				P-value
		Mean	SD	Min	Max	
Sex						
Male	118	19.54	3.11	12	26	
Female	132	19.77	2.40	15	30	0.591
Age group						
18- 43	133	19.98	2.80	13	30	
44-69	117	18.94	2.47	12	25	***0.022***
Education						
Up to high school	136	19.84	2.71	15	30	
Higher sec. and above	114	19.38	2.68	12	26	0.294

3.4.1 Tobacco, alcohol consumption and PSS score

Table 3.19 Tobacco, alcohol and PSS score

Variables		Total participants	PSS level among participants				
			Mean	SD	Min	Maximum	p-value
Current smoking							
	yes	30	20.47	2.94	15	30	
	no	141	19.50	2.68	12	27	0.079
Daily smoking							
	yes	14	20.86	2.24	16	25	
	no	157	19.56	2.76	12	30	0.091
Current smokeless tobacco products							
	yes	136	19.52	2.25	12	26	0.175
	no	35	20.23	2.46	15	30	
Daily smokeless tobacco products							
	yes	86	19.55	2.54	12	25	
	no	85	19.74	2.94	15	30	0.566
Ever consumed alcohol							
	yes	99	19.93	2.68	15	30	
	no	72	19.31	2.80	12	26	0.143
Current alcohol use							
	yes	73	19.84	2.64	15	30	0.489
	no	98	19.54	2.82	12	27	

3.4.2 Self-reported Physical activity and PSS score

Table 3.20 self-reported physical activity and PSS

Physical activity	Total participants	PSS level among participants Mean ± SD	P-value
No physical activity	94	19.51 ± 2.56	0.174
Moderate intensity	43	20.33 ± 2.82	
Vigorous-intensity	34	19.26 ± 3.06	

3.4.3 BMI and PSS score

Table 3.21 BMI and average, the standard deviation of PSS

BMI	Total participants	PSS level among participants Mean ± SD	P-value
Underweight	8	21.60 ± 5.55	
Normal weight	122	20.05 ± 2.58	
Overweight	79	19.16 ± 2.43	0.074
Obese	41	19.05 ± 3.00	

(Done using one-way ANOVA for above variable)

3.4.4 Hypertension and PSS

Table 3.22 HTN and PSS

Hypertension status	Total participants	PSS level among participants Mean ± SD	P-value
Hypertension	93	19.65 ± 2.84	0.911
Non-hypertension	78	19.69 ± 2.64	

3.5 Summary of the results

Prevalence of hypertension was higher (62.4%) among Nicobarese tribe when compared to overall prevalence for hypertension in India 29.8 percent (95% CI: 26.7–33.0- 2014) as stated by Raghupathy et al, 2014 in a systematic review. Prevalence of hypertension was higher among the elder age group (44-69, in which 81% were hypertensive), daily smokeless tobacco users (70% of daily smokeless tobacco users were hypertensive). Among the Nicobarese tribe, the fruits and vegetable consumption were found to be insufficient. Smokeless tobacco use (79.2%), alcohol use (41.6%), and self-reported physical inactivity (63.6%) were reported. 48 percent of overall participants were obese or overweight.

Perceived stress level among the participants was calculated with 171 respondents, out of which 66 percent reported moderate PSS level. The mean PSS is significantly higher in the younger age group.

Chapter 4

Discussion and conclusion

The present study has revealed a high prevalence of hypertension among the *Nicobarese tribe* in Car Nicobar Island, India. Among 250 participants the prevalence of hypertension was found to be much higher than the general population. The perceived stress level among the participants was largely distributed at a moderate level (14-26 out of 40). In my knowledge, this study is one of the first studies using the WHO step-wise approach to find out the prevalence of hypertension and this has also introduced a Global measure of perceived stress in the Nicobarese tribe.

