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Original Research Article

A longitudinal study on CVD risk reduction using WHO HEARTS risk based CVD management tools among Nicobarese tribes of Andaman and Nicobar Islands

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Abstract

Background: According to WHO data, India is estimated to be having one of the highest burdens of CVDs than any country in the world. The identification of risk level by health care providers is therefore a useful means of detecting those with high CVD risk and managing them.

Objectives: 1. To predict the 10-year CVD risk among adults aged 40 - 74 years rural population of Nicobar Islands; 2. To achieve community risk reduction by using WHO HEARTS Risk - based CVD management tools through Primary Health Care system.

Materials and Methods: A longitudinal 12 month follow up study with Baseline–Follow up–Endline components was conducted among Nicobarese tribes using WHO HEARTS risk based CVD management tools. 365 individuals aged 40-74 years of age who do not have any established coronary heart disease and strokes participated in the study.

Results: There was a reduction of CVD risk score among 34.35% participants. CVD risk reduction was observed among 41% of non-alcoholics while compared with 30.8% among alcoholic users [PR: 0.64 (95% CI: 0.41 to 1.00)] (P=0.047). Higher proportion (50.8%) among those who are in Lower Socioeconomic Class (IV-V) experienced an increase in their CVD risk scores while compared with 40.7% among participants who are from Upper/Middle Class (I-III) (P=0.035). 39.8% of those aged ≥55 years have experienced reduction in their CVD risk scores while compared with 30.9% among those aged <55 years (P=0.007), There was a significant reduction in the diastolic BP between baseline [Mean (SD): 92.9 (15.9)] and endline assessments [Mean (SD): 83.4 (12.2)] (P<0.01).

Conclusions: A 12 month follow-up was helpful in CVD risk reduction among approximately 1/3rd of the study group; Poverty, Alcohol use, and lower age (< 55 yrs) were the factors negatively affecting the CVD risk reduction. This follow-up was helpful in reducing the diastolic BP significantly at the community level.

Keywords: CVD risk, Reduction, Nicobarese, Islands, Management

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1. Introduction

Scientific studies have shown that large numbers of people die each year from cardiovascular diseases (CVDs) than from any other causes. Over three quarters of deaths due to CVDs occur in low- and middle-income countries.[1] Lack of awareness on their risk status is the major cause of poor control. The identification of risk level by health care providers is therefore a useful means of detecting those with high CVD risk and managing them.[2] Timely and healthy-lifestyle interventions along with proper management will reduce the risk of heart attack and stroke in people with a high risk of CVD, and hence will reduce premature morbidity, mortality and disabilities. Risk assessment studies have shown that lifestyle-related risk factors are the major causes of cardiovascular morbidity and mortality.[3] A healthy diet, regular physical activity, tobacco cessation and maintaining a healthy weight contributes for cardiovascular disease risk reduction.[3] Most effective CVD prevention strategies involve a combination of lifestyle changes, not just focusing on one risk factor.[3]

WHO HEARTS CVD risk management tools for conducting the community based risk assessment and its management is a useful and cost-effective tool to study the entire population using a risk score and it provides a 10-year

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risk of cardiovascular diseases and is a useful tool to take appropriate actions by respective Health authorities, and it's helpful to counsel patients to modify their lifestyles, modify risk factors and comply with their medical advices.[4] The HEARTS technical package provides a strategic approach for improving cardiovascular health. This package support health authorities to strengthen CVD management in primary health care settings. A risk stratification approach is particularly suited to settings with limited resources, where saving the greatest number of lives at the lowest cost becomes imperative.[5]

