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A Study on NCD intervention Programme

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Foreword

Kerala is in the forefront in morbidity prevalence and Non Communicable Diseases are no exception. The State has been successful in implementing the National Programme for the Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) since 2010. NCDs are screened from the subcentre level. The authors here attempts to assess the functioning of NCD clinics, the awareness and utilization of NCD clinic by NCD patients, the satisfaction of NCD patients on functioning of NCD clinics. The medication adherence and behavioral and biological risk among the NCD patients are also assessed. Secondary and primary data was used for the study. The monthly NCD reports from all the districts for 10 months (April -2017 to January -2018) were collected from State NCD cell under NHM. For the assessment of the functioning of NCD cells at PHC/SC level and the awareness and utilization of NCD clinic by the NCD patients, primary data were collected. For the collection of primary data, two districts were selected based on the performance of the monthly district level NCD data.

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I appreciate the authors of the study Dr. Oommen P Mathew, Research Investigator and Mr. Sachin K.V, Field Investigator of the PRC in successfully completing the study. The findings will definitely be of great use to Planners and Policy makers in understanding the performance of NCD Clinics in Kerala and frame strategies for the best utilization of services.

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Executive Summary

The National Programme for the Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) was initiated in 100 districts in 2010, and expanded to about 468 districts in 2012. The focus of NPCDCS is to enable opportunistic screening for common non communicable diseases, at District and CHC levels, through the setting up of NCD clinics. In Kerala, NPCDCS programme was introduced in Pathanamthitta district in 2010 and later extended to Thrissur, Idukki, Alappuzha and Kozhikode. The State Health department in order to extend the benefit of the programme to the entire population has introduced the State NCD Control programme (Amrutham Arogyam) which covers all fourteen districts up to the sub centre level. This study is intended to assess the functioning of NCD clinics, the awareness and utilization of NCD clinic by NCD patients, the satisfaction of NCD patients on functioning of NCD clinics. The medication adherence and behavioral and biological risk among the NCD patients were also studied through this report. Alappuzha and Pathanamthitta districts were selected for the study. Two CHCs, Two PHCs and 8 sub centres were selected from each district and a total of 297 NCD patients were selected from the area of these sub centres.

As per the secondary data regarding NCD from state NCD Cell, the monthly average number of people screened for NCD in Kerala is only 32585. An average estimate shows that 36 – 55 lakh people of age>30 have any any NCD, it means that less than one percent of the estimated people with NCD utilizing the government facility, less than 5 percent of estimated NCD patients seek treatment for DM and / or HT. Only through camps at work places early detection of DM, HT and common cancers are possible. The district wise NCD data revealed that Pathanamthitta district is the only district conducted more NCD detection camps at work places, 6 districts not / very less camps conducted in 2017-18. Ranking of districts based on 14 variables of NCD monitoring (per 1 lakh 30+ population), Pathanamthitta district is the best performed district. Idukki, Palakkad, Kasaragod and Wayanad are the next best performed district. The complete enumeration of 30+ population, status of NCD among these people and exposure to risk factors is not recorded in any of the sub centres selected for study, no registers exclusively maintained for it in any of the facilities. Most of the facilities in Alappuzha not maintained NCD Clinic registers and client registers. In the centre where client register maintained, only patients utilizing government facility for free medicine are registered in the register. Earlier, diagnosis for HT/DM and free medicine supply were available at SC, it was more useful to the common public and a large number of public utilized the facility. Since there is no medicine supply at SC, the functioning of NCD clinic at SC limited for screening of DM/HT and number of people utilizing SC for NCD is very less now.

BP apparatus, Glucometer and Glucostrips and lancet are available in all the centres, during the current financial year, non availability of strip is observed for more than six months in all the sub centres.

The monthly reporting of NCD data to higher facilities is not uniform. Most of the centres do not consolidate data as per the reporting format, hence the reporting of NCD data to the higher facility is found inaccurate. The consolidation of NCD data at PHC /CHC from the sub centres is not found in a uniform manner.

CHC Konni conducts NCD camps in regular and good manner at work places to identify new NCD cases, No other facilities is conducting such camps in an effective manner. Only 58 percent of the NCD patients were aware of the NCD clinics functioning in their area and 31 percent ever visited in any camp organized by the health department for the detection of NCD. The major reason for the non-visit of NCD clinic was reported as inconvenience, the second most reason for not visited any of the NCD clinic is lack of awareness about the NCD clinic. Among those visited NCD clinics, about Ninety percent patients are satisfied on the functioning of the NCD clinics. More than 95 percent of HT, DM and CAD patients depend Allopathic medicine for their treatment. Only 35 of the patients depend Government facility for the treatment of DM & HTN.

Only 3 percent of the NCD patients follow high adherence of medication and 14 percent follow low adherence. Behavioral risk among NCD patients shows that 13 percent patients are current smokers, 13 percent are current alcohol users and 37 percent are leading sedentary life, 37 percent use very low / low fruits and vegetables and 16 percent reported high salt intake. Family history is one of the main biological risk factor for major NCDs. Among the 297 patients, 31 percent have family history of CAD in first degree relatives, 16 percent of patients have family history of stroke, 56 percent have family history of diabetes, 58 percent have family history of hypertension and 37 percent have family history of Hypercholesterolemia.

Chapter 1

Introduction

In 2008, out of the 57 million global deaths, 36 million deaths, or 63%, were due to NCDs, principally cardiovascular diseases, diabetes, cancers and chronic respiratory diseases. Nearly 80% of NCD deaths occur in low-and middle-income countries. It is projected that globally NCDs will account for nearly 44 million deaths in 2020. The leading causes of NCD deaths in 2008 were: cardiovascular diseases (17 million deaths, or 48% of NCD deaths); cancers (7.6 million, or 21% of NCD deaths); respiratory diseases, including asthma and chronic obstructive pulmonary disease (COPD), (4.2 million) and diabetes (1.3 million deaths). NCDs kill at a younger age in low- and middle-income countries, where 29% of NCD deaths occur among people under the age of 60, compared to 13% in high-income countries¹. (*Global status report on non-communicable diseases 2010*)

Impaired glucose tolerance and impaired fasting glycaemia are risk categories for future development of diabetes and cardiovascular disease². In some age groups, people with diabetes have a two-fold increase in the risk of stroke³. Diabetes is the leading cause of renal failure in many populations in both developed and developing countries. Lower limb amputations are at least 10 times more common in people with diabetes than in non-diabetic individuals in developed countries; more than half of all non-traumatic lower limb amputations are due to diabetes⁴. Diabetes is one of the leading causes of visual impairment and blindness in developed countries⁵. People with diabetes require at least two to three times the health-care resources compared to people who do not have diabetes, and diabetes care may account for up to 15% of national health care budgets⁶. In addition, the risk of tuberculosis is three times higher among people with diabetes⁷. Over the last thirty years, the problem of diabetes has changed from being a mild disorder of the elderly to one of the major causes of morbidity and mortality affecting youth and middle aged people. It was estimated that there are about 6.24 crore people with diabetes in 2014 and 7.7 crore with pre-diabetes, making it one of the largest non-communicable epidemics⁸.

Worldwide, raised blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all annual deaths⁹. This accounts for 57 million DALYs or 3.7% of total DALYs. Raised blood pressure is a major risk factor for coronary heart

disease and ischaemic as well as haemorrhagic stroke¹⁰. Blood pressure levels have been shown to be positively and progressively related to the risk for stroke and coronary heart disease¹¹. Globally, the overall prevalence of raised blood pressure in adults aged 25 and over was around 40% in 2008.

Raised cholesterol levels increase the risks of heart disease and stroke¹². Globally, a third of ischaemic heart disease is attributable to high cholesterol. Overall, raised cholesterol is estimated to cause 2.6 million deaths (4.5% of total) and 29.7 million DALYs, or 2.0% of total DALYs⁹. Raised total cholesterol is a major cause of disease burden in both the developed and developing world as a risk factor for ischaemic heart disease and stroke¹³.

Most NCDs are strongly associated and causally linked with four particular behaviours: tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol. These behaviours lead to four key metabolic/physiological changes: raised blood pressure, overweight/obesity, hyperglycemia and hyperlipidemia. In terms of attributable deaths, the leading NCD risk factor globally is raised blood pressure (to which 13% of global deaths are attributed), followed by tobacco use (9%), raised blood glucose (6%), physical inactivity (6%), and overweight and obesity (5%)⁹.

Tobacco use and exposure comes in both smokeless and smoking forms. Smokeless tobacco is consumed in un-burnt forms through chewing or sniffing and contains several carcinogenic, or cancer-causing, compounds. Smokeless tobacco has been associated with oral cancer, hypertension, heart disease and other conditions. Smoking tobacco, by far the most commonly used form globally, contains over 4000 chemicals, of which 50 are known to be carcinogenic. Risks to health from tobacco use result not only from direct consumption of tobacco but also from exposure to second-hand smoke¹⁴. Almost 6 million people die from tobacco use and exposure each year, accounting for 6% of all female and 12% of all male deaths in the world⁹. Of these deaths, just over 600 000 are attributable to second-hand smoke exposure among non-smokers¹⁵ and more than 5 million to direct tobacco use (both smoking and smokeless)^{9,15}. Smoking is estimated to cause about 71% of all lung cancer deaths, 42% of chronic respiratory disease and nearly 10% of cardiovascular disease. Smoking is also an important risk factor for communicable diseases such as tuberculosis and lower respiratory infections¹⁶.

Insufficient physical activity is the fourth leading risk factor for mortality⁹. People who are insufficiently physically active have a 20–30% increased risk of all-cause mortality compared to those who engage in at least 30 minutes of moderate intensity physical activity on most days of the week¹⁷. Participation in 150 minutes of moderate physical activity each week (or equivalent) is estimated to reduce the risk of ischaemic heart disease by approximately 30%, the risk of diabetes by 27%, and the risk of breast and colon cancer by 21–25%^{9, 17}. Additionally, physical activity lowers the risk of stroke, hypertension and depression. It is a key determinant of energy expenditure and thus fundamental to energy balance and weight control¹⁷. Globally, 31% of adults aged 15 years or older were insufficiently active (men 28% and women 34%) in 2008. Prevalence of insufficient physical activity was highest in the WHO Region of the Americas and the Eastern Mediterranean Region. In both of these regions, almost 50% of women were insufficiently active, while the prevalence for men was 40% in the Americas and 36% in Eastern Mediterranean. The South-East Asia Region showed the lowest percentages (15% for men and 19% for women).

The harmful use of alcohol is a major risk factor for premature deaths and disabilities in the world⁹. Hazardous and harmful drinking was responsible for 2.3 million deaths worldwide in 2004¹⁸. That amounts to 3.8% of all deaths in the world. More than half of these deaths occurred as a result of NCDs, including cancers, cardiovascular disease and liver cirrhosis. Cancers, cardiovascular disease and liver cirrhosis are responsible for a quarter of this burden. There is a direct relationship between higher levels of alcohol consumption and rising risk of some cancers, liver diseases and cardiovascular diseases. The relationship between alcohol consumption and ischaemic heart and cerebrovascular diseases is complex. It depends on both the amount and the pattern of alcohol consumption.

Aligning varying sources and types of data to generate overall estimations of unhealthy diet prevalence is not possible. The World Cancer Research Fund has estimated that 27–39% of the main cancers can be prevented by improving diet, physical activity and body composition²⁷. Approximately 16 million (1.0%) Disability Adjusted Life Year (DALY) and 1.7 million (2.8%) of deaths worldwide are attributable to low fruit and vegetable consumption^{9, 19}. Adequate consumption of fruit and vegetables reduces the risk for cardiovascular diseases, stomach cancer and colorectal cancer^{20,21}. There is convincing evidence that the consumption of

high levels of high-energy foods, such as processed foods that are high in fats and sugars, promotes obesity compared to low-energy foods such as fruits and vegetables¹⁹. The amount of dietary salt consumed is an important determinant of blood pressure levels and overall cardiovascular risk²². A population salt intake of less than 5 grams per person per day is recommended by WHO for the prevention of cardiovascular disease²³. However, data from various countries indicate that most populations are consuming much more salt than this²⁴.

