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Original Research Article

Cross-sectional study on the prevalence of risk factors for non-communicable disease in a rural area of Kancheepuram, Tamil Nadu

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ABSTRACT

Background: Currently, non-communicable diseases (NCDs) are in the limelight replacing communicable diseases, which were the leading cause of death in most countries. Non communicable disease is the leading cause of death globally. Non communicable diseases (NCDs) kill 38 million people each year. This study aims to estimate the prevalence rate of NCD risk factors among adult population and to determine the association between behavioural and metabolic risk factors.
Methods: This is a cross sectional descriptive study carried out in the rural field practice area attached to a Medical college in Kancheepuram district. The study group were 370 adults (20-60 years). The data was collected using a structured questionnaire with the help of WHO steps approach containing socio-demographic particulars, details regarding NCD risk factors and physical measurements. Data was analysed using SPSS 15 software. Prevalence of NCD risk factors was calculated using percentages and strength of association was tested between behavioural and metabolic risk factors.
Results: Prevalence of risk factors for non-communicable disease are tobacco use (17.8%), alcohol use (17.3%), physical inactivity (50.2%), unhealthy diet (62%), overweight (38.1%), obesity (11.4%), hypertension (15.7%), diabetes (21.9%) respectively. There was strong statistical significant association between obesity (odds ratio-3.057, p=0.020 at 95% confidence interval (0.915-10.211)), hypertension (odds ratio-23.062, p=0.001 at 95% confidence interval (3.147-168.989)), diabetes (odds ratio-6.837, p=0.001 at 95% confidence interval (2.085-22.417)) and alcohol use and also between obesity (odds ratio-2.637, p=0.004 at 95% confidence interval (0.787-8.83)), hypertension (odds ratio-2.773, p=0.019 at 95% confidence interval (1.145-6.714)) and tobacco use.
Conclusions: The prevalence of non-communicable diseases risk factors is high in this study. It is necessary to minimize the burden of growing non-communicable disease epidemic in the society, by curbing the rates of the risky behaviours at a very early stage by lifestyle modification.

Keywords: Adult, WHO steps, Lifestyle modification, Epidemic

INTRODUCTION

In low income countries of the world the pattern of disease is changing at an alarming rate.[1] The changing behaviour of mankind have led to the increase of many diseases globally. Earlier communicable disease were the leading cause of death in most countries and currently, non-communicable diseases (NCDs) are in the focus replacing communicable diseases.[2]

Non-communicable diseases (NCDs) are a medical condition or disease that is not caused by infectious agents (non-infectious or non-transmissible). The 4 main types of non-communicable diseases are cardiovascular

diseases, cancers, chronic respiratory diseases and diabetes.[3] NCD is the leading cause of morbidity and mortality worldwide. 38 million people die each year globally from non-communicable diseases (NCDs).[4] Based on current trends, by the year 2020 these NCDs are expected to account for 73% of global deaths and 60% of the global burden of disease.[5]

In 2015 the World Health Organisation (WHO) has released a report, according to which every 4th Indian die from an NCD before the age of 70 years. Nearly 60 per cent of deaths are from NCDs and totally 5.8 million die every year due to NCDs. In the world India is the first country to develop specific targets and indicators in this field, which are aimed at reducing the burden of deaths from NCDs globally by the year 2025 by 25 per cent.[6]

A risk factor refers to any attribute, or exposure of an individual which increases the likelihood chance of developing a non-communicable disease. Knowledge about these risk factors can be used to reduce the distributions of these risk factors to a lower level.[7] The alarming burden of NCDs is due to the rising prevalence of behavioural and metabolic risk factors for this non communicable disease.[8]

The risk factors for non-communicable disease are grouped into 3 category they are behavioural, metabolic and biochemical risk factors. Behavioural risk factors include tobacco use, alcohol use, unhealthy diet and lack of physical activity. Metabolic risk factors include overweight, obesity, diabetes and hypertension. Biochemical risk factors include hypercholestremia and hypertriglyceridemia.[3]

WHO developed the WHO's STEPS approach as a part of a global surveillance strategy in response to the growing need for country-level trends in non-communicable diseases. Comparisons between countries can be made by using the same standardized questions and techniques, all countries can use this approach. It focuses on a minimum number of risk factors that predict the burden of major non-communicable diseases. This information can, in turn, be used in planning for strategies regarding disease prevention by risk factor reduction.[9,10]

With this background, this study was planned to find out the prevalence of non-communicable disease risk factors among adult population, in the rural field practice area of our institution with the following objectives.

- To estimate the prevalence rate of non-communicable disease risk factors among the study population.
- To determine the association between behavioural and metabolic risk factors among the study population.