According to WHO data, India is estimated to be having one of the highest burdens of CVDs than any country in the world, and is expected to be the largest cause of morbidity and mortality. In view of the causality of multiple factors in the etiology of CVDs, interplay of multiple risk factors needs to be considered while estimating the burden on population.[6,7] In recent years, data on risk factors for CVDs among people of Andaman and Nicobar Islands is increasing while compared with previous surveys.[8,9] A CVD risk stratification study in South Andaman has shown that 32.4% and 5.8% of rural population in South Andaman Islands are at moderate and high CVD risk respectively in next 10-years.[10] Few studies have been undertaken in India on estimation of common CVD risk factors using CVD risk stratification methods, but most of the studies were from mainland of India.[11,12,13]

Earlier reports from South Andaman has shown that NCD risk factors are high, undiagnosed hypertension and diabetes, irregular treatment are factors of public health concern in these Islands.[14] The Nicobarese tribes are an Austroasiatic-speaking people of the Nicobar Islands, a chain of islands in the Bay of Bengal, north of Sumatra. These tribes are indigenous tribes, and these Islands are difficult to reach, rural, and remote in nature.[15] Our initial reports of baseline reports on 10-year CVD risk levels among these tribes shows moderate to high CVD risk levels are higher among Nicobarese tribes than reported levels among general population.[16]

Non-laboratory based WHO HEARTS risk charts are for the use of settings where diabetes and cholesterol measurements are challenging at community levels. They can also be used to identify people at high risk who can be taken up for further investigations.[4] Some studies have shown that use of the non-laboratory-based tool for determining future risk performs are cost effective for decisions regarding further management of people at resource poor settings,[17,18] and therefore, Non-laboratory based risk assessments were undertaken in this study where using laboratory method at community setting in these Islands was challenging in nature. In this context a longitudinal study on CVD risk reduction among Nicobarese tribes was undertaken based on initial baseline assessment which was conducted in 2023.

2. Objectives

1. To predict the 10-year CVD risk among adults aged 40 - 74 years rural population of Nicobar Islands
2. To achieve community risk reduction by using WHO HEARTS Risk - based CVD management tools through Primary Health Care system

3. Materials and Methods

This longitudinal study with Baseline – Follow up – Endline components was conducted between July 2023 to January 2025 among Nicobarese tribes residing in the Nicobar Islands. Adults aged 40 to 74 years of age who do not have any established coronary heart disease and strokes were included in the study. Baseline survey with a community-based cross-sectional method was conducted during initial 03 months followed by an 12 month long follow up phase where cohort was managed for their CVD risk status as per WHO HEARTS risk based CVD Management tools, and an endline survey was conducted in the last 03 months to assess the CVD risk status among the same cohort.

Sample size: 384. The sample size was calculated using the formula to estimate the proportion of one sample situation. To detect the prevalence of 22.14 % of moderate to high CVD risk, as determined by a previous relevant study conducted in South, [11] minimum sample size required was 265, with an allowable error of 5% and a confidence interval of 95%. An additional 25% of the sample was added to account for non-response rate and with a design effect of 1.2, the final sample calculated was 384.

3.1. Inclusion criteria

Individuals 40-74 years of age, who do not have any established coronary heart disease and stroke.

3.2. Sampling technique

Multi-stage random sampling technique was used. Nicobar district is divided into 03 tehsils, out of which the Car Nicobar tehsil was selected through random sampling. All revenue villages in the tehsil were listed, and in the second stage, ten villages were randomly selected for the study. At the community level, in the selected villages, first line list of all eligible individuals was prepared, and then, 38 individuals from each of the selected villages were randomly selected irrespective of gender who fulfilled the eligibility criteria.