The World Health Organization (WHO) has identified four major NCDs - Cardiovascular Diseases (CVD) such as heart attacks and stroke, Diabetes, Chronic Respiratory Diseases (Chronic Obstructive Pulmonary Diseases and Asthma) and Cancer. The list of non-communicable disease is of course much longer than these four. However, these four conditions account for a high proportion of premature mortality in India. (WHO 2014)

The medication regimen of the chronic diseases demands long term drugs administration and following up. It is well known that the treatment failure caused by poor medication adherence leads to frequent re-hospitalizations, poor outcome of the disease and increased health care costs. According to the World Health Organization (WHO), non-adherence to the medical regimen consists a major clinical problem in the management of patients with chronic illness³¹. Rates of non-adherence with any medication treatment may vary from 15% to 93%, with an average estimated rate of 50%³². Adherence with medication usage is defined as the proportion of prescribed doses of medication actually taken by a patient over a specified period of time³³. Compliance, a synonymous term which was commonly used in the past, implies a passive role and simply following the demands of a prescriber, and non-compliance has been regarded as associated with deviant or irrational behavior³⁴. The term “Adherence”, implies an active role in collaboration with a prescriber, and “non-adherence” encompasses the diverse reasons for patients not following a treatment recommendation.

One of the major contributing factors for uncontrolled disease is poor medication adherence. Poor medication adherence is associated with inadequate glycemic control; increased morbidity and mortality; and increased costs of outpatient care, emergency room visits, hospitalization, and managing complications of diabetes. Poor medication adherence is linked to key nonpatient factors (eg, lack of integrated

care in many health care systems and clinical inertia among health care professionals), patient demographic factors (eg, young age, low education level, and low income level), critical patient beliefs about their medications (eg, perceived treatment inefficacy), and perceived patient burden regarding obtaining and taking their medications (eg, treatment complexity, out-of-pocket costs, and hypoglycemia)³⁰.

In India, NCDs were responsible for 53 per cent of deaths and 44 per cent of disability adjusted life years lost²⁸. India is experiencing a rapid health transition. Within India, the State of Kerala, well known for health at low cost²⁹, is the most advanced State in this transition, and a harbinger of what will happen to the rest of India in the future.

In Kerala, NCDs account for more than 50% of total deaths occurring in the age group between 30 and 60. With 27% of adult males and 19 % of adult females being diabetic, Kerala is considered to be the diabetic capital of India. The percentage of Hypertension, Cardiovascular diseases and Cancer is also very high in the community across all sections of the society. Yet there was no organized programme to combat these problems till 2010.

The National Programme for the Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) was initiated in 100 districts in 2010, and expanded to about 468 districts in 2012. The focus of NPCDCS is to enable opportunistic screening for common non communicable diseases, at District and CHC levels, through the setting up of NCD clinics. At the PHC and sub centre levels, additional funding for glucose testing was provided for all those over 30 years of age and all pregnant women from 2012 onwards.

These guidelines envisage that risk assessment, screening, referral, and follow up for selected NCDs amongst all women and men aged 30 years and above, would be included in the set of services being offered as part of comprehensive primary health care risk assessment, screening, early detection and management of Hypertension and Diabetes Mellitus including referral and follow up. In the case of common cancers, the emphasis is on screening, early detection, and appropriate referral, with follow-up being undertaken by frontline workers

NPCDCS (National Programme for Prevention of CVD, Diabetes, Cancer and Stroke) a national programme in this regard was introduced in Pathanamthitta district in 2010 and later extended to Thrissur, Idukki, Alappuzha and Kozhikode. The State Health department in order to extend the benefit of the programme to the entire population has introduced the State NCD Control programme (Amruthum Arogyam) which covers all fourteen districts up to the sub centre level²⁶

This study is intended to assess the functioning of NCD clinics, the awareness and utilization of NCD clinic by NCD patients, the satisfaction of NCD patients on functioning of NCD clinics. The medication adherence and behavioral and biological risk among the NCD patients will be studied through this report

1.1 Objectives

1. To Assess district wise performance of NCD clinics
2. To assess the functioning of NCD clinic of selected facilities of Pathanamthitta and Alappuzha districts.
3. To assess the awareness, utilization and satisfaction of NCD patients about NCD clinics.
4. To assess the medication adherence of NCD patients
5. To assess the known behavioral and biological risk factors among self reported NCD patients

1.2 Data and methodology

Secondary and primary data was used for the study. The monthly NCD reports from all the districts for 10 months (April -2017 to January -2018) were collected from State NCD cell under NHM. The performance and the utilization of the NCD clinics in each district were assessed using these reports. Month wise data from each district on total camps conducted, clinics conducted, number of BCC sessions, number of patients screened, number of new and follow up DM, new and follow up HT, new and follow up DM &HT, new cardio vascular cases detected, new cancer cases detected, number of stroke detected and number of persons given tobacco cessation counseling were collected for the analysis.

For the assessment of the functioning of NCD cells at PHC/SC level and the awareness and utilization of NCD clinic by the NCD patients, primary data were collected. For the collection of primary data, two districts were selected based on the performance of the monthly district level NCD data.

Table 1.1. Ranking of performance of activities of NCD – District wise																
Slno	District	Camps	Clinics	BCC Sessions	Patients Screened	New cases detected					Follow up cases detected			Stroke	Cessation counselling	Total rank
						DM	HT	DM & HT	Cancer	CAD	DM	HT	DM & HT			
1	PTA	1	4	10	1	6	2	6	4	1	2	2	9	5	6	53
2	IDK	2	2	5	2	10	9	8	6	5	3	3	1	2	5	55
3	PKD	4	5	2	4	7	5	5	5	7	6	7	3	3	3	61
4	KSD	9	1	10	3	3	3	4	8	10	5	1	2	7	4	66
5	KLM	13	3	1	7	1	1	3	8	12	4	5	11	8	1	75
6	WYD	6	7	4	6	4	6	7	3	6	1	4	12	6	12	77
7	KNR	3	8	3	11	8	8	10	6	9	13	8	13	6	2	98
8	EKM	12	12	7	5	5	4	1	5	10	12	6	6	7	10	101
9	KTM	10	11	8	9	9	10	10	5	3	7	11	4	7	9	103
10	KKD	7	10	10	8	11	11	9	1	4	8	10	5	6	13	104
11	TVM	13	14	10	13	2	7	2	3	2	10	13	10	4	14	115
12	ALP	5	6	10	10	13	12	10	7	12	9	9	7	8	11	119
13	MLPM	8	13	6	14	14	14	11	2	8	14	14	14	1	7	129
14	TCR	11	9	9	12	12	13	10	6	11	11	12	8	7	8	129

- The ranks based on 30+ aged population of district. Lowest rank means better in performance.

Month wise data on the performance of 14 items for each district was used for the ranking of district. The cumulative figure (April -2017 to January -2018) of each item was converted to per lakh based on total population of the district. Then ranks were assigned to each item. Lowest rank represents the highest performance in each item. The sum of ranks for each district was found out. From the Table 1.1, it can be assessing that Pathanamthitta district have lowest sum of ranks and hence the best performer while considering all the 14 elements of NCD report. Pathanamthitta, Idukki, Palakkad, Kasaragod and Kollam are the first five districts based on the ranking of performance. Kozhikode, Trivandrum, Alappuzha, Malappuram and Thrissur are the five districts having lowest ranking based on the performance. One each districts were selected at random from the five district in the top and bottom. The districts selected were Pathanamthitta and Alappuzha.

From the districts selected for the study, the monthly report in Form 5A were collected for all the block CHCs for 10 months (April -2017 to January -2018) from the district NCD cell. The performance of the 14 elements was ranked and sum of the ranks were assessed. The lowest sum of ranks indicate good performance and high score indicate low performance. One each CHCs were selected at random from the high performed CHC and low performed CHC. The high performed CHCs

selected from Pathanamthitta and Alappuzha are respectively CHC Konni and CHC Muthukulam. The low performed districts selected from Pathanamthitta and Alappuzha are CHC Thumpamon and CHC Pandanadu respectively. One additional PHC from the each of the four CHC and two sub centres each from the CHC and PHC were selected for the study. The list of facilities selected for the study is given in Table 1.2.

The functioning of NCD clinics at PHC/SC were assessed using a structured interview schedule, verification of the NCD clinic register, NCD client register and the monthly report to the higher facilities for the previous months. The interview schedule for the sub centre and PHCs were prepared based on the roles of responsibilities of the SC/PHC/CHC health care team in prevention, early detection and management of NCD as prescribed in the operational guidelines and the revised operational guidelines of NPCDCS.

Table 1.2. Facilities selected for the study		
District	CHC/PHC	Name of SC
Pathanamthitta	CHC Konni	Payyanamon
		Attachakkal
	PHC Pramadam	Vakayar
		Lhakkoor
	CHC Thumpamon	Thumpamon Main Centre
		Muttom
	PHC Pandalam	Poozhicade
		Cherikal
Alappuzha	CHC Muthukulam	Muthukulam South
		Muringachira
	PHC Krishnapuram	Pullikkanakku
		Kochumuri
	CHC Pandanadu	Main Centre Pandanad
		Pandanad North
	PHC Venmony	Illathumepuram
		Venmony East

The awareness, utilization and satisfaction of NCD patients about NCD clinic were assessed using a structured interview schedule. The interview schedule administered to selected NCD patients in the sub centre area. The interview schedule contained questions regarding the awareness about the NCD clinic, ever visited such clinic, whether received health card, what kind of diagnosis received by on free of cost and what are the test done on payment, availability of medicine at NCD clinic, the period for which medicine received when visit the clinic etc. The satisfaction of the beneficiaries on timing of clinic, diagnosis, availability of medicine, behavior of

staff and facility in the clinic were also assessed. The reason for not visit the NCD clinic were also assessed from those who never/currently visited the clinic.

The adherence to medication is an important aspect regarding the control of the NCD, the medication adherence of the NCD patients were assessed using Morisky 8-Item Medication Adherence Questionnaire. The questionnaire contains 8 items (Appendix 1). The scoring of the tool – assign score 1 to answer “Yes” for the first seven items and zero if answer “No” to the first seven items. For 8th item, score 1 assign to the answer “Never/rarely” and zero to all other response to the item. The total score varies from 0 to 8. Total score zero means high adherence, score 1-2 means Medium adherence and score greater than 2 means Low adherence.