The prevalence of hypertension estimated in the study is 62.4% (95% CI; 56.2% to 68.4%), compared to the earlier study in the same population which showed 50.5 % (95% CI; 46.1 to 54.9) in the year 2009. (Manimunda et al., 2011b)

In another such cross-sectional study conducted in a rural tribe of Darjeeling, showed that the overall 22.1 percent were hypertensive and 41.3 percent were pre-hypertensive.(Ditipriya Bhar, et al, 2019)

A study conducted in the *Kani tribe* of Kerala showed 48.3 percent prevalence of hypertension. Same study reported insufficient consumption of fruits and vegetables in the *Kani tribe* which is similar to the findings of this study (Sajeev and Soman, 2018)

The Directorate of Shipping Services (DSS) and Civil Aviation (DGCA) runs the services between the two Islands for supplying food grains, vegetables, fruits, and other essential commodities. These services are often intermittent and it may be one of the possible reasons for less consumption of fruits and vegetables by the Nicobarese community which is largely supplied from Port Blair.

4.12 Strengths of the study

There are limited studies on hypertension and stress levels among *Nicobarese tribe* from India, especially from Car Nicobar Islands which is remotely accessible from mainland India. The study has used standard tools with contextual modification as much as possible.

To my knowledge, this is the first study from Car Nicobar assessing perceived stress and second study from Car Nicobar to assess the prevalence of NCD risk factors among *Nicobarese tribe*.

Data collection was done by single investigator therefore chances of inter-observer bias were eliminated.

Generalizability

Due to its geographical positioning and isolation from mainland India, the predominate population belongs to *Nicobarese tribe* and lives in confined Island with a total area of 126.9 km^2, length, and width of 15km and 12km respectively. One of the biological studies conducted on the four different tribes namely Great Andamanese, Onges, Jarwas, and Nicobarese reveals mitochondrial DNA molecular diversity data which suggests that the genetic pool of *'Nicobarese'* is different from the rest of the tribes of South East Asia (Thangaraj et al., 2003).

Good response rate. Male participants were 48 percent in the study.

The adoption of the Kish method avoided the chance of random error.

4.2 Limitations

Self-reported information on perceived stress score, physical activities might have resulted in an overestimation of the results.

Occupation categories in WHO STEP wise surveillance were broad and non specific to capture the *Nicobarese tribe's* traditional working or vocational activities.

4.3 Implications

This study calls for a focused intervention to address increasing hypertension and mental health conditions among the *Nicobarese tribe* in Car Nicobar Island, as these tribes are limited to only this part of the world and their population had already seen shrinkage during the mega-tsunami of 2004 in South East Asia.

Exploratory ethnographic research is needed to understand the contextual, behavioral and traditional way of doing things.

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APPENDICES

APPENDIX I

PARTICIPANT INFORMATION SHEET (English)

ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES (AMCHSS)

Hello, I am Dr. Rohit, 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 "***Assessing the prevalence of stress and hypertension among the native tribal population living in the car Nicobar Islands- A community-based cross-sectional study".***

I plan to do this study to find out the prevalence of raised blood pressure and stress among the Nicobarese tribe in Car Nicobar, the administrative headquarters of the Nicobar group of islands, India.

I would like to ask you some questions related to this study regarding some behavior like smoking/chewing tobacco, drinking alcohol, diet, physical activities, and medical history of the patient which are related to increased risk of developing chronic non-communicable diseases (NCD's). I will take measurements of your height, weight, and blood pressure. I will also ask questions about hypertension history and medication. 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. I sincerely hope that in the long run, this exploration will help in better planning for health

interventions in Nicobar tribal communities and other tribes living in the islands. 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 purposes. Your participation in this study will be voluntary. You are free to withdraw from the interview at any point in time. Also, you can refuse to answer any question without giving any explanations.

Contact information

If you have any research-related questions or you would like to verify my credentials, you may kindly contact me or a member of our institute's ethics committee at the following address

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Dr. Mala Ramanathan,
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APPENDIX II

Informed consent form (English)

I have read/been read out the information provided in the information sheet earlier .the nature of the study and my involvement has been explained and all my questions have been addressed satisfactorily.