3.3. Study tools

1. WHO Hearts CVD risk assessment tools for the South Asian region were used to assess the CVD risk. [4] The predictor variables for the risk prediction were - Age, Gender, Smoking, Systolic BP, and BMI
2. A semi-structured interview schedule adapted from the WHO STEPS instrument for Non-communicable Diseases to collect socio-

demographic details and CVD risk-related details.[19]

3. During the follow up period, management of CVD risk status was undertaken as per the WHO HEARTS CVD risk management tools. A schedule of follow-up based on WHO PEN Protocol 1 is provided in the tool. [4] Accordingly regular follow up and medication and counseling as per the protocol were undertaken

3.4. Ethical approval

Owing to ethical considerations, ethical approval was obtained from the Institutional Ethics Committee (Human) of the ICMR–Regional Medical Research Centre, Sri Vijayapuram

3.5. Operational definitions

3.5.1. Diagnosis of hypertension

Table 1: Classification of Hypertension [As per National High BP Education program, 2004][20]

Blood Pressure Classification	SBP mm Hg	DBP mm Hg
Normal	<120	and <80
Prehypertension	120–139	or 80–89
Stage 1Hypertension	140–159	or 90–99
Stage 2 Hypertension	≥160	or ≥100

1. *Diagnosis of Type – 2 Diabetes Mellitus*: RBS: 200 mg/dL or above. [As per American Diabetes Association, 2022][21]
1. *Smokers:* All current smokers and those who used any tobacco product (cigarettes, beedis, chewing tobacco, or snuff) on a regular basis for at least the previous 01 year before the assessment. [As per CDC definition][22]
2. *Alcohol users:* Alcohol use refers to the intake of any form of alcohol in the past 12 months. [As per NFHS][8,9]
3. *Overweight:* BMI>23kg/m2. BMI calculated using Quetelet's Index formula [As per WHO Expert Consultation, 2004].[23]

3.6. Data collection and statistical analysis

3.6.1. Anthropometric measurements

Weight was calculated using an EQUAL digital weighing scale with 180 kg capacity and with an accuracy of 100 gm, and height was measured using a stadiometer.

3.6.2. Assessment of blood pressure and blood sugar

Blood pressure was measured using Omron HEM-7120 Automatic Blood Pressure Monitor with two different-sized cuffs — one medium and one large size. Accu-Chek active blood glucose meter kit was used to measure blood glucose.

3.7. Statistical analysis

Data analyses were performed using STATA version 16 (StataCorp LLC, College Station, TX). Cardiovascular disease (CVD) risk was assessed using the World Health Organization (WHO) CVD risk charts (non-laboratory–based). Descriptive statistics for continuous variables are presented as median and interquartile range (IQR), while categorical variables are summarized as frequencies and percentages. Bivariate relationships between categorical variables, including hypertension classification, CVD risk assessment classification, and changes in CVD risk status from baseline to follow-up, were evaluated using Pearson's Chi-squared test or Fisher's exact test, as appropriate. For subgroup comparisons of continuous variables, the Kruskal-Wallis rank sum test and Wilcoxon rank sum test were employed. To identify factors associated with hypertension and CVD risk classifications, univariable and multivariable generalized linear models were constructed to estimate prevalence ratios. Specifically, prevalence ratios for smoking, tobacco use, obesity, hypertension, and alcohol consumption were calculated using simple and multiple generalized linear models with a binomial distribution and log link function. The selection of variables for inclusion in the regression models was guided by statistical significance in bivariate analyses and findings from relevant literature. Potential multicollinearity and confounding were assessed and addressed during model building. All statistical tests were two-tailed, and statistical significance was defined as a p-value of less than 0.05 ($\alpha = 0.05$).