The behavioral and biological risk factors among the NCD patients were also collected using the interview schedule. The behavioral risk factors such as tobacco use, alcohol use, physical activity, consumption of fruits and vegetables, intake of salt were assessed. Smokeless tobacco is consumed in un-burnt forms through chewing or sniffing and contains several carcinogenic, or cancer-causing, compounds. Smokeless tobacco has been associated with oral cancer, hypertension, heart disease and other conditions. Smoking tobacco, by far the most commonly used form globally, contains over 4000 chemicals, of which 50 are known to be carcinogenic. Questions to assess the Tobacco use and exposure comes in both smokeless and smoking forms were included in the interview schedule. The harmful use of alcohol is a major risk factor for premature deaths and disabilities in the world. The use of alcohol was also assessed through the schedule. Regular physical activity reduces the risk of cardiovascular disease including high blood pressure, diabetes, breast and colon cancer, and depression. Questions were asked to assess the physical activities and duration of each activity. Sedentary or insufficient activity was defined as less than 5 times 30 minutes of moderate activity per week, or less than 3 times 20 minutes of vigorous activity per week, or equivalent. Adequate consumption of fruit and vegetables reduces the risk for cardiovascular diseases, stomach cancer and colorectal cancer. Most populations consume much higher levels of salt than recommended by WHO for disease prevention; high salt consumption is an important determinant of high blood pressure and cardiovascular risk. The intake of fruits and vegetables were assessed through the schedule. Less than servings of Fruits + vegetables per day is defined as “Low Fruits+ vegetable intake”. If number of servings of fruits+ vegetable is less is less 14, defined as very

low intake of fruits & Vegetables, if it is between 14 & 28. Defined as low intake of fruits and vegetables and if number of servings in a week is more than 28, it is defined as sufficient intake of fruits and vegetables. A population salt intake of less than 5 grams per person per day is recommended by WHO for the prevention of cardiovascular disease. We can divide people in to two groups, high salt intake group and low salt intake group. In this study, those who add salt to diet everyday and take pickles pappads and salted fish everyday can be considered as high salt intake group and others as low intake group. The hereditary of disease is biological risk factor. Questions were included in the schedule to collect the hereditary of DM, HT, CAD, Stroke and cholesterol in first degree relatives.

1.3 Sample size and sampling : Assessment of awareness, utilization, satisfaction of NCD clinics, the medical adherence of NCD patients and the behavioral and biological risk of the NCD among the NCD patients is intended to collect from NCD patients of the selected area of Pathanamthitta and Alappuzha districts. The NCD patients of the district constitute the population. Sample size was calculated by the formula

$$N = \frac{Z_{\alpha}^2 p(1-p)}{d^2}$$

where, p is the proportion of medical adherence among patients with diabetes, hypertension, and dyslipidemia. The proportion of medical adherence among patients with diabetes, hypertension, and dyslipidemia²⁷ is 0.59 (Cramer JA et al.), the level of precision is taken as 15% of p, level of significance was taken as 0.05 ($Z_{\alpha} = 1.96$). Hence the sample size for the study is determined as 267.

To assess the level of reporting and functioning of NCD clinics in the CHC/PHC/SC, two districts were selected based on secondary data. Two each sub centres from four PHC/CHC per each district were selected for the study. Hence a total of 16 sub centres were selected for the study. Person has any of DM / Hypertension/Both with age 30 or more is defined as a sample unit for the study. About 20 sampling unit from each sub centre area will be enough to attain the prescribed sample size. Consecutive sampling was used to attain the required sample from each sub centre area.

Chapter II

Performance of NCD clinics, its utilization and satisfaction of beneficiaries

The performance of NCD clinics based on secondary data taken from the State NCD cell is presented in this chapter. The performance on various elements of reporting was analyzed and comparison were carried out among the 14 districts. The functioning, management of records and reporting of NCD clinic data of those facilities visited in connection with the study were analyzed and are presented in this chapter. The awareness of the NCD patients about the functioning of NCD clinic in their area, the utilization of NCD clinic by the patients selected for the study and their satisfaction towards the functioning of NCD clinics were also analyzed and presented in the following section.

2.1 Analysis of Performance of NCD clinics based on secondary data

The performance of the NCD clinics were assessed by the secondary data received from state NCD cell. The monthly report from all the districts from April 2017 to January 2018 was collected from the state NCD cell to assess the performance of the NPCDCS in the state and each of the district. The interview with the state nodal officer revealed that NCD cell is functioning in all health facilities ranging from sub centre to District hospital. In each sub centre NCD clinic functions once in a week. BP monitoring and random blood sugar using glucometer for those reaching the clinic is the activity at sub centre level. Previously disbursing of medicine was carried out at sub centre. Since medicine is not available in sub centre, patients with DM and HT were sent to PHCs and medicines were provided at PHC. The screening of DM and HT is available in PHC and CHC and medicine are also available at PHC/CHC. Each sub centre submits monthly report to PHC. A data entry operator is available at the block level, who collects the monthly report from each PHC/CHC of the block and submit the report to district NCD Cell. District NCD cell submits report in prescribed form to the state cell on every month.

The consolidated data on NCD received from the districts from April 2017 to January 2018 is presented in Table 2.1. The first column represents number of camps organized in the district. Objectives of NPCDCS point out that Opportunistic screening at all levels in the health care delivery system from sub-centre and above for early detection of diabetes, hypertension and common cancers, Outreach camps

are also envisaged. Only through camps at work places early detection of DM, HT and common cancers are possible. From the table it can be seen that no camps conducted for the early detection in Thiruvananthapuram and Wayanad for the last 10 months. Pathanamthitta district is the only district which conducted more than 1000 camps during the last 10 months. Number of camps conducted by Kollam, Kottayam, Ernakulam, Thrissur, Kannur, Malappuram and Kasargode districts are comparatively less in numbers. Each of the facilities SC/PHC/CHC/THQH/DH has to conduct clinics and total of all such clinics for the last 10 months given in the Table. The district with highest number of clinics conducted are Palakkad and Alappuzha . The districts such as Malappuram and Kannur conducted less number of clinics. One of the objective of NPCDCS is to build capacity at various levels of health care for prevention, early diagnosis, treatment, IEC/BCC, operational research and rehabilitation. When looking into the number of BCC sessions conducted in these districts during the last 10 months, it can be inferred that districts such as Thiruvananthapuram, Pathanamthitta, Alappuzha, Kottayam and Kasargode not conducted even a single BCC session during the last 10 months. The districts which conducted highest number of BCC sessions are Kasargode and Palakkad. Average monthly screened cases are given in the table.

Table 2.1 District wise consolidated figures on NCD from Aprilc2017- January 2018															
Sln o	District	Camps	Clinics	BCC Session s	Patients Screened **	New cases detected					Follow up cases detected			Strok e	persons given tobacco Cessation counsell ing
						DM **	HT**	DM & HT **	Canc er	CAD	DM **	HT**	DM & HT **		
1	TVM	0	0	0	2026	797	863	593	143	697	6372	8573	5282	107	0
2	KLM	156	9267	3181	3649	519	697	154	111	238	14860	16304	3504	29	3115
3	PTA	1470	7180	0	2714	236	470	85	35	380	7228	9544	2123	19	7021
4	ALP	209	10613	0	2184	191	320	81	14	0	4713	8241	3830	0	2997
5	KTM	113	4500	0	2284	210	337	95	137	212	5144	7457	4206	25	979
6	IDK	546	7278	872	2232	109	209	60	10	99	4978	7580	3911	68	9251
7	EKM	71	6869	186	3545	367	560	129	52	716	9865	11969	7341	12	8919
8	TCR	53	6706	162	1978	315	452	127	29	36	5970	9522	5320	13	10746
9	PKD	338	12300	6873	4021	362	785	236	36	139	7964	11342	6583	128	25566
10	KKD	509	8367	7350	2806	377	660	105	39	83	5214	12524	3445	39	37811
11	MLPM	156	1296	2312	613	102	283	71	178	133	684	1997	936	224	13596
12	WYD	0	4361	2953	974	263	421	84	0	0	2625	4043	1131	0	19535
13	KNR	8	1171	1134	3697	460	768	2135	38	44	4484	12889	4634	7	4523
14	KSD	29	8548	0	2047	264	401	111	3	20	3707	8911	3386	4	11024
15	Kerala	3658	88456	25023	32585	4381	6905	3985	811	2797	79095	122654	51800	675	114275

**(monthly Average)

Those who are on treatment visit the clinic every month and screen again. Average number of cases screened for NCD is presented in the Table 2.1. The monthly average number of people screened for NCD in Kerala is only 32585. An average estimate shows that 36 – 55 lakh people of age 30+ have any one of NCD, it means that less than one percent of the estimated people with NCD utilize the government facility, and less than 5 percent of estimated NCD patients seek treatment for DM and / or HT. Number of patients screened in Malappuram and Wayanad are very less. During the 10 month period, cancer detection was more in Thiruvananthapuram, Kollam, Malappuram and Kottayam. The detection of new cases of CAD was found more in Thiruvananthapuram, Kollam, Ernakulam, Pathanamthitta and Kottayam. Follow up cases of DM, HT and both are found very less in the district of Malappuram and Wayanad. Number of stroke reported is more from Malappuram, Palakkad and Thiruvananthapuram

Inorder to compare the performance of the reported NCD data from the districts for first 10 months of the year 201-18, the figures are converted for number per lakh in proportion to 30+ population of the corresponding district. Rank for each of the columns was calculated and sum of the ranks of all the 14 variables taken for the report were calculated and presented in the Table. Lower the rank represent the better the performance.

Number of camps conducted per lakh 30+ population for the 10 month period of 2017-18 shows that Pathanamthitta district conducted 205 such camps followed by Idukki with 89 camps. The camps conducted at work places and community is the main source of identifying new cases of DM/HT/CAD/Cancer etc. Most of the district shows poor performance in conducting camp. The district Wayanad, Thiruvananthapuram, Kasaragod, Ernakulam, Kannur, Thrissur and Malappuram conducted less than 10 camps/lakh population for a period of 10 months. Pathanamthitta, Idukki, Kasaragod and Wayanad performed better in conducting clinics. The performance in conducting NCD clinics in Thiruvananthapuram, Kannur and Malappuram districts are very poor. No BCC sessions were conducted during the period of 10 months in Pathanamthitta, Kasaragod, Kottayam, Thiruvananthapuram and Alappuzha and in this regard Palakkad and Wayanad performed better. Number of patients screened for 30+ population / lakh is highest in Pathanamthitta (3785), followed by Idukki (3638) and Kasaragod (3318).

Slno	District	Camps	Clinics	BCC Sessions	Patients Screened **	New cases detected					Follow up cases detected			Stroke	persons given tobacco Cessation counseling	Ranking score (Based on all the 14 variables)
						DM **	HT**	DM & HT **	Cancer	CAD	DM **	HT**	DM & HT **			
1	PTA	205	1001	0	3785	33	66	12	5	53	1008	1331	296	3	979	53
2	IDK	89	1186	142	3638	18	34	10	2	16	811	1235	637	11	1508	55
3	PKD	24	871	487	2848	26	56	17	3	10	564	804	466	9	1811	61
4	KSD	5	1386	0	3318	43	65	18	0	3	601	1445	549	1	1787	66
5	WYD	0	1080	731	2412	65	104	21	0	0	650	1001	280	0	4836	75
6	KLM	11	636	218	2506	36	48	11	8	16	1021	1120	241	2	214	77
7	KKD	32	524	461	1759	24	41	7	2	5	327	785	216	2	2370	98
8	KNR	1	88	85	2780	35	58	161	3	3	337	969	348	1	340	101
9	EKM	4	365	10	1883	20	30	7	3	38	524	636	390	1	474	103
10	KTM	10	387	0	1966	18	29	8	12	18	443	642	362	2	84	104
11	TVM	0	0	0	1120	44	48	33	8	39	352	474	292	6	0	115
12	ALP	17	860	0	1770	16	26	7	1	0	382	668	310	0	243	119
13	MLPM	9	76	136	360	6	17	4	10	8	40	117	55	13	798	129
14	TCR	3	389	9	1147	18	26	7	2	2	346	552	309	1	623	129
15	Kerala	21	501	142	1845	25	39	23	5	16	448	695	293	4	647	

** Monthly Average figure / lakh 30+ population :Source : State NCD Cell, NHM, Kerala

The performance in screening of patients is poor in Malappuram, Thrissur and Thiruvananthapuram. Detection of new cases of HT/ DM or both is found more in Kannur, Wayanad, and Pathanamthitta. The detection of new cases of DM/HT/Both is found to be poor in Malappuram, Alappuzha, Ernakulam and Kottayam. The detection of new cases of CAD is more in Pathanamthitta, Ernakulam and Thiruvananthapuram. Number of screening of follow up cases of HT/DM or both is found high in Idukki, Palakkad, Pathanamthitta and Kasaragod and its performance is found less in Malappuram, Kannur and Thiruvananthapuram districts. Persons given tobacco Cessation counseling is found high in the northern districts Wayanad, Kozhikode, Kasaragod and Palakkad districts and found least in Kottayam, Alappuzha and Thiruvananthapuram districts. The cumulative rank of all the 14 variables for the NCD monitoring is found lowest in Pathanamthitta district, it means when considering the service in NCD per 1 lakh 30+ population, Pathanamthitta district is the best performed district. Idukki, Palakkad, Kasaragod and Wayanad are the next best performed districts based on the reported NCD clinic data. The four least performed districts are Thiruvananthapuram, Alappuzha, Malappuram and Thrissur .