By signing the consent form I, indicate that I understand what will be expected of me and that I am willing to participate in the study. I understand that participation is voluntary and I am free to withdraw from the above-mentioned study at any given point of time, without producing any reason. I understand that my identity will not be published in any information released to third parties or so. I have been informed who should be contacted if the need arises. I have been given a copy of the information sheet to keep.

Participant’s name

Participant’s signature /thumb impression

Interviewer’s name

Interviewer’s signature

Date with time

Place

APPENDIX III

INTERVIEW SCHEDULE-WHO STEPWISE APPROACH FOR

SURVEILLANCE OF NCD RISK FACTORS- V.3.0

RESPONDENT NO. ☐☐☐

IDENTIFICATION INFORMATION(I)				
CODE NO.	**SL. NO**	**QUESTIONS**	**RESPONSE**	**OPTIONS**
I1	**1**	Cluster name(Tribal settlement)		
I2	**2**	House number		
I3	**3**	Date of interview	__ /___ /___ (dd/mm/yyyy)	
I4	**4**	Contact number	mobile	
DEMOGRAPHIC INFORMATION(C)				
CODE NO.	**SL. NO**	**QUESTIONS**	**RESPONSE**	**CODING COLUMN**
C1	**5**	How old are you? (Age in completed years)	☐☐	
C2	**6**	Gender (Record male, female or transgender as observed)	☐	**M= 01, F=02, O = 03**
C3	**7**	What is the highest level of education you have completed?	☐	1- No formal schooling 2- Primary school level(1-7) 3- High school level (8-10) 4- Higher secondary level (11-12) 5- Diploma after higher secondary(13-14) 6- Graduate level(13-15) 7- Postgraduate degree(16 and above) 8- Others (specify)………
C4	8	Which of the following best describes your main work status over the last 12 months?	☐	(*use WHO STEPS show card*)

NCD RISK FACTORS-(*MAJOR RISK FACTORS)*

STEP 1- BEHAVIOURAL MEASURES

TOBACCO USE (SECTION –S)

Now I'm going to ask you some questions about use.

Tobacco smoking, chewing, and consumption.

S1	9	Do you currently smoke any tobacco products such as cigarettes, beedi or others	☐	Yes No If No, go to S3
S2	10	Do you currently smoke tobacco products daily?	☐	Yes No
S3	11	Do you currently use any smokeless tobacco product such as chewing tobacco & betel leaves(supari); zarda, pan masala, gutka, sukkha(dried leaves)	☐	Yes No
S4	12	Do you currently use any smokeless tobacco products daily?	☐	Yes No
S5	13	When did you start using tobacco products daily? (age)	☐	Age in years Don't remember-88

ALCOHOL CONSUMPTION (SECTION –A)

The next questions will be on alcohol consumption

A1	14	Have you ever consumed alcohol such as beer, whiskey,rum, brandy, wine, other local purchases, or local preparations?	☐	Yes No If no, go to D1
A2	15	Have you consumed any alcohol, MFL, or local preparation (toddy) within the past 30 days?	☐	Yes No
A3	16	For how many years you have been taking alcohol?	☐	Age in years Don't remember-88

.

DIET (SECTION –D)

The next questions will be on the diet and consist of fruits and vegetables that you usually eat. I have a nutrition card here that shows you some examples of fruits and vegetables. As you answer these questions please think of a typical week in the last

D1	17	In a week, how many days do you eat fruit?	☐	Number of days
D2	18	How many servings of fruit do you eat? *(servings-WHS nutrition card)*	☐	Number of servings
D3	19	In a week, how many days do you eat vegetables?	☐	Number of days
D4	20	How many servings of vegetables do you eat on one of those days?	☐	Number of servings
D5	21	What type of oil/fat is most often used for meal preparation in your household?	☐	Vegetable oil Butter/ghee Coconut oil Others (specify) .... None in particular Non used
D6	22	Do you follow the practice of adding salt to rice when being cooked or served?	☐	Yes No

RECREATIONAL (SECTION –P)