4. Results

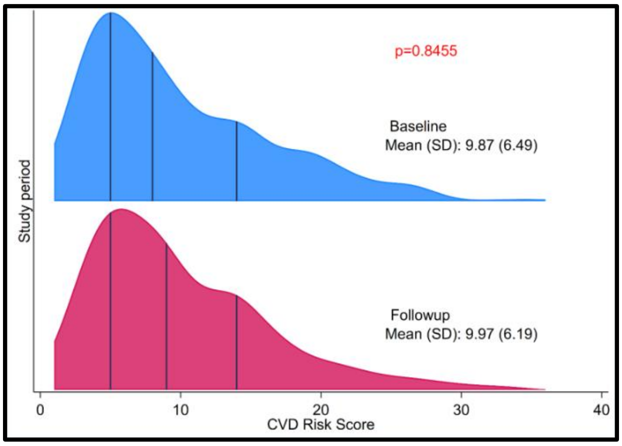
With a response rate of 95.05%, 365 individuals participated in the baseline study. Among the enrolled cohort, 161 (44.1%) were male, with a median age of 54 years (interquartile range: 47 to 62 years). Baseline survey revealed that a substantial proportion, 125 (34.2%), were illiterate. The majority, 361 (98.9%), identified as Nicobarese, and 199 (54.5%) were classified as lower socio-economic status. A notable portion, 244 (66.8%), had a BMI ≥ 23.0 (indicating obesity), while 89 (24.4%) were smokers. Smokeless tobacco use was prevalent among 273 (74.8%), and 228 (62.5%) reported alcohol consumption. 160 (43.8%) individuals reported a history of hypertension. Still, it was found that during the study, almost half of the participants (49.3%) had hypertension, and nearly another half were in pre-hypertension (47.7%). Among those who reported that they knew their status, only 63.1% were regularly taking treatment. None of the female participants were screened for cervical cancer during their lifetime. The median weekly intake of fruits and vegetables was three servings (interquartile range: 2 to 4), with 54 (14.8%) consuming excessive salt. Only 125 (34.2%) engaged in regular physical activity.

4.1. Prediction of 10–year CVD risk

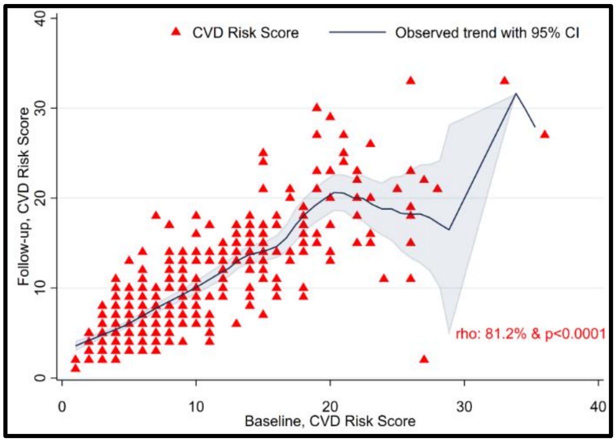
Based on the non-laboratory component of the CVD risk assessment chart, 83 (22.7%) had a risk <5%, 132 (36.2%) a risk of 5-9%, 114 (31.2%) a risk of 10-19%, 34 (9.3%) a risk of 20-29%, and 2 (0.5%) a risk of 30% and above.

Same cohort was managed as per the WHO HEARTS risk based CVD management tools over a period of 12 months, and end line assessement was conducted between October 2024 to January 2025.

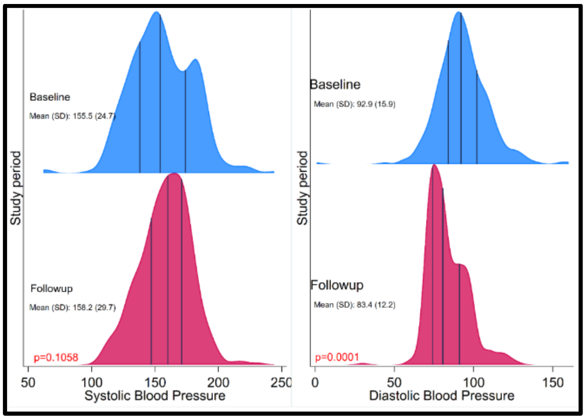
During the follow up period of 12 months, out of 365, four participants passed away due to complications of Tuberculosis, 03 participants were lost due to CVD related deaths. Remaining 358 people completed the follow-up period and were available for endline assessment.