2.2 Assessment of NCD clinic by verifying records of selected CHC/PHC/SC of Pathanamthitta and Alappuzha

For the assessment of the NCD Clinics in the districts selected for the study, 2 CHCs were selected from each districts. One each of the PHCs was selected from these CHCs. Two Sub centres were selected from each of the CHCs & PHCs selected. The clinic register, the client register and reports submitted to the higher facilities were checked in all these selected facilities. One structures interview schedule was prepared for each of the sub centres to assess the functionalities of the NCD clinic as prescribed in guidelines for population level screening of common NCD and the NPCDCS Final Operational Guidelines.

As per the guideline of NPCDCS, Community Based Assessment Check list (CBAC) for all the men and women of age 30+ should be conducted at each sub centre. The guidelines also insist the enumeration of population of 30+ years and a specific register of enumeration of all population and risk factors of the said population. There is no register containing all 30+ population with exposure to risk

factors in any of the facilities. Out of the 8 Sub centres in the Pathanamthitta district only 4 centres have the figure of 30+ population. This figure was obtained in these centres after the completion of the latest “jagratha survey”. There is no figure regarding 30+ population of the remaining 4 Sub centres. In Alappuzha district, any of the centre have figure of 30+ population. Hence in almost all sub centres, the complete enumeration of 30+ population and assessment of the exposure to risk and disease conditions are not available. In Pathanamthitta, all sub centre have client registers. The client register entry is must in this district to get medicine from the THQH/ DH for a period of one month. If the patient don't have a unique Id from the sub centre, the NCD clinic provide medicine for one week and insist the patients to complete registration from the concerned sub centre. Hence patients utilizing the government facility for getting medicine are registered in the clinic register. In centres having figure of 30+ population it was observed that below 10 percent of them registered in the client register. In Alappuzha district only four out of 8 sub centre maintained client register. The entries in this register is as it in Pathanamthitta district, ie the patients utilizing government facility for free medicine registered in the client register. In 4 sub centres, there is no client register. In Pathanamthitta district, the clinic register is maintained in all the sub centres. The BP readings and RBS readings (using Glucometer) of the patients who came to the NCD clinic are maintained in clinic register. Since there is no medicine supply from sub centres, the patients utilizing the clinic is very less, as in the number of patients visiting on clinic days varies from 5-15. It is found that, in four sub centres of Konni block, the NCD clinics are attached along with nutritional day. So each month, one such clinic is conducted at one ward, after prior intimation to the public of that area. Hence, the detection of new DM/HT cases have increased with these clinics. The number of cases attending these clinics are about 20-30 as compared to usual NCD clinics. Almost all the sub centres conduct the NCD clinic on specified days in a regular manner. Separate NCD clinic register is available in all the sub centres of Pathanamthitta district. But in the Alappuzha district, no separate clinic register was available in 4 sub centres out of the 8 selected. The conduct of NCD clinic is also not regular in 6 out of 8 selected sub centres in Alappuzha. The records revealed that only 2-3 clinics days per month are conducted in these centres. A functional BP apparatus is available in all the sub centres selected for study. Glucometer, Glucostrips and lancet were available in all the centres on the day of visit. During the current financial year, non availability of strip was observed for more than six months in all these sub centres. As per NPCDCS guidelines, there has to be a

separate patient referral card, but as this card has not been printed and distributed, none of the facility has such a referral card.

The reporting of monthly NCD clinic data was found to be a major problem in almost all centres. It was observed that there is under reporting of data in almost all the sub centres. But the reporting of 3 sub centres in Pathanamthitta was found to be in a good manner. After each clinic, the consolidated figures marked as per the required format and monthly consolidation, is also available in these centres. Whereas, in the remaining 5 sub centres of Pathanamthitta district, no consolidation was found in the clinic register, hence only approximated figures are reported to the PHCs. It was observed that the data consolidation from one sub centre under a PHC in Pathanamthitta, was not in a good manner and not as per the reported format. The sub centres conduct the clinic in a good manner. But amongst all, one JHI in charge of data consolidation at PHC was found to be below par at work, hence the reporting from this PHC is not as prescribed. As a result, the data is underreported from this PHC. In Thumpamon Block, the reporting from the PHCs to the data entry operator is not in the prescribed manner. There is no consolidation at PHC level. The details are sent by the JHI / JPHN of each sub centre to the data entry staff at NCD clinic of Adoor by either through whatsapp or through phone. The reporting from the entire block is not as per the required format, hence the reporting from this block is underreported. In Thumpomon CHC, doctors prescribe medicines to all the patients attending OP, but no record in this regards is maintained in the CHC. Hence, the report from this CHC is much less than the actual service rendered. In Alappuzha district, the consolidation of the clinic days are not found in clinic register and the reporting from these Sub centres to PHC/CHC is not accurate.

The NCD clinic at Konni CHC is conducted in a very good manner. A large number of people make use of this facility, a large proportion of people even from medium / high socio economic group make use of this facility. The staff at the NCD clinic is very cordial to the public. This NCD clinic conduct regular camps in work places such as police station, transport stand etc and the detection of new cases of DM/HT is mainly through these camps. No other PHC/ CHC selected for the study has not conducted any such camps during the current financial year.

2.3 Awareness and utilization of NCD Clinic

The awareness and utilization of NCD clinics by NCD patients at the selected area of Pathanamthitta and Alappuzha districts is analyzed and findings are provided in this session. The awareness of NCD clinics and its utilization is provided in Table 2.3. Only 58 percent of the NCD patients were aware of the NCD clinics functioning in their area.

Table 2.3 Distribution according awareness and utilization of NCD clinics by NCD patients

		Count	Percent
Heard about NCD clinic	Yes	173	58.2
	No	124	41.8
Visited any camp for the detection of NCD (DM/HTN/CAD/Cancer) organized by panchayat / health department	Yes	94	31.6
	No	203	68.4
Ever Visited DH/THQH/CHC/PHC/SC for the detection of NCD(DM/HTN/CAD/Cancer) For treatment	SC	4	1.3
	PHC	40	13.5
	CHC	37	12.5
	THQH/DH	44	14.8
	No	172	57.9
Currently visiting NCD clinic	SC	4	3.2
	PHC	34	27.2
	CHC	27	21.6
	THQH/DH	32	25.6
	No	28	22.4

Among the 297 patients, only 31 percent ever visited a camp organized by the health department for the detection of NCD. The patients were enquired whether they have ever visited any health facility for the screening of NCD or for getting medicines from the facility. Nearly 58 percent never visited any facility for the screening of NCD or for treatment, meanwhile nearly 15 percent visited THQH/DH and 13 percent visited CHC. Among those who have utilized any health facility, only 78 percent are currently utilizing the government facility for screening / treatment. Among the current users, nearly one fourth of the patients were utilizing THQH/DH, 27 percent were utilizing PHC and 21 percent were utilizing CHC.

Association of awareness of NCD Clinics and selected socio personal and clinical background of patients is presented in Table 2.4. Among the patients in the age group 30-45, 68 percent have heard about the functioning of NCD clinics and 64

percent of the patients in the age group 46-60 have heard about the NCD clinic, whereas only 40 percent of patients in the age of above 75 have heard of NCD clinics. The Chi square test ($p < 0.05$) shows that the awareness of NCD clinics is significantly associated with age of patients. Females (63%) are more aware of NCD clinics as compared with males (50%), and this association is statistically significant at 0.05 level. When considering the educational status of the patients, the awareness is more among low educated group as compared to high educated group. The awareness is found independent ($p > 0.05$) of the disease of the patients such as DM, HTN and CAD.

Table 2.4 Association of awareness of NCD Clinics and selected socio personal and clinical background of patients.

		Heard about NCD clinic				χ^2	p
		Yes		No			
		Count	Percent	Count	Percent		
Age	30-45	15	68.2	7	31.8	9.17*	0.027
	46-60	72	63.7	41	36.3		
	61-75	67	58.8	47	41.2		
	>75	19	39.6	29	60.4		
Gender	Male	54	50.0	54	50.0	4.75*	0.029
	Female	119	63.0	70	37.0		
Education	Primary	73	59.3	50	40.7	20.41**	0.000
	Secondary	81	69.2	36	30.8		
	Hr.Secondary & Above	19	33.3	38	66.7		
Type of NCD	Hypertension	60	53.6	52	46.4	2.76	0.251
	Diabetes Mellitus	35	67.3	17	32.7		
	Both HTN & DM	68	57.1	51	42.9		
Cardiovascular diseases	Yes	57	58.8	40	41.2	0.02	0.901
	No	116	58.0	84	42.0		
Social class	APL	97	48.5	103	51.5	23.93**	0.000
	BPL	76	78.4	21	21.6		
Type of family	Nuclear	73	55.3	59	44.7	3.7	0.158
	Joint/Extended	96	62.3	58	37.7		
	Single member	4	36.4	7	63.6		

**:- Significant at 0.01 level, *:- Significant at 0.05 level

The patients from BPL families are more aware about the NCD clinics (78.4%) as compared to the patients from APL families (48.5%), and this association is statistically significant at 0.01 level. The awareness about the NCD clinic is more among those from joint/extended families (62.3 %) as compared to patients from nuclear families (55.3) and the awareness is considerably low among single member families. The chi square test ($p > 0.05$) shows that the association of type of family with the awareness of NCD clinic is not significant.

Association of NCD camp utilization and selected socio-personal and clinical variables are presented in Table 2.5. Visit to camps for detection of NCD is found to be more among patients in the age group 40-60 (35%), but the utilization of NCD

detection camps is independent of age of patients. Similarly gender, type of family, presence of DM/HTN/CAD are independent of the camp utilization for the detection of NCD.

Table 2.5 Association of visit of NCD Clinics and selected socio personal and clinical background of patients

		Visited any camp for the detection of NCD (DM/HTN/CAD/Cancer) organized by panchayat / health department				χ^2	p
		Yes		No			
		Count	Percent	Count	Percent		
Age	30-45	5	22.7	17	77.3	4.49	0.214
	46-60	40	35.4	73	64.6		
	61-75	39	34.2	75	65.8		
	>75	10	20.8	38	79.2		
Gender	Male	27	25.0	81	75.0	3.47	0.063
	Female	67	35.4	122	64.6		
Education	Primary	48	39.0	75	61.0	8.38*	0.015
	Secondary	36	30.8	81	69.2		
	Hr.Secondary & Above	10	17.5	47	82.5		
DM _HTN	Hypertension	31	27.7	81	72.3	2.01	0.366
	Diabetes Mellitus	18	34.6	34	65.4		
	Both HTN & DM	43	36.1	76	63.9		
Cardiovascular diseases	Yes	32	33.0	65	67.0	0.12	0.730
	No	62	31.0	138	69.0		
Social class	APL	42	21.0	158	79.0	32.11**	0.000
	BPL	52	53.6	45	46.4		
Type of family	Nuclear	42	31.8	90	68.2	2.74	0.254
	Joint/Extended	51	33.1	103	66.9		
	Single member	1	9.1	10	90.9		

**:- Significant at 0.01 level, *:- Significant at 0.05 level

Education of patients shows that, primary and secondary educated patients have more utilized the detection camp as compared to higher secondary or above educated patients. Hence education of patients is significantly associated with the utilization of camps. Similarly, the social class of patients is significantly associated with the utilization of detection camps. Nearly 54 percent of the patients from the BPL families has visited NCD detection camps whereas only 21 percent of patients from APL families has visited NCD detection camps.