Now I would like to ask you about sports, fitness and recreational activities (leisure)

P1	23	Do you do any vigorous-intensity sports, fitness activities that cause an increase in large breathing or heart rate like (running) for at least 10mins continuously?	☐	Yes No If yes, ... days/week ....hour.......min/day
P2	24	Do you do any moderate-intensity sports, fitness, or recreational activities that cause a small increase in breathing or heart rate (walking, cycling, and swimming) for at least 10mins continuously?	☐	Yes No If yes, ... days/week ....hour.......min/day

TREATMENT HISTORY (SECTION –H)

H1	25	Have you ever had your blood pressure measured by a doctor/health worker?	☐	Yes No
H2	26	Have you ever been told by a doctor/health worker that you have elevated blood pressure or hypertension?	☐	Yes No
H3	27	Are you currently receiving any treatment for high blood pressure prescribed by a doctor/health worker?	☐	Yes No

PHYSICAL MEASUREMENT (Section -M)

HEIGHT (mts), WEIGHT (Kg), BMI (Wt/H^2), Blood pressure (mmHg) – mean of 3 readings

M1	For women: Are you pregnant?	☐	1-Yes 2-No if Yes, go to next section
M2	Height in meters		
M3	Weights in Kg		
M4a	Reading 1 (*record 1st measurement after the participant has rested for 15 minutes. Wait 3mins before taking 2nd measurement.*)		Systolic blood pressure
			Diastolic blood pressure
M4b	Reading 2 *Ask the participant to rest for another 3mins before taking the third measurement*		Systolic blood pressure
			Diastolic blood pressure
M4c	Reading 3		Systolic blood pressure
			Diastolic blood pressure

Mean systolic blood pressure = ____________________ *(mmHg)*

Mean diastolic blood pressure = ___________________ *(mmHg)*

Mean arterial blood pressure = _____________________ *(mmHg)*

BMI =

APPENDIX IV

STRESS MEASUREMENT – II

"A Global Measure of Perceived Stress", Author(s): Sheldon Cohen, Tom Kamarck and Robin MermelsteinReviewed work(s): Source: Journal of Health and Social Behaviour, Vol. 24, No. 4 (Dec. 1983), pp. 385-396Published by American Sociological AssociationStable URL: http://www.jstor.org/stable/2136404

SCORE: ☐

PERCEIVED STRESS SCALE

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

{0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often}

1. In the last month, how often have you been upset because of something that happened unexpectedly?

[0] [1] [2] [3] [4]

2. In the last month, how often have you felt that you were unable to control the important things in your life?

[0] [1] [2] [3] [4]

3. In the last month, how often have you felt nervous and "stressed"?

[0] [1] [2] [3] [4]

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

[0] [1] [2] [3] [4]

5. In the last month, how often have you felt that things were going your way?

[0] [1] [2] [3] [4]

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

[0] [1] [2] [3] [4]

7. In the last month, how often have you been able to control irritations in your life?

[0] [1] [2] [3] [4]

8. In the last month, how often have you felt that you were on top of things?

[0] [1] [2] [3] [4]

9. In the last month, how often have you been angered because of things that were outside

of your control?
[0] [1] [2] [3] [4]

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
[0] [1] [2] [3] [4]

QUESTION NO.	RESPONSE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

***Scoring:** PSS scores are estimated by reversing the responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items.*

0-13	14-26	27-40
LOW	MODERATE	HIGH

APPENDIX V

Kish Summary of eight tables

Directions Identify which table to use for each household with the Kish household list. Fill out the Kish coversheet and using the number of eligible respondents in the household and the Table number already identified, select the participant. Example: If the Table number was C and there were 4 adults in the household, the adult numbered 2 should be interviewed.

If the Table number was E1 and there were 5 adults in the household, the adult numbered 3 should be interviewed.