METHODS

Study design

This is a population based cross sectional descriptive study carried out in a rural area of Padappai.

Study area

This study was conducted in the rural field practice area of the Rural Health and Training Centre attached to our Institution, located at Padappai in Kancheepuram District of Tamil Nadu.

Study population

The population covered by the rural health and training centre is about 21187 as per 2011 census. Total number of houses in Padappai village is 1851 and the total population is 7198, consisting of 3709 males and 3489 females. Study population identified were those belonging to the age group of 20–60 years residing in the study area permanently at the time of the study.

Study period

This study was carried out from April 2017-June 2017.

Sample size

The sample size for the study was calculated based on a previous study done by Kokila Selvaraj, which showed a prevalence of overweight as 24.3% which is one of the risk factor for non-communicable disease. Using the formula $4PQ/L^2$, the sample size was calculated with an absolute precision of 4.5%. Adding 4% refusal rate, the sample size was calculated to be 372 which was rounded off to 370.

Inclusion criteria

The inclusion criteria for the study were adult population of age group (20-60 years) residing in the study area, who were apparently healthy and willing to participate in the study.

Exclusion criteria

The exclusion criteria for the study were females who were pregnant, psychiatric patients, who are severely ill and those who rejected to participate in the study.

Sampling technique

Systematic random sampling technique was used to identify the study subjects. Sampling Interval (N/n) is calculated as follows: [N= Total number of households in Padappai=1851, n=sample size=370. N/n=1851/370=5]. Thus every 5th household is selected for identifying adult population between 20-60 years of age. If there were no

persons of 20-60 years age group in that house, the next house with appropriate study subject (age group of 20-60 years) was selected. From that house, next 5th household was selected for the sample identification for the study.

Study tool

A standardised pretested structured questionnaire consisting of the socio demographic particulars, details regarding risk factors for non-communicable disease and measurements (height, weight, waist circumference and BP).

Data collection

The data was collected using the standardized pretested structured interview schedule using the WHO STEPS approach 1 and 2.

Step 1 (Interview): Study protocol was based on the WHO STEPS approach. Information on socio-demographic variables and behavioural risk factors, such as tobacco-use, alcohol-use, physical exercise, and diet, were obtained by using a proforma translated in local language.

Step 2 (Physical measurements): Height, weight, waist-circumference, and blood pressure were measured. Physical measurement, such as height and weight, was recorded to calculate BMI (kg/m2). Blood pressure was measured using OMRON digital equipment recommended by Indian Council of Medical Research (ICMR) (OMRON-HEM7111, OMRON Healthcare Co. Ltd. Uky-Ku, Kyoto, Japan). Two readings were taken at an interval of 5 minutes, and the average value of the measurements was used for the analysis. Biochemical estimation could not be done due to limited fund.

Operational definition.[11,12]

Behavioural risk factors

- Tobacco users were defined as individuals who had used any form of tobacco in the last 30 days.
- Alcohol users were those who had consumed at least one standard drink of alcohol (30 ml of spirits, 285 ml of beer or 120 ml of wine) in the last 12 months.
- Unhealthy diet is Low consumption of fruits and vegetables at less than five servings per day (one cup of raw leafy vegetables or half cup of other vegetables (cooked) was considered one serving. One medium-sized piece of fruit or half cup of chopped fruit was measured as one serving).
- Physical activity low physical activity was defined as <150 minutes of moderate physical activity per week.

Metabolic risk factors

- Overweight was defined as BMI equal to or more than 25 kg/m^2.
- Obesity as BMI equal to as or more than 30 kg /m2.
- Waist circumference ≥94 cm in men and ≥80 cm in women was taken as cut off point to define central obesity.
- Hypertension was defined if systolic blood pressure was ≥140 mm of Hg and/or diastolic pressure ≥90 mm of Hg, or diagnosed cases taking antihypertensive drugs.

Data analysis

All the data collected were entered into the Microsoft Excel and analysis was carried out using SPSS 15 Software. The prevalence of NCD risk factors was calculated using percentages. Statistical significance (chi square test and p value) and strength of association (Odds ratio and 95% Confidence Interval) were tested between behavioural and metabolic risk factors.

Ethical clearance and informed consent

The study was carried out after obtaining approval from the Institutional Ethical Committee. The participants were briefed about the purpose of the study and informed consent was obtained prior to the data collection.

RESULTS

Table 1: Socio-demographic characteristics of the study population.