Patient's ever visit to NCD clinic and its association with selected socio personal and clinical backgrounds are presented in Table 2.6. Patients in the age group of 30-45, 73 percent has never visited any NCD clinics, Chi square test shows that age of patients is not associated with the visit of NCD clinic. Similarly, gender, type of

family and presence of any disease such as DM/HT/CAD are not associated with the visit of NCD clinic.

Table 2.6 Association of ever visit of NCD Clinics and selected socio personal and clinical background of patients

		SC	PHC	CHC	THQH/DH	No	χ^2	p
Age	30-45	0 (0)	1 (4.5)	0 (0)	5 (22.7)	16 (72.7)	19.3	0.082
	46-60	2 (1.8)	14 (12.4)	16 (14.2)	22 (19.5)	59 (52.2)		
	61-75	0 (0)	20 (17.5)	16 (14)	14 (12.3)	64 (56.1)		
	>75	2 (4.2)	5 (10.4)	5 (10.4)	3 (6.3)	33 (68.8)		
Gender	Male	0 (0)	11 (10.2)	14 (13)	13 (12)	70 (64.8)	5.96	0.202
	Female	4 (2.1)	29 (15.3)	23 (12.2)	31 (16.4)	102 (54)		
Education	Primary	4 (3.3)	28 (22.8)	14 (11.4)	19 (15.4)	58 (47.2)	35.3**	0.000
	Secondary	0 (0)	9 (7.7)	19 (16.2)	22 (18.8)	67 (57.3)		
	Hr.Secondary & Above	0 (0)	3 (5.3)	4 (7)	3 (5.3)	47 (82.5)		
DM _HTN	Hypertension	0 (0)	14 (12.5)	14 (12.5)	19 (17)	65 (58)	10.27	0.246
	Diabetes Mellitus	0 (0)	4 (7.7)	7 (13.5)	10 (19.2)	31 (59.6)		
	Both HTN & DM	4 (3.4)	21 (17.6)	15 (12.6)	14 (11.8)	65 (54.6)		
Cardiovascular diseases	Yes	2 (2.1)	13 (13.4)	17 (17.5)	9 (9.3)	56 (57.7)	6.5	0.165
	No	2 (1)	27 (13.5)	20 (10)	35 (17.5)	116 (58)		
Social class	APL	2 (1)	22 (11)	19 (9.5)	25 (12.5)	132 (66)	16.8**	0.002
	BPL	2 (2.1)	18 (18.6)	18 (18.6)	19 (19.6)	40 (41.2)		
Type of family	Nuclear	0 (0)	14 (10.6)	17 (12.9)	21 (15.9)	80 (60.6)	11.95	0.154
	Joint/Extended	4 (2.6)	26 (16.9)	20 (13)	22 (14.3)	82 (53.2)		
	Single member	0 (0)	0 (0)	0 (0)	1 (9.1)	10 (90.9)		

**:- Significant at 0.01 level

Education and social class of patients are significantly associated with the ever visit of NCD clinic by patients. Nearly 83 percent of patients from higher educated group have never visited NCD clinics, whereas about half of the patients with lower level education have visited these NCD clinics. Among the APL category patients, only 34 percent patients ever visited NCD clinic, whereas 59 percent of patients from BPL category ever visited NCD clinic.

Among the 297 patients interviewed, 172 patients never visited any of the NCD clinics. The main reasons for the non-visit of NCD clinic is presented in Table 2.6. The major reason reported is the inconvenience. The inconvenience of the patients includes the timing of the clinic, inconvenience to reach the facility, long waiting time for getting service from the NCD clinic.

Table 2.7 Distribution according to reason for non visit of NCD clinic

	Reason for non-visit	Count	Percent
Never visit of NCD clinic	Not aware of NCD clinic	52	30.2
	Aware but inconvenience	115	66.9
	Medicine not available	12	7.0
	Poor quality of medicine	15	8.7
	Poor quality of service	3	1.7
	Others	17	9.9
Current visit of NCD clinics	Inconvenience	12	42.9
	Medicine not available	14	50.0
	Poor quality of medicine	5	17.9
	Poor quality of service	1	3.6
	Others	4	14.3

The second most common reason for not visiting any of the NCD clinics is lack of awareness about the NCD clinic. About 30 percent have reported that they were not aware of separate NCD clinic functioning in government facilities. The other reasons reported for not visiting the NCD clinics are non-availability of medicine (7%) and poor quality of medicine (8.7%). Among the 125 ever users of NCD clinics, 28 patients are not currently utilizing the NCD clinics. The table for non-utilization shows that non availability of medicine is the main reason (50%) followed by inconvenience (43%).

2.4 Satisfaction of beneficiaries about NCD Clinic

The satisfaction of beneficiaries of NCD clinics and its association with selected variables is presented in this section. The satisfaction of the patients after NCD clinic visit is presented in Table 2.7. Ninety percent patients are satisfied on timing; 86 percent are satisfied on diagnosis, 84 percent are satisfied on quality of medicine, 92 percent are satisfied on behavior of staff and 93 percent satisfied on facility available at NCD clinic. The satisfaction is comparatively less on availability of medicine.

Table 2.8 Distribution according to satisfaction about NCD clinic

Satisfaction about NCD clinic	Highly satisfied	Satisfied	Neither satisfied/Nor dissatisfied	Dissatisfied	Highly dissatisfied
Timing of NCD clinic	2 (1.6)	110 (88)	10 (8)	2 (1.6)	1 (0.8)
Diagnosis of DM/HTN	5 (4)	103 (82.4)	12 (9.6)	2 (1.6)	3 (2.4)
Medicine availability	5 (4)	84 (67.2)	7 (5.6)	6 (4.8)	23 (18.4)
Quality of medicine	4 (3.2)	101 (80.8)	7 (5.6)	4 (3.2)	9 (7.2)
Behaviour of staff	3 (2.4)	111 (88.8)	6 (4.8)	3 (2.4)	2 (1.6)
Facility of NCD clinic	2 (1.6)	114 (91.2)	8 (6.4)	1 (0.8)	0 (0)

Association of satisfaction of beneficiaries on the functioning of NCD clinics based on the age of beneficiaries is presented in Table 2.8. From the Table it can be observed that the satisfaction is independent of the age of beneficiaries.

Table 2.9 Association of satisfaction about NCD clinic based on age

Satisfaction about NCD clinic	30-45	46-60	61-75	>75	χ^2	p
Timing of NCD clinic	6 (100)	50 (92.6)	43 (86)	13 (86.7)	2.05	0.562
Diagnosis of DM/HTN	6 (100)	48 (88.9)	41 (82)	13 (86.7)	2.05	0.561
Medicine availability	6 (100)	38 (70.4)	35 (70)	10 (66.7)	2.63	0.452
Quality of medicine	6 (100)	47 (87)	40 (80)	12 (80)	2.29	0.515
Behaviour of staff	6 (100)	48 (88.9)	46 (92)	14 (93.3)	1.06	0.786
Facility of NCD clinic	6 (100)	50 (92.6)	46 (92)	14 (93.3)	0.52	0.914

Association of satisfaction of beneficiaries on the functioning of NCD clinics according to the gender of beneficiaries is presented in Table 2.8. From the Table it can be understood that the satisfaction is independent of the gender of beneficiaries.

Table 2.10 Association of satisfaction about NCD clinic based on gender

Satisfaction about NCD clinic	Male		Female		χ^2	p
	Count	Percent	Count	Percent		
Timing of NCD clinic	35	92.1	77	88.5	0.37	0.544
Diagnosis of DM/HTN	33	86.8	75	86.2	0.01	0.924
Medicine availability	23	60.5	66	75.9	3.03	0.082
Quality of medicine	31	81.6	74	85.1	0.24	0.626
Behaviour of staff	35	92.1	79	90.8	0.06	0.813
Facility of NCD clinic	35	92.1	81	93.1	0.04	0.843

Association of satisfaction of beneficiaries on the functioning of NCD clinics based on social class of beneficiaries is presented in Table 2.10. About the satisfaction of diagnosis, 81 percent of beneficiaries from APL categories were satisfied whereas 93 percent of the beneficiaries from the BPL class were satisfied by it. The Chi square statistics shows that the satisfaction about diagnosis is significantly associated with social class. Similarly, the satisfaction towards quality of medicine is also significantly high among beneficiaries from BPL class (91%) as compared to APL class (77.9%).

Table 2.11 Association of satisfaction about NCD clinic based on social class

Satisfaction about NCD clinic	APL		BPL		χ^2	p
	Count	Percent	Count	Percent		
Timing of NCD clinic	59	86.8	53	93.0	1.29	0.257
Diagnosis of DM/HTN	55	80.9	53	93.0	3.86*	0.049
Medicine availability	45	66.2	44	77.2	1.84	0.176
Quality of medicine	53	77.9	52	91.2	4.07*	0.044
Behaviour of staff	59	86.8	55	96.5	3.66	0.056
Facility of NCD clinic	61	89.7	55	96.5	2.14	0.144

*: - Significant at 0.05 level

When compare the satisfaction on other aspects, there is no statistical significance between APL and BPL.

Chapter III

Risk factors among NCD patients and their medication Adherence

The known biological and behavioral risk among self reported NCD patients and its association with selected variables, the type of medication and medication adherence are analyzed and presented in this chapter.

3.1 Socio personal and clinical background of NCD patients

Socio personal and clinical back ground of the NCD patients selected for the study from Pathanamthitta and Alappuzha districts are presented in this section.

The socio personal characteristics of the sample patients are presented in Table 3.1. Among the patients 64 percent are females. About 72 percent patients are in the age group 46-75 and 16 percent of patients are above 75 years of age. About 70 percent of the patients are currently married. Nearly 40 percent of the patients are secondary educated, nearly 40 percent have lower primary/ upper primary education.