Table Number	If the number of adults in a household is:					
	1	2	3	4	5	6 or more
	Select adult numbered:					
A	1	1	1	1	1	1
B1	1	1	1	1	2	2
B2	1	1	1	2	2	2
C	1	1	2	2	3	3
D	1	2	2	3	4	4
E1	1	2	3	3	3	5
E2	1	2	3	4	5	5
F	1	2	3	4	5	6

KISH table was available with the interviewer during data collection. All the questionnaires were given serial numbers from 1-250. During the first household visit,

the interviewer listed out the age and sex of all eligible members in the households (men and women in the age group of 18-69 years) and ranked it based on decreasing age (oldest to youngest).

Sex M=1, F=0	Age	Rank
1	58	1
0	44	2
1	32	3
1	21	4
0	18	5

KISH table with an example

In the next step, one questionnaire was selected randomly and noted the last digit of its serial number. KISH table was followed and 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 selected as a study participant from that household and this process was carried out for all the subsequent households.

Example If the serial number is 102 and the 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.

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

Figure KISH grids – instructions

APPENDIX VI WHO STEPS wise surveillance Show Cards

Diet (Typical Fruit and Vegetables and Serving Sizes)

For use with This show card relates to:

Step	Section	Items
Step 1, core 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).

WHO Recommendation The World Health Organization recommends at least:

- 400 grams of vegetables and fruits per day, or
- Five servings of 80 grams each.

Note: Tubers such as potatoes and cassava, however, are not included in this recommendation

List of Work Status

For use with This show card relates to:

Step	Section	Items
Step 1, core demographic information	C	C7

Work Status	Description
Government employee	An individual who is hired by a government office or agency and paid a salary. This includes employees of: • Federal • State, or • Municipal governments and their agencies. • Parastatal enterprises, and • Semi-autonomous institutions (such as social security institutions) that are owned by the government. • Institutions like religious schools (if paid by the government).
Non-government employee	An individual who is hired to work and is paid a salary or wages. This includes any employees not working for the government.
Self-employed	An individual who produces goods for sale or earns an income through provision of services to different people or firms. The individual works alone or with intermittent assistance from others, but does not employ anyone for a paid wage or salary on a regular basis.
Non-paid - subsistence farming etc	An individual who spends significant amount of time working for a volunteer organisation, family business, family farm or other similar activity without pay.
Student	An individual whose primary activity is engaging in studies at elementary, secondary, university or technical schools.
Homemaker (household chores)	An individual whose primary activity is in carrying out household tasks without being paid.
Retired	An individual who has earned income during some period in the workforce or as an employer and who is no longer working due to age.
Unemployed - able to work	An individual who could work but does not currently have a job or business (excluding homemaker).
Unemployed - unable to work	An individual who cannot work because of his/her health status.

APPENDIX VII

श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, त्रिवेन्द्रम
तिरुवनन्तपुरम - ६९५०११, केरल, इंडिया
SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM
Thiruvananthapuram - 695 011, Kerala, India
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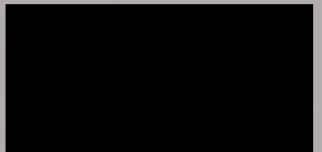
Institutional Ethics Committee
(IEC Regn No. ECR/189/Inst/KL/2013/RR-16)

SCT/IEC/1464/NOVEMBER-2019 21.11.2019



The Institutional Ethics Committee reviewed and discussed your application to conduct the study entitled "ASSESSING THE PREVALENCE OF HYPERTENSION AND STRESS AMONG PEOPLE LIVING IN THE CAR NICOBAR ISLAND, INDIA" (IEC/1464) on 5th November, 2019.