Sociodemographic variables		Frequency (n=370)	%
Age	20-30 years	63	17
	31-40 years	74	20
	41-50 years	70	18.9
	51-60 years	163	44.1
Sex	Male	139	37.6
	Female	231	62.4
Education	Illiterate	55	14.9
	Primary school	67	18.1
	Middle school	121	32.7
	High school	88	23.8
	Post high school diploma	6	1.6
	UG/PG	21	5.7
	Professional	12	3.2
Socio-economic status	Upper class	45	12.2
	Upper middle class	63	17
	Lower middle class	167	45.1
	Upper lower class	80	21.6
	Lower class	15	4.1

Socio-demographic characteristics of the study population

The socio-demographic characteristics of the study population are presented in Table 1. Among the study participants 62.4% were females and 47.6% were males.

Around 44.1% belonged to 51-60 years of age followed by 20% belonging to 31-40 years of age. Nearly 32.7%of the study subjects had middle school education and 23.8% had high school education. Socio economic status was classified based on BG Prasad scale. Around 45.1% belonged to Class III socio economic status and 21.6% belonged to Class IV socio economic status.

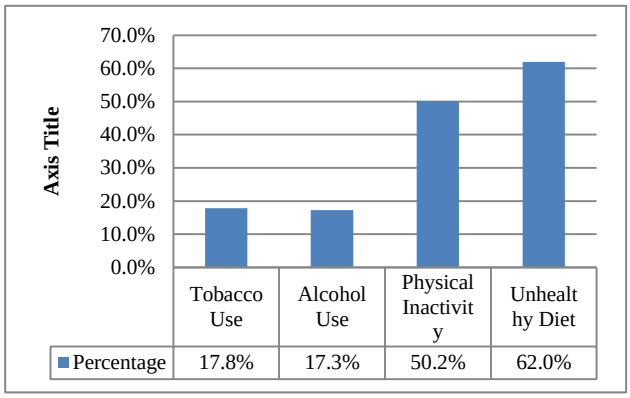

Figure 1: Prevalence of the behavioural risk factors among the study population.

Prevalence of non-communicable risk factors among the study population

As we can see from Figure 1, the prevalence of behavioural risk factors of the study participants are tobacco use (17.8%), alcohol use (17.3%), physical inactivity (50.2%), unhealthy diet (62%). Prevalence of metabolic risk factors are overweight (38.1%), obesity (11.4%), hypertension (15.7%), diabetes (21.9%) respectively as depicted in Figure 2.

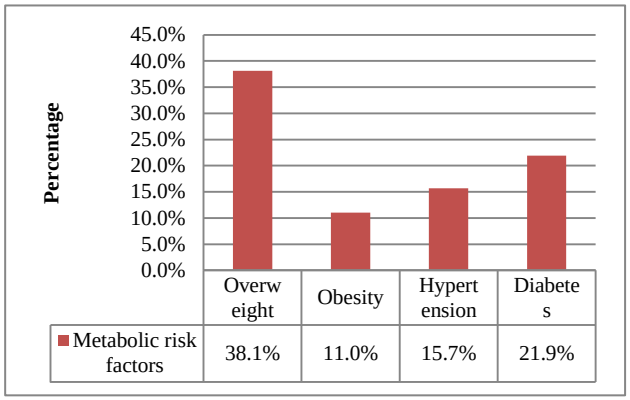

Figure 2: Prevalence of the metabolic risk factors among the study population.

Characteristics of the smoking habit of the study population

As shown in Table 2 nearly 15.4% of the study population are smokers and 2.4% consume smokeless tobacco. Of the study population 0.8% are using tobacco for a duration of <1 year, 3.2% are using for 1-5 years, 2.4% has the habit for 5-10 years and 8.9% are using for more than 10 years. 10.5% among the participants consume less than 10 cigarettes/day, 2.4% smoke nearly 10-20 cigarettes/day, and 0.8% consumes more than 20 cigarettes/day.

Table 2: Smoking habit of the study population.

Tobacco use		Frequency	%
Smoking	Yes	57	17.8
	No	313	82.2
Duration	<1 year	3	0..8
	1-5 years	12	3.2
	5-10 years	9	2.4
	>10 years	33	8.9
Frequency	Daily or few days a week	39	10..5
	Few days a month	3	0.8
	Past user	15	4..1
Quantity	1-10 cigarettes/ day	39	10.5
	10-20 cigarettes/ day	9	2.4
	>20 cigarettes/ day	3	0.8
Smokeless tobacco use	Yes	9	2.4
	No	361	97.6

Table 3: Drinking habit of the study population.

