

# Chronic Non Communicable Diseases and Risk Factors among Adults in Rural Kerala

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## Abstract

**Background and Objectives:** India is facing the dual burden of non-communicable disease along with communicable diseases. High prevalence of hypertension, diabetes and their risk factors are being reported in India. For reducing the high cost of health care and premature loss of life these risk factors are to be identified early and controlled. This study aims to estimate the burden of diabetes, hypertension, renal failure and risk factors like overweight, smoking, over use of alcohol and physical inactivity among a rural community in Kerala, India.

**Methods:** A survey was conducted among an estimated sample of 802 adults aged 20 years and above in a rural Panchayat in northern Kerala. The presence of diabetes, hypertension and renal diseases among the subjects were obtained from medical records and treatment history. Data on smoking, alcohol consumption and physical activity were obtained by interview, and Body mass index and blood pressure were obtained by measurement. Prevalence rates were obtained by data analysis using computer software.

**Results and Interpretations:** The mean age of subjects was 47.1(CI = 46 to 48.2). The prevalence of hypertension was 25.7% and diabetes 21.3% (already diagnosed cases only) and 10.3% of subjects had both. 5.7% of subjects had chronic kidney disease already diagnosed indicating inadequate control of diabetes and hypertension. Smoking was reported by 37.2% of men, regular alcohol consumption by 2.5% men and low level of physical activity by 17.7% of all.

**Conclusions:** There is high prevalence of hypertension and diabetes. High prevalence of kidney disease points to inadequate control of diabetes and hypertension. There is also high prevalence of smoking among men.

**Key words:** Non communicable diseases, Risk factors, Diabetes, Hypertension, Overweight, Smoking.

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## Introduction

Non communicable diseases (NCD) have become the major cause of death worldwide. Nearly 80% of these are occurring in developing and non-developed countries.<sup>1</sup> Coronary heart disease diabetes, cancers, chronic lung disease and mortality due to these are on the increase among low income populations also and are attributable to behavioural risk factors like unhealthy diet, low physical activity, overweight and obesity, tobacco use and excessive use of alcohol.

India is currently experiencing the problem of non-communicable diseases especially cardio vascular deaths which occurs at least 10 years earlier in Indian population compared to developed countries.<sup>2</sup> Hence it is of vital importance that primary health care should address the prevention and control of these risk factors namely over weight and obesity, hypertension, diabetes, tobacco use and physical inactivity. Uncontrolled hypertension, diabetes and tobacco use are prevalent among un educated populations in India because of lack

of awareness and leads to premature death.<sup>3</sup> India's population is experiencing a demographic transition to older age groups and an epidemiological transition from communicable disease to non-communicable diseases.<sup>4</sup>

The IDSP-NCD risk factor survey has shown high prevalence of hypertension diabetes, overweight, physical inactivity and tobacco and alcohol use.<sup>5</sup>

This study was conducted with the objective of detecting the prevalence of overweight and obesity, hypertension, diagnosed cases of diabetes and physical inactivity, smoking and reported alcohol use. To plan for control measures and to arrest the epidemic of NCDs data are required on the prevalence of these risk factors.

## Materials and Methods

The study was conducted in Vettathoor a rural area in northern Kerala during August- September 2015. Vettathoor Panchayat has a population of 28060. A sample of houses were identified by systematic random sampling to get a calculated sample of 712 adults aged 20 years and above taking 20% prevalence for diabetes and allowing for absolute difference of 1.5%. From the selected houses all adults 20 years and above were included in the study. Data was collected on a structured format about health problems already diagnosed, and the presence of risk factors like smoking, tobacco use, regular consumption of alcohol and physical inactivity. Height and weight were

measured using a stadiometer and a weighing scale and Body mass index was calculated. Blood Pressure was measured twice at interval of 5 minutes using sphygmomanometer and lower reading was recorded. Hypertension included all cases diagnosed and on treatment regardless of their current reading and also newly diagnosed cases as per WHO guidelines for classification.

**Results**

Data were obtained from 802 adults aged 20 years and above. Among them, 393 were women and 409 were men. The mean age was 47.1years (95% CI = 46 to 48.2). The distribution of study subjects according to age group gender and socio economic class are depicted in **Table 1**.

**Table 2** describes the body mass index of the subjects studied according to their socio economic class (as per socio economic classification by BG Prasad). 80% of all the subjects had BMI in normal range, 5.4% were below average and 14.1% were overweight and only 0.7% had obesity. Over weight was observed to be more prevalent among the upper socio-economic class

(38.0%) compared to the lower and middle classes (6.5 to 8.8%) whereas below average BMI were observed in 20% of lower class people compared to 1.3% in upper class. Overweight is more among men compared to women whereas obesity was observed among 1.4% of women but not among men. Paradoxically these obese women belonged to the lower classes.

Prevalence of Chronic non communicable diseases like hypertension, diabetes and chronic renal failure are given in **Table 3**. Of these hypertension includes all previously diagnosed cases and cases diagnosed during the study where as diabetes and renal disease include only cases which are already diagnosed by treating physicians. Hence the figure will not include latent cases and early stages.

Prevalence of smoking, tobacco use and reported use of alcohol are given in **Table 5**. Tobacco smoking which is a very important risk factor was reported in 20% of all subjects. Taking into consideration that smoking is rare among women in Kerala as it is not socially acceptable; the prevalence among men alone taken is 37.2%.