The following documents were reviewed:
Original submission

1. *Covering letter addressed to IEC – SCTIMST with checklist*
2. *Forwarding letter from the guide*
3. *Research proposal*
4. *IEC application form*
5. *Interview schedule in English*
6. *TAC Approval letter*
7. *Participant information sheet in English*
8. *Informed consent form for participants in English*
9. *Permission letter from Deputy Director (Health), Andaman & Nicobar administration*
10. *CV of PI in appropriate IEC format*

Revised submission

1. *Covering letter addressed to the Chairperson IEC, SCTIMST with checklist*
2. *Copy of IEC Recommendation Letter dated 7.11.2019*
3. *Forwarding letter from the HOD*
4. *Research proposal*
5. *IEC application form*
6. *Interview schedule in English*
7. *TAC Approval letter*
8. *Participant Information Sheet in English*
9. *Informed Consent Form for participants in English*
10. *Permission letter from Deputy Director (Health), Andaman & Nicobar administration*
11. *CV of PI in appropriate IEC format*

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The following members of the Ethics Committee were present at the meeting held on 5th November, 2019 at G. Parthasarathi Board Room, AMCHSS, SCTIMST

SL. No.	Member Name	Highest Degree	Gender	Scientific /Non Scientific	Affiliation with Institution(s)
1.	Dr. R V G Menon	M Tech, PhD	Male	Lay Person (Chairman)	No
2.	Dr. Kala Kesavan. P	MBBS, MD	Female	Basic Medical Scientist	No
3.	Dr. K R S Krishnan	M.E., Ph.D.	Male	Medical Technology	Yes
4.	Dr. Harikrishna Varma PR	Ph.D(Materials Science)	Male	Medical Technology	Yes
5.	Dr. S S Giri Sankar	LL.M. Ph.D.	Male	Legal Expert	No
6.	Dr. V. Raman Kutty	M D, M Phil, M P H	Male	Health Sciences Expert/Clinician	Yes
7.	Dr. Aneesh V Pillai	BA. LLB (Hons.), LLM, Ph. D, SET (Law)	Male	Legal Expert	No
8.	Smt. Sathi Nair	MA (English Literature)	Female	Lay Person	No
9.	Dr. P. Manickam	BSMS, MSc (Epid).,PhD	Male	Health Science Expert/ Social Scientist	No
10.	Dr. Harikrishnan S	MD, DM (Cardiology) DNB (Cardiology)	Male	Clinician	Yes
11.	Mr. Satheesh Chandran	MSW, PGDPM	Male	Lay person/ NGO/ Social Scientist	No
12.	Dr. Christina George	MD Psychiatry	Female	Clinician	No
13.	Dr. Mala Ramanathan	PhD	Female	Social Scientist (Member Secretary)	Yes

IEC Decision

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

APPENDIX VIII

उप निदेषक (स्वास्थ्य) का कार्यालय
OFFICE OF THE DEPUTY DIRECTOR (HEALTH)
अण्डमान तथा निकोबार प्रषासन
ANDAMAN & NICOBAR ADMINISTRATION
स्वास्थ्य सेवा निदेषालय
DIRECTORATE OF HEALTH SERVICES
****

File No. 1-9/DDH/misc/2018-19/1020 *Port Blair, dated the 26th of December 2019*

To,

The Deputy Commissioner,
South Andaman District,
Port Blair.

Sub: Request for issuance of Tribal Pass –reg.

Sir,

This is with reference to the letter received from [redacted] MPH Scholar at Shree Chitra Triunal Institute of Medical Science and Technology, GoI, Trivandrum) R/o Rangachang, South Andaman on 20/12/2019 who is willing to carry out Community Health Survey, "Assessing the prevalence of Hypertension and Stress among people living in the Car Nicobar Island".

In this regard you are requested to issue him Tribal Pass for his visit to the Protected area and carry out the said survey.

This is for your kind information and necessary action please.

Yours Faithfully

26/12/19

(Dr. Avijit Roy)
Deputy Director (Health)

APPENDIX IX

FORM-B
(See Rule 5)
PASS FOR ENTERING A RESERVED AREA IN THE ANDAMAN AND NICOBAR ISLANDS

PASS NO: 3839 / 2019

This PASS under section 7 of Andaman & Nicobar Islands(Protection of Aboriginal Tribes) Regulation, 1956 (hereinafter referred to as "the Pass-holder") identifiable by the following particulars, Name (hereinafter referred to as "the Regulation") here by granted to Shri/Smti/Kumari **ROHIT**