Alcohol use		Frequency	%
Alcohol use	Yes	64	17.3
	No	306	82.7
Duration	<1 year	-	-
	1-5 years	24	6.5
	5-10 years	16	4.3
	>10 years	24	6.5
Frequency	Daily or few days a week	18	4..9
	Few days a month	36	9.7
	Past user	10	2.7
Quantity	<250 ml/day	40	10.8
	250-500 ml/day	21	5.7
	500-1000 ml/ day	3	0.8
	>1000 ml/day	Nil	Nil
Type of drink	Beer	13	3.5
	Brandy	42	11.4
	Vodka	9	2.4

Characteristics of the drinking habit of the study population

Nearly 17.3% consume alcohol as shown in Table 3.among the study group 6.5% are taking alcohol for 1-5 years, 9.7% are taking for a duration of 5-10 years and 2.7% are consuming alcohol for more than 10

years.10.8% of the study participants consume less than 250 ml/day, 5.7% consume 250-500 ml/day and 0.8% consume 500-1000 ml/day. From the study participants 3.5%, 11.4% and 2.4% consume beer, brandy and vodka respectively.

Anthropometric and blood pressure characteristics of the study population

From Figure 3 3.2% are underweight, 47.3% belong to normal BMI category. 38.1% of the participants are overweight and 11.4% are obese. Among the study group 63.5% belong to normal blood pressure category (Table 4). Nearly 20.8% are pre-hypertensive.11.6% have stage 1 hypertension and 4.1% of the study population suffer from stage 2 hypertension.

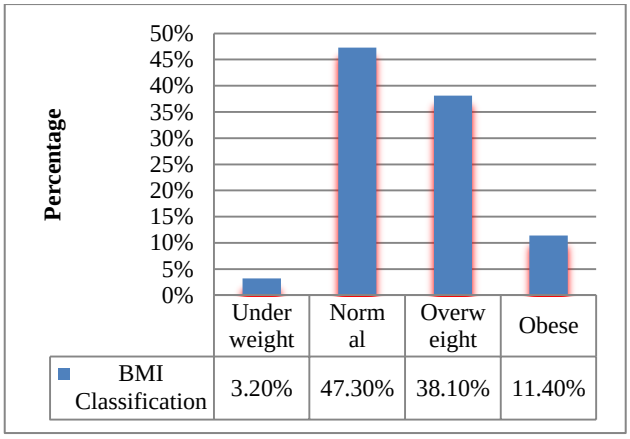

Figure 3: BMI classification of the study population.

Table 4: Blood pressure category of the study population.

Blood pressure		Category	Frequency (n=370)	Percentage (%)
Systolic	Diastolic			
<120	<80	Normal	235	63.5
120-139	80-89	Prehypertension	77	20.8
140-159	90-99	Hypertension stage 1	43	11.6
≥160	≥100	Hypertension stage 2	15	4.1

Table 5: Association between behavioural risk factors and obesity.

	Total (n=370)	Obesity				
		Frequency (n=43)	Percentage (%)	Odds ratio (95% CI)	Chi-square value	P value
Tobacco use						
Yes	57	3	7	1		
No	313	40	93	2.637	70.603	*0.004
				(0.787-8.835)		
Alcohol use						
Yes	64	3	7	1		
No	306	40	93	3.057	13.245	*0.020
				(0.915-10.211)		
Physical inactivity						
Yes	186	20	46.5	1		
No	184	23	53.5	1.054	0.412	0.532
				(0.558-1.990)		
Unhealthy diet						
Yes	233	27	62.7	1		
No	137	16	37.3	1.008	0.073	0.958
				(0.522-1.947)		

Association between behavioural and metabolic risk factor

The statistical association between various behavioural and metabolic risk factors is seen in Table 5-7. As shown, it is evident that there is a strong statistical significant association between tobacco use and obesity (odds ratio-2.637, p=0.004 at 95% confidence interval (0.787-8.835)).strong statistical significant association is present between alcohol use and obesity (odds ratio-3.057, p=0.020 at 95% confidence interval (0.915-10.211)).

Strong statistical significant association is present between tobacco use and hypertension (odds ratio-2.773, p=0.019 at 95% confidence interval (1.145-6.714)). Alcohol users have 23 (odds ratio-23.062) times higher

risk of developing hypertension than non-alcohol users. Alcohol use and diabetes mellitus had a strong statistical significant association (odds ratio-6.837, p=0.001 at 95% Confidence interval (2.085-22.417)).

Table 6: Association between behavioural risk factors and hypertension.