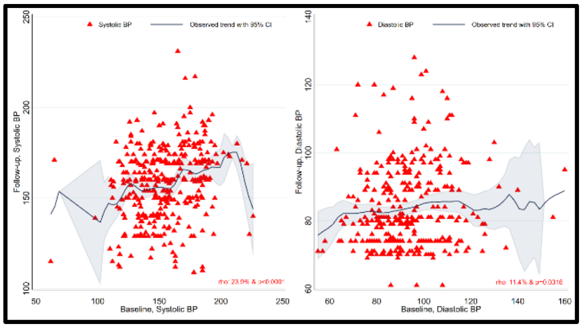
Graph 1: Comparison of distribution of CVD risk score between baseline and endline assessments



Graph 2: Scatter plot showing comparison of CVD risk score with observed trend (95% CI)



Graph 3: Distribution of Systolic and Diastolic BP readings between base line and end line assessments



Graph 4: Scatter plot showing distribution of Systolic and Diastolic BP readings between base line and end line assessments with observed trend (95% CI)

Comparison of CVD risk stratification is shown in **Table 1**, and there was a reduction of CVD risk score among 34.35% participants, there was no change among 19% of the participants where as 45.8% had experienced an increase in their CVD risk score. Mean CVD risk score of baseline and endline were 9.87 and 9.97 respectively and this difference was not statistically significant. 39.8% of those aged ≥55 years have experienced reduction in their CVD risk scores while compared with 30.9% among those aged <55 years which was found to be statistically significant (P=0.007). Higher proportion (50.8%) among those who are in Lower Socioeconomic Class (IV-V) experienced an increase in their CVD risk scores while compared with 40.7% among participants who are from Upper/Middle Class (I-III), and these differences were found to be statistically significant (P=0.035). 54.7% of participants those who reported that they consume higher amount of salt in their diet have experienced an increase in CVD risk scores while compared with 41.7% and 45% among those who reported low and right amount of salt consumption in their diet respectively. Proportion of CVD risk reduction was better among Non-tobacco users, those who did physical exercises regularly and among those who consumed higher servings of fruits and vegetables while compared with their counter parts, but any how these differences were not found to be statistically significant (**Table 4**).

Table 2: Classification of CVD Risk Score

CVD Risk Score	Follow-up [n=355]		Baseline [n=365]	
	N	%	215	%
CVD Risk: <10%	208	58.6%	215	58.9%
CVD Risk: 10-19%	116	32.7%	114	31.2%
CVD Risk: ≥20%	31	8.7%	36	9.9%

Table 3: Comparison of CVD risk status between baseline and endline

Variable	No change N = 68[1]	Decrease in Risk N = 123[1]	Increase in Risk N = 164[1]	p-value[2]
Gender of the Participants, n (%)				0.970
Female	38 (19.1)	70 (35.2)	91 (45.7)	
Male	30 (19.2)	53 (34.0)	73 (46.8)	
Age Classification, n (%)				0.007
Age: <55	48 (25.1)	59 (30.9)	84 (44.0)	
Age: ≥55	20 (12.2)	64 (39.0)	80 (48.8)	
Educational Status, n (%)				0.091
Literate	53 (22.2)	77 (32.2)	109 (45.6)	
Illiterate	15 (12.9)	46 (39.7)	55 (47.4)	
Occupational Status, n (%)				0.700
Salaried/Self-Employed	35 (20.2)	62 (35.8)	76 (43.9)	
Non-Paid/Unemployed	33 (18.1)	61 (33.5)	88 (48.4)	
Socioeconomic status, n (%)				0.035
Lower Class (IV-V)	28 (14.5)	67 (34.7)	98 (50.8)	
Upper/Middle Class (I-III)	40 (24.7)	56 (34.6)	66 (40.7)	
Ever used, Smokeless Tobacco, n (%)				0.700
Non-Tobacco User	15 (17.4)	33 (38.4)	38 (44.2)	
Ever Tobacco User	53 (19.7)	90 (33.5)	126 (46.8)	
Ever Used, Alcohol, n (%)				0.140
Non-Alcohol User	24 (17.9)	55 (41.0)	55 (41.0)	
Ever Used, Alcohol	44 (19.9)	68 (30.8)	109 (49.3)	
Consumption of fruits per week, n (%)				0.240
>2 Servings	34 (18.8)	70 (38.7)	77 (42.5)	
≤2 Servings	34 (19.5)	53 (30.5)	87 (50.0)	
Consumption of vegetables per week, n (%)				0.840
>6 Servings	20 (17.4)	41 (35.7)	54 (47.0)	
≤6 Servings	48 (20.0)	82 (34.2)	110 (45.8)	
Consumption of salt, n (%)				0.052
Right Amount	61 (21.9)	92 (33.1)	125 (45.0)	
Low Amount	4 (16.7)	10 (41.7)	10 (41.7)	
High Amount	3 (5.7)	21 (39.6)	29 (54.7)	
Any form Physical Exercise/Activity, n (%)				0.600
No Physical Activity	44 (18.7)	78 (33.2)	113 (48.1)	
Physical Activity	24 (20.0)	45 (37.5)	51 (42.5)	
Known diabetic, n (%)				0.300
Non-Diabetes	66 (19.9)	112 (33.8)	153 (46.2)	
Diabetes	2 (8.3)	11 (45.8)	11 (45.8)	
[1]Median (IQR) or Frequency (%)				
[2]Pearson's Chi-squared test; Fisher's exact test				