(a) Father's or Husband's Name — **S/O LATE JAFAR HUSSAIN**

(b) Nationality — **INDIAN**

(c) Height — **1.75**

(d) Colour of Hair — **Black**

(e) Colour of Eye — **Black**

(f) Distinguish Mark — **MOLE NEAR RIGHT SIDE OF THE NOSE**

(g) Address Present — **SCTIMST, TRIVANDRUM, KERALA**

Permanent — **BEODNABAD, SOUTH ANDAMAN, A&N ISLANDS**

(h) Signature / Thumb impression

(i) Purpose — **TO CONDUCT TRIBAL HEALTH STUDY AT CAR NICOBAR**

(j) Sponsered By — **PERMISSION FROM DY DIRECTOR (HEALTH), DHS, PORT BLAIR**

2. Subject to the provision of the Regulation and the Andaman & Nicobar Islands(Protection of Aboriginal Tribes) Rule, 1957(hereinafter referred to as "The said Rules") and also to the condition set forth in the following this PASS authorising the pass holder to enter and remain in **CAR NICOBAR**

(hereinafter referred to as "the said reserved area"),shall be valid and remain in force from **15-12-2019** to **01-02-2020** namely:-

STATEMENT OF CONDITION

1. The Pass Holder may visit the said reserved area and remain therein during the period of validity of this PASS for following purpose and shall,after the expiry of such period, surrender this PASS to the Officer-in-Charge of nearest police station or to the nearest Magistrate and, if this PASS is lost , a report of such loss shall be made by the pass holder forthwith to said Officer-in-charge or the said Magistrate.

Namely (DC:N))

2. The pass holder shall not carry on or engage himself in any trade or business in the said reserved area except to the extent,if any, authorised by this PASS.

3 The pass-holder shall not collect any forest produce from the said reserved area and shall not carry to or from the reserved area any book diary, manuscript map picture photograph film curio or article of religions or scientific interest, which is likely to be against public interest or may alter the security of the state

4 The pass holder shall not introduce or attempt to introduce onto the said reserved area any of the following articles namely

(i) beer wine or other spirituous or fermented liquor

(ii) opium bhang ganja other hurtful or intoxicating drug

(iii) arms weapons gun powder or other explosive or highly inflammable substance except to the extent permitted by the Chief Commissioner of the Andaman and Nicobar Islands (hereinafter referred to as "The Chief Commissioner") or by any law for the time being in force and

(iv) such other articles as may be prohibited by the Chief Commissioner

5 This PASS shall be liable to be cancelled if the pass-holder is convicted of an offence punishable under the provisions of the Regulation or the said rules or any other law for the time being in force or is shown to the satisfaction of the Chief Commissioner to be leading a scandalous or notoriously evil mode of life conducive to breach of the public peace or prejudicial to the maintenance of the public safety in the said reserved area

6 The Deputy Commissioner may and shall when so required by the Chief Commissioner at any time after recording his reasons in writing but without assigning to the pass-holder any reasons for so doing by order in writing cancel this PASS The PASS shall be void from the date of receipt of such order by the pass holder

PROVIDED that where this PASS is so cancelled by the Deputy Commissioner he shall forthwith send a copy of his recorded reasons for so doing to the Chief Commissioner and the Chief Commissioner may on his own motion or on application by the pass holder or otherwise reverse the order of the Deputy Commissioner and thereupon the PASS shall again come into force and be valid

7 Any breach of the provisions of the Regulation or the said Rules or of the conditions of this PASS shall in addition to any other penalty render the passholder disqualified for being granted any pass under section 7 of the Regulation