	Total (n=370)	Hypertension				
		Frequency (n=83)	Percentage (%)	Odds ratio (95% CI)	Chi-square value	P value
Tobacco use						
Yes	57	6	7.2	1		
No	313	77	92.8	2.773	5.489	*0.019
				(1.145-6.714)		
Alcohol use						
Yes	64	1	1.2	1		
No	306	82	99.8	23.062	22.380	*0.001
				(3.147-168.989)		
Physical inactivity				1		
Yes	186	44	53	0.874		
No	184	39	47	(0.535-1.425)	0.003	0.782
Unhealthy diet						
Yes	233	52	63	1		
No	137	31	37	1.018	0.130	0.982
				(0.614-1.687)		

Table 7: Association between behavioural risk factors and diabetes mellitus.

	Total (n=370)	Diabetes mellitus				
		Frequency (n=43)	Percentage (%)	Odds ratio (95% CI)	Chi-square value	P value
Tobacco use						
Yes	57	9	15.7	1		
No	313	71	22.6	1.564	1.352	0.245
				(0.732-3.344)		
Alcohol use						
Yes	64	3	4.6	1		
No	306	77	25.1	6.837	13.095	*0.001
				(2.085-22.417)		
Physical inactivity						
Yes	186	41	22	1		
No	184	39	21.1	0.926	0.033	0.956
				(0.563-1.524)		
Unhealthy diet						
Yes	233	49	21	1		
No	137	31	22.6	0.855	0.005	0.718
				0.518-1.413		

DISCUSSION

Non-communicable diseases (NCDs) are the leading cause of adult mortality and morbidity worldwide. NCDs are rapidly increasing globally and reached epidemic proportions in many countries, largely due to industrialization, socio-economic development, rapid urbanization, demographic and lifestyle changes. These diseases are posing a major public health challenge that undermines social and economic development, and place a tremendous demand on health systems and social welfare throughout the world especially in low and middle income countries.[13] This study aimed to find out the prevalence of NCD risk factors among the adult (20-60 years) age group in the rural community. The results from this study give a new insight to the existing problem.

The prevalence of tobacco use (smoking and smokeless tobacco use) in the study population was found to be 17.8%. This was similar to studies done by Garg, Devi, and Chhaya.[14-16] The prevalence from studies by Sandhu and Oommen were 23.4% and 23% respectively.[17,8] Studies done by Tagurum, Saxena and Zaman recorded a prevalence of 3.6%, 8.5% and 54% respectively and this wide disparity is due to the differences in the study setting.[18-20]

Prevalence of alcohol use in this study is 17.3% which is comparable to the results from the studies by Devi, Agarwal and Bhattacherjee.[15,21,1] Low prevalence of alcohol use was recorded in studies by Naseem (1.8%), Tagurum (3.1%) and Chhaya (5.9%).[22,18,16] In studies by Bhardwaj and Oommen 37.7% and 62% use alcohol respectively.[23,8]

From the results of the study 50.2% are physically inactive and which is consistent with studies by Oommen, Tagurum and Sandhu.[8,18.17] Nearly 62% of the study participants consume low fruits and vegetables daily which was comparable to Sandhu and Bhattacherjee studies.[17,1] This shows that the study population was following an unhealthy lifestyle habits.

Overweight, obesity, hypertension diabetes mellitus prevalence from the study were 38.1%, 11.4%, 15.7% and 21.9% respectively. In this study there was an strong statistical significant association between obesity (odds ratio-3.057, p=0.020 at 95% confidence interval (0.915-10.211)), hypertension (odds ratio-23.062, p=0.001 at 95% confidence interval (3.147-168.989)), diabetes (odds ratio-6.837, p=0.001 at 95% confidence interval (2.085-22.417)) and alcohol use and also between obesity (odds ratio-2.637, p=0.004 at 95% confidence interval (0.787-8.835)), hypertension (odds ratio-2.773, p=0.019 at 95% confidence interval (1.145-6.714)) and tobacco use.

CONCLUSION

The result of this study shows that the prevalence of non-communicable diseases risk factors is high. It is necessary to minimize the burden of growing Non Communicable Disease epidemic in the society, by curbing the rates of the risky behaviours at a very early stage by lifestyle modification. This necessitates the reduction in this problem by improving the knowledge and awareness regarding NCD risk factors. Knowledge can be improved by using IEC and BCC methods and also by creation of awareness through various available Medias, public health campaigns and various outreach activities.

Promoting healthy lifestyle is a challenge. Building a healthier future depends on effective interventions during this critical window of adult life. Coverage of the NCD control program should be increased and strengthening of the health sector by allocating more funds on health promoting activities must also be done.

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Limitation

In this study WHO STEPS approach 3 was not used due to lack of funding.

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Ethical approval: The study was approved by the Institutional Ethics Committee, Sree Balaji Medical College and Hospital

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