A reduction in the CVD risk scores were observed among 41% of non-alcoholics while compared with 30.8% among alcoholic users, and these differences were found to be statistically significant [PR: 0.64 (95% CI: 0.41 to 1.00) (P=0.047)].

Analysis of hypertension showed that there was a significant reduction in the diastolic BP between baseline [Mean (SD): 92.9 (15.9)] and endline assessments [Mean (SD): 83.4 (12.2)] (P<0.01).

Table 4: Regression table - The factors associated with the reduction of CVD risk class

Variable	**No Change/ Increase in Risk** N = 232[1]	**Decrease in Risk** N = 123[1]	**PR(95% CI)**[2]	**p-value**	**Adjusted PR(95% CI)**[2]	**p-value**
Gender of the Participants, n (%)						
Female	129 (64.8)	70 (35.2)	—			
Male	103 (66.0)	53 (34.0)	0.95 (0.61 to 1.47)	0.813		
Age Classification, n (%)						
Age: <55	132 (69.1)	59 (30.9)	—		—	
Age: ≥55	100 (61.0)	64 (39.0)	1.43 (0.92 to 2.22)	0.109	1.32 (0.82 to 2.13)	0.248
Educational Status, n (%)						
Literate	162 (67.8)	77 (32.2)	—		—	
Illiterate	70 (60.3)	46 (39.7)	1.38 (0.87 to 2.19)	0.168	1.34 (0.80 to 2.23)	0.268
Occupational Status, n (%)						
Salaried/Self-Employed	111 (64.2)	62 (35.8)	—		—	
Non-Paid/ Unemployed	121 (66.5)	61 (33.5)	0.90 (0.58 to 1.40)	0.646	0.71 (0.43 to 1.16)	0.174
Socioeconomic status, n (%)						
Lower Class (IV-V)	126 (65.3)	67 (34.7)	—		—	
Middle Class (I-III)	106 (65.4)	56 (34.6)	0.99 (0.64 to 1.54)	0.977	0.91 (0.57 to 1.45)	0.692
Ever used, Smokeless Tobacco, n (%)						
Non-Tobacco User	53 (61.6)	33 (38.4)	—			
Ever Tobacco User	179 (66.5)	90 (33.5)	0.81 (0.49 to 1.34)	0.405		
Ever Used, Alcohol, n (%)						
Non-Alcohol User	79 (59.0)	55 (41.0)	—		—	
Ever Used, Alcohol	153 (69.2)	68 (30.8)	0.64 (0.41 to 1.00)	0.049	0.60 (0.37 to 0.99)	**0.047**
Consumption of fruits per week, n (%)						
>2 Servings	111 (61.3)	70 (38.7)	—		—	
≤2 Servings	121 (69.5)	53 (30.5)	0.69 (0.45 to 1.08)	0.105	0.72 (0.43 to 1.19)	0.195
Consumption of vegetables per week, n (%)						
>6 Servings	74 (64.3)	41 (35.7)	—		—	
≤6 Servings	158 (65.8)	82 (34.2)	0.94 (0.59 to 1.50)	0.783	1.19 (0.71 to 2.02)	0.518
Consumption of salt, n (%)						
Right Amount	186 (66.9)	92 (33.1)	—		—	
Low Amount	14 (58.3)	10 (41.7)	1.44 (0.60 to 3.35)	0.396	1.55 (0.62 to 3.75)	0.330
High Amount	32 (60.4)	21 (39.6)	1.33 (0.72 to 2.42)	0.359	1.43 (0.75 to 2.67)	0.271