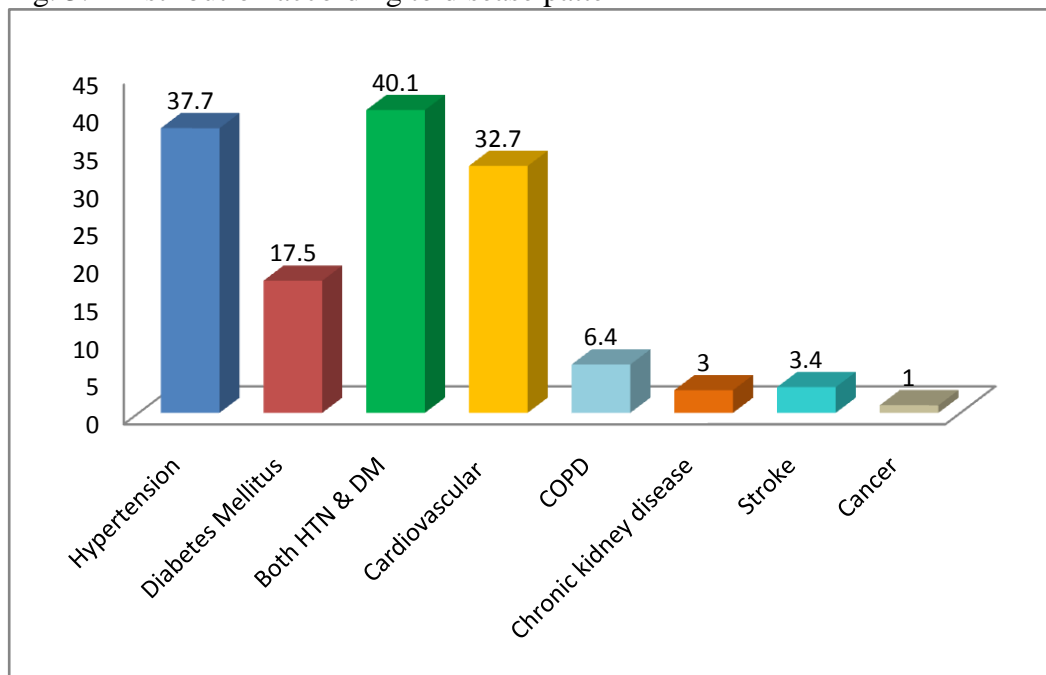
Table 3.1 Distribution according to socio personal background of NCD patients

Background characteristics		Count	Percent
Gender	Male	108	36.4
	Female	189	63.6
Age	30-45	22	7.4
	46-60	113	38.0
	61-75	114	38.4
	>75	48	16.2
Marital status	Currently Married	208	70.0
	Others	89	30.0
Education	Lower primary	73	24.6
	Upper primary	50	16.8
	Secondary	117	39.4
	Hr. Secondary	31	10.4
	Degree and above	26	8.8
Social class	APL	200	67.3
	BPL	97	32.7
Religion	Hindu	177	59.6
	Christian	97	32.7
	Muslim	23	7.7
Type of family	Nuclear	132	44.4
	Joint/Extended	154	51.9
	Single member	11	3.7

About three-fourth of the patients are from APL families, nearly 60 percent patients are from Hindu religion. About 52 percent of patients from joint/extended families and 44 percent are from nuclear family.

The disease pattern of patients selected for the study is presented in Fig 3.1. Among the patients, 38 percent are suffering from Hypertension, 17 % from DM and 40 percent of the sample are suffering from Hypertension and DM. Among the patients 32 percent are suffering from cardiovascular disease, 6 percent from COPD, 3 percent from CKD and Stroke.

Fig. 3.1 Distribution according to disease pattern



Distribution according to duration of diseases is presented in Table 3.2. Nearly half of the Hypertensive patients present with the disease within 5 years, nearly 44 percent of DM patients present with the disease within duration of less than 5 years. Among the cardio vascular patients, more than 55 percent present with the disease within a period of 5 years.

Table 3.2 Distribution according to duration of disease

Diseases	<5 Yrs		5 - 10 Yrs		>10 Yrs	
	Count	Percent	Count	Percent	Count	Percent
Hypertension	110	47.6	69	29.9	52	22.5
Diabetes mellitus	74	43.3	44	25.7	53	31.0
Cardiovascular diseases	54	55.7	28	28.9	15	15.5
Chronic obstructive pulmonary disease	7	36.8	6	31.6	6	31.6
Chronic kidney disease	7	77.8	2	22.2	0	0.0
Stroke	5	50.0	3	30.0	2	20.0
Cancer	2	66.7	0	0.0	1	33.3

The association of disease pattern with age and gender is given in Table 3.3. The disease pattern is found independent of gender ($p>0.05$). The proportion of Hypertension, HT& DM is found more among patients of age greater than 75 years. The proportion of these diseases increases with increase in age and this association is statistically significant at 0.01 level.

Table 3.3 Association of disease with age and gender

		Hypertension	Diabetes Mellitus	Both HTN & DM	χ^2	p
Gender	Male	38 (36.9)	18 (17.5)	47 (45.6)	0.86	0.651
	Female	74 (41.1)	34 (18.9)	72 (40)		
Age	30-45	4 (19)	10 (47.6)	7 (33.3)	25.22**	0.000
	46-60	43 (41)	26 (24.8)	36 (34.3)		
	61-75	44 (39.3)	14 (12.5)	54 (48.2)		
	>75	21 (46.7)	2 (4.4)	22 (48.9)		

**:- Significant at 0.01 level

3.2 Type of Medication and Medication Adherence of NCD patients

The medication regimen of the chronic diseases demands long term drug administration and follow up. One of the major contributing factors for uncontrolled disease is poor medication adherence. It is well known that the treatment failure caused by poor medication adherence leads to frequent re-hospitalizations, poor outcome of the disease and increased health care costs. The type of medication and medication adherence is presented in this section.

The type of medication and mode of purchase of medicine for the NCD by the patients are given in Table 3.4. More than 95 percent of HT, DM and CAD patients depend on Allopathic medicine for their treatment. For the treatment of DM & HTN, only 35 percent of the patients depend on Government facility and the remaining patients depend on private facilities. For CAD patients, below 30 percent of patients depend on government facility for medicine.

Table 3.4 Distribution according to type of medication and mode of purchase

			Count	Percent
Hypertension	Type of medication	Allopathic Tablets	224	97.0
		Ayurvedic	4	1.7
		Not taking medicine	3	1.3
	Mode of purchase	Government facility	79	34.6
		Private hospital/ clinic	84	36.8
		Medical store	65	28.5
Diabetes	Type of medication	Allopathy	163	95.3
		Ayurvedic	8	4.7
	Mode of purchase	Government facility	60	35.9
		Private hospital/ clinic	61	36.5
		Medical store	46	27.5
CAD	Type of medication	Allopathy	94	95.9
		Ayurvedic	4	4.1
	Mode of purchase	Government facility	28	29.2
		Private hospital/ clinic	42	43.8
		Medical store	26	27.1

The adherence to medication is an important aspect regarding the control of the NCD, the medication adherence of the NCD patients were assessed using Morisky 8-Item Medication Adherence Questionnaire. The medication adherence scale contains 8 items. The scoring of the tool is such that we assign score 1 to those who answer “Yes” for the first seven items and zero if the answer is “No” for the first seven items. For the 8th item, score 1 is assigned to the answer “Never/rarely” and zero to all other response to the item. The total score varies from 0 to 8. Total score zero means high adherence, score 1-2 means Medium adherence and score greater than 2 means Low adherence.

Table 3.5 Distribution of patients according to medication adherence

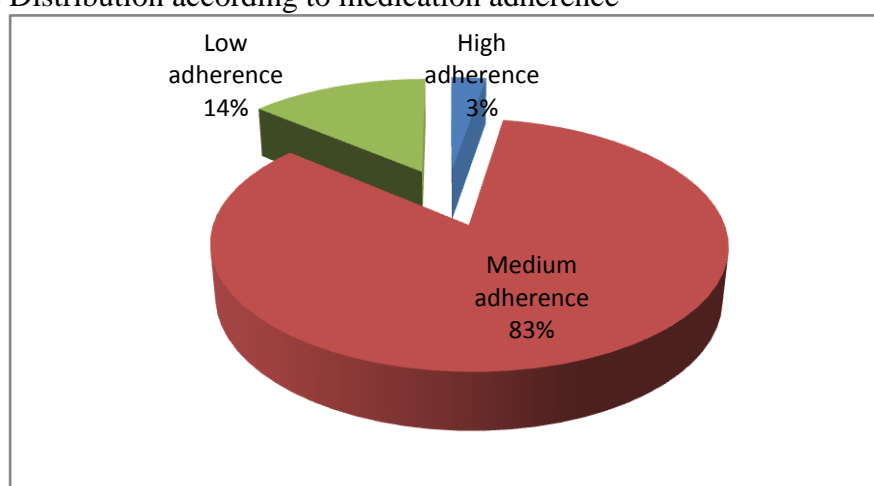
Medication adherence		Count	Percent
Sometimes forgets to take your medicine		73	24.6
sometimes miss taking their medicines for reasons other than forgetting over the past 2 weeks		56	18.9
Cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it		33	11.1
forget to bring along your medicine when travel or leave home		21	7.1
Take all medicines yesterday		278	93.6
sometimes stop taking your medicine when feel like your symptoms are under control		27	9.1
Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan		2	0.7
Frequency regarding difficulty remembering to take all medicine	Never/rarely	215	72.4
	Once in a while	30	10.1
	Sometimes	49	16.5
	Usually	3	1.0

From the Table 3.5, it can be observed that 93 percent of patients forget to take the medicine while travelling or while leaving home. Nearly one-fourth of patients

forget to take medicine some times and about 28 percent have difficulty in remembering all the medicines they have to take.

Fig 3.2 shows that only 3 percent of the NCD patients follow high adherence and 14 percent follow low adherence.

Fig. 3.2 Distribution according to medication adherence



Association of medication adherence and selected socio personal and clinical background of the patients is presented in Table 3.6. From the Table, it can be observed that gender and type of NCD are independent of medication adherence.

Table 3.6 Association of medication adherence and selected socio personal and clinical background

		High adherence	Medium adherence	Low adherence	χ^2	P
Gender	Male	5 (4.6)	88 (81.5)	15 (13.9)	2.45	0.294
	Female	3 (1.6)	160 (84.7)	26 (13.8)		
Age	30-45	2 (9.1)	13 (59.1)	7 (31.8)	20.7**	0.002
	46-60	0 (0)	94 (83.2)	19 (16.8)		
	61-75	3 (2.6)	103 (90.4)	8 (7)		
	>75	3 (6.3)	38 (79.2)	7 (14.6)		
Type of NCD	Hypertension	1 (0.9)	91 (81.3)	20 (17.9)	4.03	0.402
	Diabetes Mellitus	2 (3.8)	43 (82.7)	7 (13.5)		
	Both HTN & DM	4 (3.4)	102 (85.7)	13 (10.9)		
Cardiovascular diseases	Yes	4 (4.1)	81 (83.5)	12 (12.4)	1.31	0.520
	No	4 (2)	167 (83.5)	29 (14.5)		

**:- Significant at 0.01 level

Age of the patients is significantly associated with medication adherence. For patients in the age group 30-45, the percentage of low adherence is comparatively high (32%) as compared to other age group. The low adherence is found more

among low age group and this association is statistically significant at 0.01 level of significance.

3.3 Risk factors among NCD patients

Most NCDs are strongly associated and causally linked with four particular behaviours: tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol. These behaviours lead to the four key metabolic/physiological changes: raised blood pressure, overweight/obesity, hyperglycaemia and hyperlipidemia.

Table 3.7 Distribution according to behavioral risk among self reported NCD patients

		Count	Percent
Current Smoker	No	260	87.5
	Yes	37	12.5
Current alcohol User	No	258	86.9
	Yes	39	13.1
Physical activity	Sedentary	110	37.0
	Non Sedentary	187	63.0
Fruits & Vegetable Intake	Very Low	57	19.2
	Low	54	18.2
	Sufficient	186	62.6
High Salt intake	No	247	83.2
	Yes	50	16.8

Table 3.7 shows that 13 percent of patients are current smokers, 13 percent are current alcohol users and 37 percent are leading sedentary life, 37 percent use very low / low fruits and vegetables and 16 percent reported to have high salt intake.

Association of the behavioral risk with selected socio personal and clinical variables is presented in the following tables.

From Table 3.8, it can be observed that the sedentary life style is significantly associated with age of patients. About 40% patients in the age group 30-45 years are leading sedentary life style and 70 percent of patients of age more than 75 years leads a sedentary life. The proportion of sedentary life style is comparatively less among 46-75 years of age. The educational status of patients is significantly associated with sedentary life style. About 46 percent of patients with primary education are leading a sedentary life, where as its proportion is comparatively less among secondary educated patients (29%).