**Table 1: Demographic Characteristics of the population**

		Frequency	Percent
Age group in years	>=20	24	3.0
	21-30	129	16.1
	31-40	159	19.8
	41-50	186	23.2
	51-60	156	19.5
	61-70	92	11.5
	71-80	45	5.6
	81-90	11	1.4
Gender	Females	393	49.0
	Males	409	51.0
Socio-economic class *	1	79	9.9
	2	92	11.5
	3	352	43.9
	4	245	30.5
	5	34	4.2
	<b>Total</b>	<b>802</b>	<b>100.0</b>

\*As per socio-economic classification of BG Prasad, based on per capita income

**Table 2: Body mass index in relation to socioeconomic class**

Socioeconomic class *	Body mass index				Total
	Low BMI	Average	Overweight	Obese	
Class 1	1(1.3%)	48(60.8%)	30(38.0%)	0(0%)	79
Class 2	1(1.1%)	75(81.5%)	16(17.4%)	0(0%)	92
Class 3	15(4.3%)	288(81.8%)	48(13.6%)	1(0.3%)	352
Class 4	19(7.8%)	206(84.1%)	16(6.5%)	4(1.2%)	245
Class 5	7(20.6%)	23(67.6%)	3(8.8%)	1(2.9%)	34
<b>Total</b>	<b>43(5.3%)</b>	<b>640(80%)</b>	<b>113(14.1%)</b>	<b>6(0.7%)</b>	<b>802</b>

\*As per socio-economic classification of BG Prasad, based on per capita income

**Table 3: Body mass index & gender**

Sex	Body mass index (Binned)					Total	P value
	Below average	Average	Over weight	Obesity	Total	Chi square	
Female	25	323	39	6	393		
Male	18	317	74	0	409	17.7	0.001
Total	43	640	113	6	802		

**Table 4: Prevalence of Hypertension, diabetes and Chronic Kidney diseases**

Chronic health Problems	Frequency	Percent N=802	95% Confidence interval
Normal BP	599	74.7	71.6 - 77.8
Hypertension	203	25.3	22.2 – 28.4
Normal for diabetes	631	78.7	75.8 – 81.6
Diabetes	171	21.3	18.4 – 24.2
Both hypertension and diabetes	83	10.3	8.2 – 12.4
Chronic kidney disease	46	5.7	1.6 – 7.8

**Table 5: Prevalence of tobacco and alcohol use and physical inactivity**

Habitation	Frequency			Percent N = 802	95% Confidence interval
	Men	Women	Total		
No habituations	222 (54.3%)	365 (92.1%)	587	73.2	70.1 – 76.3
Smoking	152 (37.2%)	8 (2%)	160	20.0	17.2 – 22.8
Regular Alcohol use	0	20 (4.9%)	20	2.5	0.3 – 5.3
Other forms tobacco	15 (3.7%)	20 (5.1%)	35	4.4	1.0 – 7.8
Physical inactivity	52 (12.7%)	90 (22.9%)	142	17.7%	15.0 – 20.4

**Discussion**

Overweight is common among upper class in rural Kerala points to the faulty eating habits possibly over consumption of carbohydrates which is common in Kerala due to dependence on rice as staple food coupled with inactivity. High prevalence is observed for hypertension and diabetes which are risk factors for coronary heart disease, stroke and renal failure leading to high cost for health care and premature death. Nearly 6% of population has chronic renal disease already diagnosed and most of them are associated with hypertension, diabetes or both. This is likely to be much more if the undiagnosed early stages of renal disease are also detected and included. This points towards inadequate control of diabetes and hypertension in. Smoking which is an important risk factor for COPD, lung cancer coronary heart disease and stroke are reported by 37.2% of men and 2% of women.

The IDSP risk factor survey reports 26% prevalence of overweight 48% hypertension and 20% of males were smokers in rural Kerala.<sup>5</sup> Compared to this our study shows a lower prevalence of overweight and hypertension whereas prevalence of smoking is higher in our study. Another study done in rural Kerala showed hypertension prevalence of 36.2% and is also higher compared to our observation of 25.3% prevalence. The above study gives prevalence of smoking 45.2% among men and diabetes prevalence 20.6% and overweight 20.9%.<sup>6</sup> Another study by same author for hypertension among another rural population

in Kerala also reported 36.7% prevalence for hypertension.<sup>7</sup> A systematic review and meta-analysis study on prevalence of hypertension across different regions of India reveals prevalence of hypertension varying from 16.7 and 33.2 with rural south India having prevalence of 28.3% similar to our observation.<sup>8</sup>

High burden of chronic renal disease observed among the study population (5.7%) shows that Chronic renal disease associated with hypertension and diabetes is becoming a major burden in Kerala also. High prevalence of chronic renal disease associated with overweight, hypertension and diabetes is observed in other parts of India also. In a large multicentre study involving 5188 subjects from different hospitals, reports high burden of various stages of chronic kidney disease and among them high prevalence of hypertension (64.5%) diabetes (31.6%) and overweight (31.6%).<sup>9</sup>

Researchers have observed that in Kerala the risk factors for non-communicable disease starts early in life. Kerala is a consumer state in India which increasingly depends on commercially available food preparations which have high content of salt, energy and trans-fats which favours development of the risk factors.<sup>10</sup>

Our study has the limitation that the prevalence of diabetes and renal disease are based on medical history and hence early stages which are not diagnosed could not be included leading to an estimate lower than the actual prevalence.

## Conclusions

The study observes high prevalence of risk factors like smoking hypertension and diabetes along with its complication that is renal failure. This point to the need for control measures like life style changes by individuals and early detection, follow up and control of overweight, hypertension and diabetes by primary health care system and by treating doctors and hospitals.

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