Any form Physical Exercise/Activity, n (%)						
No Physical Activity	157 (66.8)	78 (33.2)	—		—	
Physical Activity	75 (62.5)	45 (37.5)	1.21 (0.76 to 1.91)	0.420	1.14 (0.70 to 1.83)	0.603
Known diabetic, n (%)						
Non-Diabetes	219 (66.2)	112 (33.8)	—		—	
Diabetes	13 (54.2)	11 (45.8)	1.65 (0.71 to 3.82)	0.237	1.35 (0.55 to 3.26)	0.500
[1]Median (IQR) or Frequency (%)						
[2]PR = Prevalence Ratio, CI = Confidence Interval						

5. Discussions

WHO HEARTS CVD risk prediction tools are feasible and valuable tools to predict CVD risk among asymptomatic individuals and these tools help in early detection and prevention of CVDs in resource-scarce settings.[12] In India cost effectiveness of using these approaches was conducted by Parthibane Sivanantham and group, and it considered two screening strategies, and it was reported that implementing either of the CVD screening strategies, i.e., screening the population initially using a non-lab-based CVD risk assessment method, and subjecting those having ≥10% CVD risk to lab-based CVD risk assessment (two-stage screening) or screening the population only using the lab-based CVD risk assessment method (single-stage screening) would be cost-effective at an implementation effect of 40%. [24] Since this study was conducted in remote Islands where use of laboratory method was challenging in nature, non-laboratory method was used for risk prediction.

In our study the baseline estimations on CVD risk among Nicobarese tribes using Non-laboratory method was higher while compared with previous reports in India,[11,12,13] and it was higher than previous reports which was conducted among general population of South Andaman Islands.[10] In this study after a follow-up of 12 months with the help of CVD risk management tools, even though there was a reduction of CVD risk score among 34.35% participants, mean CVD risk score between baseline and end line could not be achieved, indicates that CVD risk reduction at population requires a continuous and prolonged approach. However, it is observed that 12 month intervention using this approach was helpful in reducing the Diastolic BP of the cohort as there was a significant reduction between baseline [Mean (SD): 92.9 (15.9)] and endline assessments [Mean (SD): 83.4 (12.2)], but this did not affect in achieving reduction of risk scores as diastolic BP was not among the variables used in computation of CVD risk scores. Higher proportion (50.8%) among those who are in Lower Socioeconomic Class (IV-V) experienced an increase in their CVD risk scores while compared with participants who are from Upper/Middle Class (I-III) (40.7%), this suggests that compliance to treatment and access to consume sufficient amount of fruits and vegetables, will have an significant impact in achieving CVD risk reduction. Moderate to high CVD risk levels at baseline results were associated with alcohol use (P=0.006) and lower levels of vegetable consumption (P=0.007). A reduction in the CVD risk scores were observed among 41% of non-alcoholics while compared with 30.8% among alcoholic users, and it is a known fact that alcohol consumption is influenced by cultural and religious factors; individual characteristics, including sex, education, and income;[25] in Nicobarese tribes it is observed that higher proportions of both women and men consume alcohol, and in baseline it was observed that alcohol consumption was significantly associated with higher CVD risk scores. In studies directly examining the relationship between sodium intake and CVD outcomes across a broad range of consumption levels have now observed that both high (eg, >6 g sodium/d) and low sodium consumption (eg, <3 g/d) are associated with higher CVD risk with the lowest risk of CVD or death being between 3 and 6 g/d.[26] In our study we have found that 54.7% of participants those who reported that they consume higher amount of salt in their diet have experienced an increase in CVD risk scores, therefore optimal consumption of salt in daily diet is recommended by various studies, [26] and our reports re-confirm the same evidence.