Table 3.8 Association of physical activity and selected socio personal and clinical variables

		Sedentary		Non Sedentary		χ^2	p
		Count	Percent	Count	Percent		
Age	30-45	9	40.9	13	59.1	32.21**	0.000
	46-60	27	23.9	86	76.1		
	61-75	40	35.1	74	64.9		
	>75	34	70.8	14	29.2		
Gender	Male	39	36.1	69	63.9	0.06	0.803
	Female	71	37.6	118	62.4		
Education	Primary	57	46.3	66	53.7	8.09*	0.017
	Secondary	34	29.1	83	70.9		
	Hr. Secondary & Above	19	33.3	38	66.7		
DM & HTN	Hypertension	48	42.9	64	57.1	3.13	0.209
	Diabetes Mellitus	15	28.8	37	71.2		
	Both HTN & DM	43	36.1	76	63.9		
Cardiovascular diseases	Yes	37	38.1	60	61.9	0.08	0.783
	No	73	36.5	127	63.5		

**:- Significant at 0.01 level, *:- Significant at 0.05 level

Gender, presence of DM/HT and CAD are not significantly associated ($p>0.05$) with physical activity of the patients.

Association of intake of fruits and vegetables with selected variables is presented in Table 3.9. From the Table it can be seen that age, education and type of NCD is not significantly associated with intake of fruits and vegetables.

Table 3.9 Association of fruits & vegetable intake and selected socio personal and clinical variables

		Very Low	Low	Sufficient	χ^2	p
Age	30-45	4 (18.2)	2 (9.1)	16 (72.7)	2.45	0.294
	46-60	26 (23)	21 (18.6)	66 (58.4)		
	61-75	20 (17.5)	18 (15.8)	76 (66.7)		
	>75	7 (14.6)	13 (27.1)	28 (58.3)		
Gender	Male	16 (14.8)	19 (17.6)	73 (67.6)	20.7**	0.002
	Female	41 (21.7)	35 (18.5)	113 (59.8)		
Education	Primary	35 (28.5)	24 (19.5)	64 (52)	4.03	0.402
	Secondary	17 (14.5)	21 (17.9)	79 (67.5)		
	Hr.Secondary & Above	5 (8.8)	9 (15.8)	43 (75.4)		
DM _HTN	Hypertension	20 (17.9)	18 (16.1)	74 (66.1)	1.31	0.520
	Diabetes Mellitus	11 (21.2)	11 (21.2)	30 (57.7)		
	Both HTN & DM	24 (20.2)	23 (19.3)	72 (60.5)		

**:- Significant at 0.01 level

Food intake of patients is significantly associated with gender of patients. About 68% of males consume sufficient fruits and vegetables, whereas only 60 percent of females consume sufficient fruits and vegetables, about 22 percent of females use very low fruits and vegetables. Hence the risk of low intake of fruits and vegetables is significantly high among females as compared to males.

Association of high salt intake and selected socio personal data is presented in Table 3.10. From the Table, it can be observed that none of the socio personal and clinical variables are significantly associated with high salt intake.

Table 3.10 Association of high salt intake and selected socio personal and clinical variables

		High Salt intake				χ^2	p
		No		Yes			
		Count	Percent	Count	Percent		
Age	30-45	21	95.5	1	4.5	5.27	0.153
	46-60	88	77.9	25	22.1		
	61-75	98	86.0	16	14.0		
	>75	40	83.3	8	16.7		
Gender	Male	86	79.6	22	20.4	1.52	0.218
	Female	161	85.2	28	14.8		
Education	Primary	101	82.1	22	17.9	0.17	0.918
	Secondary	98	83.8	19	16.2		
	Hr.Secondary & Above	48	84.2	9	15.8		
DM _HTN	Hypertension	90	80.4	22	19.6	2.73	0.256
	Diabetes Mellitus	44	84.6	8	15.4		
	Both HTN & DM	105	88.2	14	11.8		

**: - Significant at 0.01 level, *: - Significant at 0.05 level

Family history is one of the main biological risk factor for major NCDs. The distribution of the patients according to family history is given in Fig 3.3. Among the 297 patients, 31 percent have family history of CAD in first degree relatives, 16 percent of patients have family history of stroke, 56 percent have family history of diabetes, 58 percent have family history of hypertension and 37 percent have family history of Hypercholesterolemia.

Fig. 3.3 Distribution according to family history in First degree relatives

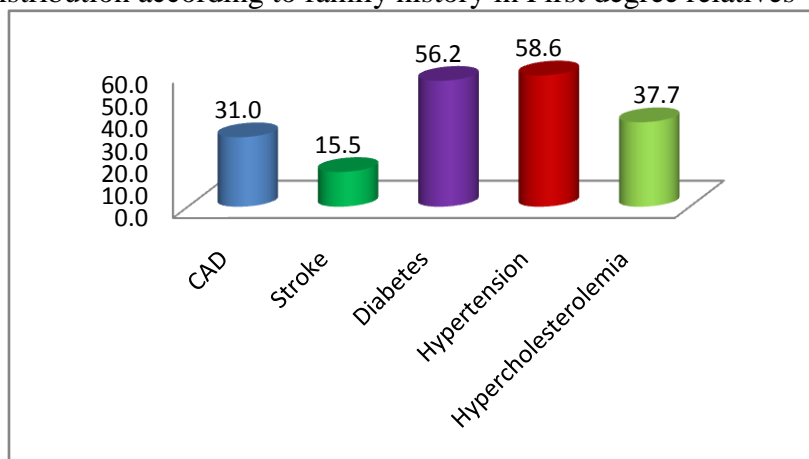


Table 3.11 Association of family history of various NCDs and presence of DM/HTN

Family History		Hypertensi on	Diabetes Mellitus	Both HTN & DM	χ^2	p
First degree relatives have evidence of CAD	Yes	32 (28.6)	17 (32.7)	36 (30.3)	0.29	0.864
	No	80 (71.4)	35 (67.3)	83 (69.7)		
First degree relatives have history of Stroke	Yes	19 (17)	7 (13.5)	17 (14.3)	0.47	0.791
	No	93 (83)	45 (86.5)	102 (85.7)		
First degree relatives have Diabetes	Yes	44 (39.3)	41 (78.8)	73 (61.3)	25.07**	0.000
	No	68 (60.7)	11 (21.2)	46 (38.7)		
First degree relatives have Hypertension	Yes	68 (60.7)	30 (57.7)	68 (57.1)	0.33	0.849
	No	44 (39.3)	22 (42.3)	51 (42.9)		
First degree relatives have Hypercholesterolemia	Yes	39 (34.8)	27 (51.9)	43 (36.1)	4.88	0.087
	No	73 (65.2)	25 (48.1)	76 (63.9)		

**: - Significant at 0.01 level

The association of presence of DM/HTN and the family history of various NCDs are presented in Table 3.14. From the Table it can be observed that those who suffering from DM, 79 percent have the family history of DM in first degree relatives and among those are suffering from DM&HT, 61 percent have the family history of DM. The association of DM/HT is significantly associated with family history of DM in first degree relatives. The present status of DM/HT is not significantly associated with the family history of CAD/Stroke /HT and Hypercholesterolemia

Chapter IV

Summary and findings

Diabetes is the leading cause of cardiovascular disease, stroke and renal failure in many populations in both developed and developing countries. Blood pressure levels have been shown to be positively and progressively related to the risk for stroke and coronary heart disease. Raised cholesterol levels increase the risks of heart disease and stroke. Most NCDs are strongly associated and causally linked with four particular behaviours: tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol. These behaviours lead to four key metabolic/physiological changes: raised blood pressure, overweight/obesity, hyperglycemias and hyperlipidemia. Moderate intensity physical activity lowers the risk of stroke, hypertension and depression. Adequate consumption of fruit and vegetables reduces the risk for cardiovascular diseases, stomach cancer and colorectal cancer. The amount of dietary salt consumed is an important determinant of blood pressure levels and overall cardiovascular risk. The medication regimen of the chronic diseases demands long term drugs administration and following up. It is well known that the treatment failure caused by poor medication adherence leads to frequent re-hospitalizations, poor outcome of the disease and increased health care costs.

In India, NCDs were responsible for 53 per cent of deaths and 44 per cent of disability adjusted life years lost. In Kerala, NCDs account for more than 50% of total deaths occurring in the age group between 30 and 60. The percentage of Hypertension, Cardiovascular diseases and Cancer is also very high in the community across all sections of the society.

The National Programme for the Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) was initiated in 100 districts in 2010, and expanded to about 468 districts in 2012. The focus of NPCDCS is to enable opportunistic screening for common non communicable diseases, at District and CHC levels, through the setting up of the NCD clinics. At the PHC and sub centre levels, additional funding for glucose testing was provided for all those over 30 years of age and all pregnant women from 2012 onwards.

In Kerala, NPCDCS programme was introduced in Pathanamthitta district in 2010 and later extended to Thrissur, Idukki, Alappuzha and Kozhikode. The State Health

department in order to extend the benefit of the programme to the entire population has introduced the State NCD Control programme (Amrutham Arogyam) which covers all fourteen districts up to the sub centre level.

This study is intended to assess the functioning of the NCD clinics, the awareness and utilization of the NCD clinic by NCD patients, the satisfaction of NCD patients on functioning of the NCD clinics. The medication adherence and behavioral and biological risk among the NCD patients were also studied through this report.

The performance of the NCD clinics were assessed by the secondary data received from the state NCD cell. The monthly report from all the districts from April 2017 to January 2018 was collected from the state NCD cell to assess the performance of the NPCDCS in the state and each of the district. Major findings as per the analysis of the said data are:-Pathanamthitta district is the only district which conducted more than 1000 camps during the last 10 months. The district with highest number of clinics conducted are Palakkad and Alappuzha. Districts which conducted highest number of BCC sessions are Kasargode and Palakkad. The monthly average number of people screened for NCD in Kerala is only 32585. An average estimate shows that 36 – 55 lakh people of age>30 have any one of NCD, it means that less than one percent of the estimated people with NCD utilize the government facility, and less than 5 percent of estimated NCD patients seek treatment for DM and / or HT. Number of patients screened in Malappuram and Wayanad are very less. Follow up cases of DM, HT and both is found very less in the district of Malappuram and Wayanad.

To compare the performance of the reported NCD data, the figures were converted in number per lakh in proportion to 30+ population. Rank for each of the variables was calculated and sum of the ranks of all the 14 variables were calculated such that lower the rank will represent better in performance. Number of camps conducted per lakh 30+ population shows that Pathanamthitta district conducted 205 such camps followed by Idukki with 89. Pathanamthitta, Idukki, Kasargode and Wayanad have performed better in conducting clinics. In BCC sessions conducted, Palakkad and Wayanad performed better. Number of patients screened for 30+ population / lakh is highest in Pathanamthitta (3785), followed by Idukki (3638) and Kasargode (3318). The performance in screening of patients is poor in Malappuram, Thrissur and Thiruvananthapuram. In detection of new cases of HT/ DM or both is found more in Kannur, wayanad and Pathanamthitta. The detection of new cases of CAD is more

in Pathanamthitta, Ernakulam and Thiruvananthapuram. Number of screening of follow up cases of HT/DM or both is high in Idukki, Palakkad, Pathanamthitta and Kasargode. Persons given tobacco Cessation counseling is found high in the northern districts Wayanad, Kozhikode, Kasargode and Palakkad districts. The cumulative rank of all the 14 variables for the NCD monitoring is found lowest in Pathanamthitta district, it means when considering all the service in NCD per 1 lakh 30+ population, Pathanamthitta district is the best performed district. Idukki, Palakkad, Kasargode and Wayanad are the next best performed district based on the reported NCD clinic data. The four least performed districts are Thiruvananthapuram, Alappuzha, Malappuram and Thrissur.