Dated at

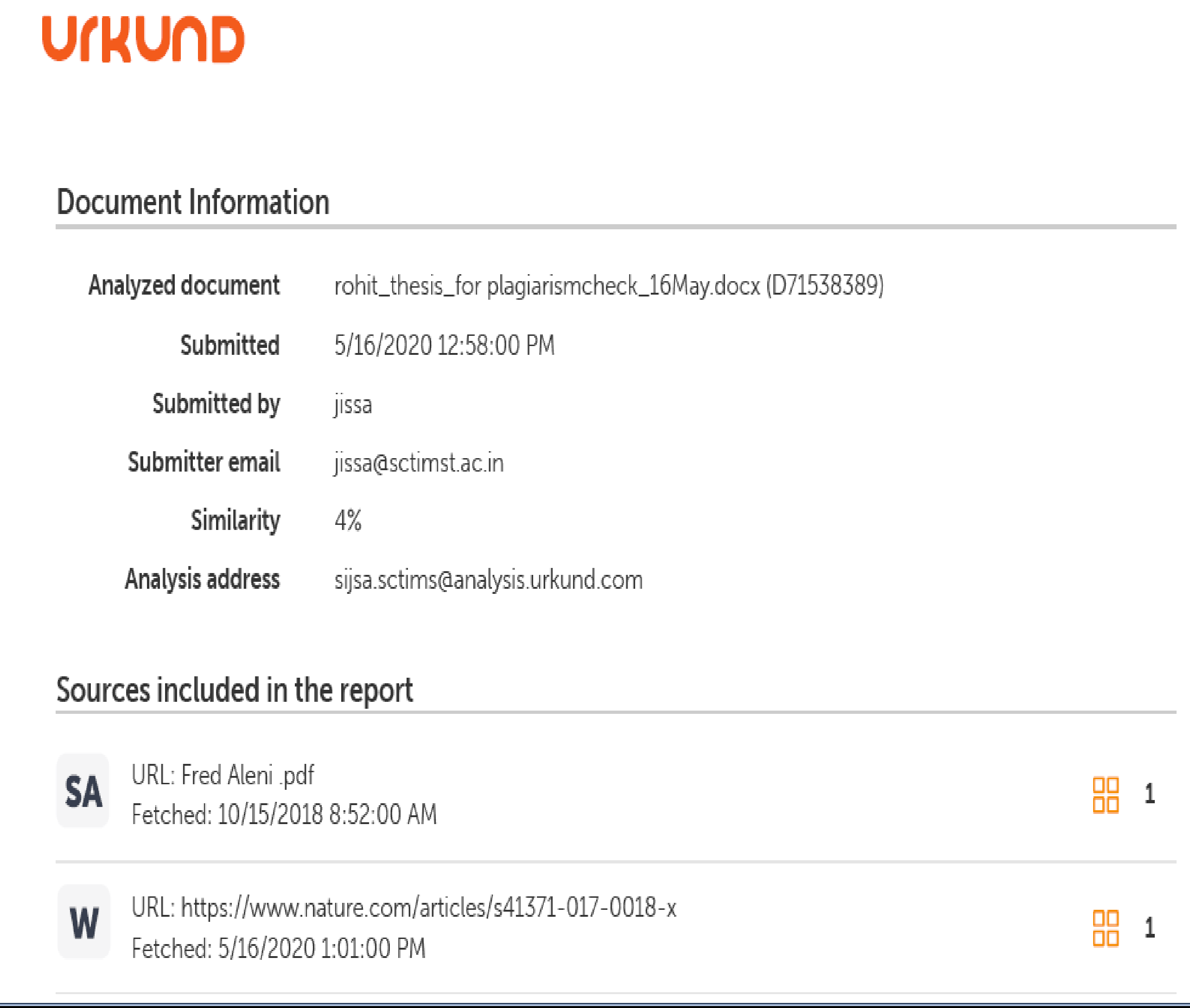
The 13th Day of Dec 2019

for Deputy Commissioner, South Andaman

उपायुक्त
Deputy Commissioner
दक्षिण अण्डमान
South Andaman

copy to -
1 The Deputy Commissioner Nicobar District
2 The Supdt of Police(CID) Port Blair

APPENDIX X



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Sources included in the report

SA	URL: Fred Aleni .pdf Fetched: 10/15/2018 8:52:00 AM	1
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****************THE END***************