However it is important to note that CVD risk management tools are not intended to replace clinical judgment; instead, this tool aims to help individuals and health professionals to improve their understanding of CVD risk and the relevance of detecting and addressing modifiable risk factors and to support proven interventions that are part of the health strategies implemented.[5]

CVD risk reduction requires a continuous approach on various actions including aiming at diet having sufficient proportions of fruits and vegetables, regular physical activities, cessation or control of harmful use of alcohol and tobacco, regular medications for identified health conditions;[3] it's not a one-time intervention activity to produce aimed results; The evidences from scientific literature indicates that the health-promoting impact of healthy daily habits and actions are important in prevention and treatment of conditions related to management of CVDs.[27,28,29] The scientific evidences supports the fact that improvements in lifestyle measures have been cited as the major reason for the reduction in CVD in recent years, but major challenges remain due to converting of evidences into practice at community level. One of the reports by Ford ES etal in US has shown that the mortality rates from coronary heart disease (CHD) reduced by more than 40% due to lifestyle changes.[30] In 2013, the World Health Organization launched the 25×25 Global Action Plan, which is an ambitious road map for countries to reduce NCD-related premature mortality by 25% by 2025.[31] The global action plan focused on strengthening health services and public policy to prevent and manage major NCDs (CVD, cancer, diabetes mellitus, and chronic respiratory diseases), which contribute most to global morbidity and mortality, and 4 main health-related behaviors; tobacco use, diet, physical activity, and alcohol. Of these 4 diseases, CVD deaths are among the most amenable to rapid change, suggesting that if the ambitious target is to be achieved, it will be necessary to reduce CVD deaths.[31,32] Effective action requires reliable data on CVDs, its main risk factors, and information on obstacles to effective management if evidence-based health policy is to be designed and implemented.[33] Various reports have concluded that, Globally Age-specific death rates for CVDs have actually reduced by 15.6% between 2005 and 2015 although recent data suggest that this rate of decline has been slowing; [33-36] but it is important to note that these declines have been greatest in high-income countries (HICs), compared to middle and low income Countries. [36] Since these Islands are in remote, difficult to reach and rural in nature, immediate actions to reduce CVD risk and its consequences is need of the hour to prevent CVD related morbidity and mortalities.

6. Conclusions

A 12 month follow-up using WHO HEARTS risk based CVD management tools was helpful in CVD risk reduction among approximately 1/3rd of the study group; Poverty, Alcohol use and lower age (less than 55 yrs) were the factors negatively affecting the CVD risk reduction; this 12 month follow-up was helpful in reducing the diastolic BP significantly at community level. Risk factors such as consumption of alcohol, smokeless tobacco, obesity, and lower level of vegetable consumption are high among Nicobarese tribes. High prevalence of pre-hypertension, hypertension and its irregular treatment is a major public health issue, which requires immediate attention.

7. Authors Contributions

1. Manjunatha R: Conceptualization, preparation of protocol, project implementation plan, project management, report writing, manuscript preparation
2. Muruganandam N: Field supervision, coordination
3. Kannan T: Data management and data analysis

8. Conflict of Interest

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9. Conflicts of Interests

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