For the assessment of the functioning of NCD cells at PHC/SC level and the awareness and utilization of NCD clinic by the NCD patients, primary data were collected. Functioning of the NCD clinics at CHC/PHC/SC were assessed using a structured interview schedule, verification of the NCD clinic register, NCD client register and the monthly report to the higher facilities for the previous months.

There is no register containing all 30+ population with exposure to risk factors in any of the selected facilities. Out of the 8 Sub centres in the Pathanamthitta district, only 4 centres have the figure of 30+ population. Hence in almost all sub centres, the complete enumeration of 30+ population and assessment of the exposure to risk and disease conditions are not available. In Alappuzha district, only four out of 8 sub centres have maintained client register. The patients utilizing government facility for free medicine are registered in the client register. Since there is no medicine supply from sub centres, the patients utilizing the clinic is very less. It is found that, in four sub centres of Konni block, the NCD clinics are attached with nutritional day, hence detection of new DM/HT is possible with these clinic. The conducting of NCD clinic is not regular in 6 out of 8 sub centres of Alappuzha. Glucometer and Glucostrips and lancet are available in all the centres on the day of visit. During the current financial year, non availability of strip is observed for more than six months in all the sub centres. In NPCDCS manual, there is separate patient referral card, but this card is not printed and distributed, hence none of the facility has such a referral card.

The reporting of monthly NCD clinic data is found a major problem in almost all centres. It was observed that the reporting from the sub centres is under reporting in

almost all sub centres. In 5 sub centres of Pathanamthitta district, no consolidation found in the clinic register, hence an approximated figure reported to the PHCs. The sub centres of one PHC in Pathanamthitta conduct the clinic in good manner; there is one JHI in charge of consolidation of NCD data at the PHC but not doing it in a proper way. The data reporting from this PHC is not as prescribed, hence the data is underreporting from this PHC. The reporting from the Thumpamon block is not as per the required format, the NCD data from CHC is not counting for monthly reporting. Hence the reporting from this block is also underreporting. In Alappuzha district, the consolidation of the clinic days are not found in clinic register and the reporting from the Sub centres to PHC/CHC is not accurate.

The NCD clinic of Konni CHC is conducting in a very good manner. A large number of people utilize this facility, even from medium / high socio economic group. This NCD clinic conduct regular camps in work places such as police station, transport stand etc, the detection of new cases of DM/HT is mainly through these camps. No other PHC/ CHC selected for the study were not conducted any such camps during the current financial year.

The awareness, utilization and satisfaction of NCD patients about NCD clinic were assessed using a structured interview schedule. The interview schedule administered to selected NCD patients in the sub centre area. The medication adherence of the NCD patients was assessed using Morisky 8-Item Medication Adherence Questionnaire. The behavioral risk factors such as tobacco use, alcohol use, physical activity, consumption of fruits and vegetables, and intake of salt were assessed through the interview schedule.

Only 58 percent of the NCD patients is aware of the NCD clinics functioning in their area and 31 percent ever visited in any camp organized by the health department for the detection of NCD. Nearly 58 percent answered that, they were never visited any facility for the screening of NCD or for the treatment of NCD. Patients of younger age group, female patients, secondary or lower educated and patients from BPL families have significantly higher awareness about NCD clinics.

The major reason for the non-visit of NCD clinic was reported as inconvenience, the second most reason for not visited any of the NCD clinic is lack of awareness about the NCD clinic. Among those visiting NCD clinics, Ninety percent of patients are

satisfied on timing; 86 percent satisfied on diagnosis, 84 percent satisfied on quality of medicine, 92 percent satisfied on behavior of staff and 93 percent satisfied on facility available at NCD clinic.

Among the patients, 38 percent are suffering from Hypertension, 17 percent from DM and 40 percent of the sample are suffering from Hypertension and DM, 32 percent are suffered from cardiovascular disease. More than 95 percent of HT, DM and CAD patients depend Allopathy medicine for their treatment. For the treatment of DM & HTN , only 35 of the patients depend Government facility and the remaining patients depend private facilities. Only 3 percent of the NCD patients follow high adherence and 14 percent follow low adherence. Age of the patients is significantly associated with medication adherence. Behavioral risk among NCD patients shows that 13 percent patients are current smokers, 13 percent are current alcohol users and 37 percent are leading sedentary life, 37 percent use very low / low fruits and vegetables and 16 percent reported high salt intake

Family history is one of the main biological risk factor for major NCDs. Among the 297 patients, 31 percent have family history of CAD in first degree relatives, 16 percent of patients have family history of stroke, 56 percent have family history of diabetes, 58 percent have family history of hypertension and 37 percent have family history of Hypercholesterolemia.

Objectives of NPCDCS point out that Opportunistic screening at all levels in the health care delivery system from sub-centre and above for early detection of diabetes, hypertension and common cancers, Outreach camps are also envisaged. Only through camps at work places early detection of DM, HT and common cancers are possible. The district wise NCD data revealed that Pathanamthitta district is the only district conducted more NCD detection camps at work places, 6 districts not / very less camps conducted in 2017-18. An average estimate shows that 36 – 55 lakh people of age>30 have any one of NCD in Kerala, average number of people screened for NCD in Kerala is only 32585, it means that less than one percent of the estimated people with NCD utilizing the government facility, less than 5 percent of estimated NCD patients seek treatment for DM and / or HT. Pathanamthitta, Idukki, Kasargode and Wayanad performed better in conducting clinics. Very less clinics per month conducted in 3 districts. Eight districts not/ very less BCC sessions conducted. The detection of new cases of CAD is more in Pathanamthitta,

Ernakulam and Thiruvananthapuram. Number of screening of follow up cases of HT/DM or both is high in Idukki, Palakkad, Pathanamthitta and Kasargode. Persons given tobacco Cessation counseling is found high in the northern districts Wayanad, Kozhikode, Kasargode and Palakkad districts. Ranking of districts based on 14 variables of NCD monitoring (per 1 lakh 30+ population), Pathanamthitta district is the best performed district. Idukki, Palakkad, Kasargode and Wayanad are the next best performed district, Thiruvananthapuram, Alappuzha, Malappuram and Thrissur are the least performed districts.

The complete enumeration of 30+ population, status of NCD among these and exposure to risk factors is not recorded in any of the facilities selected for study, no registers exclusively for it maintained in any of the facilities. Approximate figures of 30+ population is not available in most of the facilities. Most of the facilities in Alappuzha not maintained NCD Clinic registers and client registers. In the centre where client register maintained, only patients utilizing government facility for free medicine are registered in the register. Earlier, diagnosis for HT/DM and free medicine supply were available at SC, it was more useful to the common public and a large number of public utilized the facility. Since there is no medicine supply at SC, the functioning of NCD clinic at SC limited for screening of DM/HT and number of people utilizing SC for NCD is very less now. Hence, the conduct of NCD clinic in SC is not regular in many sub centres. Glucometer and Glucostrips and lancet are available in all the centres, during the current financial year, non availability of strip is observed for more than six months in all the sub centres.

The monthly reporting of NCD data to higher facilities is not uniform. Most of the centres not made consolidation of clinics as per the reporting format, hence the reporting of NCD data to the higher facility is found not accurate. The consolidation of NCD data at PHC /CHC from the sub centres is not found in a uniform manner, the clinic details at PHC/ CHC conducted by the Medical officer was not considering for the monthly report in most of the facilities and figures reported is less than the actual service provided in the facilities. CHC Konni conducting NCD camps in regular and good manner at work places to identify new NCD cases, No other facilities conducting such camps in an effective manner.

Only 58 percent of the NCD patients were aware of the NCD clinics functioning in their area and 31 percent ever visited in any camp organized by the health department for the detection of NCD. The major reason for the non-visit of NCD

clinic was reported as inconvenience, the second most reason for not visited any of the NCD clinic is lack of awareness about the NCD clinic. A large share of people utilizing NCD clinic are from low/moderate socio economic group. Among those visited NCD clinics, about Ninety percent patients are satisfied on the functioning of the clinic. More than 95 percent of HT, DM and CAD patients depend Allopathy medicine for their treatment. Only 35 of the patients depend Government facility for the treatment of DM & HTN.

Only 3 percent of the NCD patients follow high adherence of medication and 14 percent follow low adherence. Behavioral risk among NCD patients shows that 13 percent patients are current smokers, 13 percent are current alcohol users and 37 percent are leading sedentary life, 37 percent use very low / low fruits and vegetables and 16 percent reported high salt intake. Family history is one of the main biological risk factor for major NCDs. Among the 297 patients, 31 percent have family history of CAD in first degree relatives, 16 percent of patients have family history of stroke, 56 percent have family history of diabetes, 58 percent have family history of hypertension and 37 percent have family history of Hypercholesterolemia

Recommendations

1. Only through camps at work places early detection of DM, HT and common cancers are possible. Pathanamthitta is the only district conducting more camps. Initiatives at state and district level are necessary to conduct more camps at work places.
2. As per the monthly consolidation of State on NCD for the first 10 months of 2017-18, less than one percent of the estimated people of age 30+ with one or more NCD utilized the government facility in Kerala. Hence, a detailed investigation is required to find out the gaps in utilizing facilities for screening & treatment of NCD.
3. In certain districts, number of clinics / Lakh 30+ population is very less, steps are essential to find out the reason for conducting less camp and to conduct camps in effective manner.
4. Organizing BCC sessions is very less or for namesake in most of the districts. Initiative is essential to find out reason for not conducting BCC session and steps required to conduct such sessions.

5. Persons who underwent tobacco cessation counseling is found to be high in the northern districts such as Wayanad, Kozhikode, Kasaragod and Palakkad districts. The counseling session in certain district is for name sake, tobacco use is the main risk of all the NCDs, steps are essential to conduct such counseling in the districts in which it is more vulnerable.
6. The complete enumeration of 30+ population, status of NCD among them and exposure to risk factors is not recorded in any of the facilities selected for study, no registers are exclusively maintained in any of the facilities. Urgent measures are required to complete its census associated with other programme, which will give the complete picture of incidence of NCD in Kerala.
7. Most of the facilities in Alappuzha have not maintained the NCD clinic registers and client registers. In the centre where client register is maintained, only patients utilizing government facility for free medicine are registered. So clear instruction should be provided to maintain such registers in uniform manner.
8. Since there is no medicine supply at SC, the functioning of NCD clinic at SC is limited for screening of DM/HT and number of people utilizing SC for NCD is very less.
9. Certain sub centres conduct camp approach for detection of New NCD cases in connection with Nutritional day, this type of extension of NCD to area rather than sub centre is appreciable.
10. As per the guidelines of NPCDCS, there should be referral card in duplicate to be given to the patients and the other to be retained at sub centre for future reference. There is no such referral card in any of the Sub centre selected for the study. Official procedure required for maintaining the referral system in good manner as per the guideline.
11. Adequate supply of Glucostrip and lancets are essential at sub centre to conduct the diagnosis of DM on regular basis. It was found that Glucostrip was out of stock for more than 6 months in the last financial year. Steps should be taken to ensure adequate consumables at sub centre.
12. The monthly reporting of NCD data to higher facilities is not uniform. Consolidation of clinics as per the reporting format is not done by many of the facilities. The clinic details at PHC/ CHC conducted by the Medical officer was not considering for the monthly report in most of the facilities. Hence essential steps / training are required to uniform reporting pattern.

13. The monthly meeting reviews the NCD programme at district level. But there is no effective monitoring / supervision at SC/PHC/CHC to assess the quality of conducting clinics, camps, maintaining clinic register, client register and reporting of NCD figures to higher facilities. An effective monitoring is required to maintain the quality of conducting NCD clinics and reporting of the NCD data.

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