

A study to assess the risk factors of non-communicable diseases among adults of a selected urban community in Coimbatore, India

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Abstract—Background: Non-communicable diseases (NCDs) are the leading cause of mortality worldwide, with low- and middle-income countries experiencing a disproportionate burden. Early identification of behavioural and metabolic risk factors is essential for preventing premature morbidity and mortality. This study assessed the risk factors for NCDs among adults residing in an urban community of Coimbatore, India, and examined their association with selected demographic variables.

Methods: A quantitative descriptive research design was adopted among 300 adults aged ≥ 30 years selected using non-probability consecutive sampling from Sivananda Puram, Coimbatore. Data were collected through face-to-face interviews using a structured questionnaire comprising socio-demographic characteristics, lifestyle and clinical variables, and Community-Based Assessment Checklist (CBAC). Descriptive statistics summarized the data, while Chi-square tests determined associations between NCD risk and selected variables.

Results: Among the participants, 56% were identified as having a high risk of NCDs (CBAC score ≥ 4). Physical inactivity (62%), overweight/obesity (45%), inadequate sleep (55%), and increased waist circumference were common risk factors. Significant associations were observed between NCD risk and gender ($\chi^2=5.618$, $p<0.05$), education ($\chi^2=10.17$, $p<0.05$), age ($\chi^2=11.76$, $p<0.01$), body mass index ($\chi^2=12.75$, $p=0.005$), smoking ($\chi^2=7.13$, $p<0.05$), sleep duration ($\chi^2=7.00$, $p<0.05$), waist circumference, physical activity ($\chi^2=17.57$, $p<0.001$), and family history of NCDs ($\chi^2=24.00$, $p<0.001$).

Conclusion: A substantial proportion of urban adults were at high risk for NCDs. Community-based screening, lifestyle modification, and targeted health education should be strengthened within primary healthcare to

reduce the burden of NCDs and promote early prevention.

Index Terms—Non-communicable diseases (NCDs), Risk factors, Community-Based Assessment Checklist (CBAC), Adults, Urban community

I. INTRODUCTION

Non-communicable diseases (NCDs) are chronic conditions resulting from the interaction of genetic, physiological, environmental, and behavioural factors. The four major NCD are cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes are the leading causes of morbidity and mortality worldwide. According to the World Health Organization (WHO), NCDs accounted for 43 million deaths in 2021, representing approximately 75% of all non-pandemic-related deaths globally. Nearly 18 million of the deaths occurred prematurely among individuals aged 30–70 years, with 82% occurring in low- and middle-income countries.

The increasing burden of NCDs is largely attributable to modifiable behavioural risk factors, including tobacco use, unhealthy diets, physical inactivity, and harmful alcohol consumption. These factors contribute to metabolic abnormalities such as hypertension, obesity, hyperglycaemia, and dyslipidaemia, thereby increasing the risk of chronic diseases.

Adults (30–59 years) are at increased risk of developing NCDs due to age-related metabolic changes and prolonged exposure to unhealthy lifestyle behaviours. In India, NCDs account for approximately 66% of all deaths, with many occurring prematurely between 30 and 70 years of age. The Indian Council of Medical Research–India Diabetes (ICMR–INDIAB) Study reported in 2023 showed a high burden of diabetes, hypertension, and obesity, with prevalence increasing significantly after 40 years of age.

Rapid urbanization has further accelerated the NCD epidemic through environmental and lifestyle changes. More than 55% of the world's population currently resides in urban areas, and this proportion is projected to reach 68% by 2050. Poor urban planning, air pollution, limited opportunities for physical activity, unhealthy food environments, and inadequate green spaces have emerged as important determinants of NCD risk. (WHO, 2025)

India is undergoing a rapid epidemiological transition characterized by an increasing prevalence of NCDs, driven by urbanization, population ageing, sedentary lifestyles, unhealthy dietary practices, and greater exposure to behavioural risk factors. Early identification of modifiable risk factors, including tobacco use, unhealthy diet, physical inactivity, obesity, hypertension, diabetes, and alcohol consumption, is essential for reducing morbidity, mortality, and healthcare costs. Assessing the prevalence of the risk factors provides evidence to guide targeted health promotion initiatives, screening programmes, and community-based interventions. (WHO and Ministry of health and family welfare 2025)

In view of the growing burden of NCDs, assessing the distribution of behavioural and metabolic risk factors is a public health priority in India. Such evidence is critical for informing effective prevention and control strategies, strengthening early detection efforts, and supporting progress towards the Sustainable Development Goal (SDG) target of reducing premature mortality from NCDs by one-third by 2030.

II. OBJECTIVE

- To assess the risk factors of non-communicable diseases among adults
- To find the association between the NCD risk factors with selected demographic variables

III. METHODOLOGY

A quantitative research approach was adopted for this study. A descriptive research design was adopted to assess the risk factors of non-communicable diseases (NCDs) among adults residing in an urban community. The study was conducted in Sivananda Puram, an urban community. A preliminary survey was carried out to identify the target population, which revealed that 1,280 adults aged 30 years and above resided within a 2-km radius of the selected study area.

The study population comprised adults aged 30 years and above who met the predefined inclusion criteria. A total of 300 participants were selected by using a non-probability consecutive sampling technique.

Inclusion Criteria

- Adults aged 30 years and above, willing to participate and who were available during the data collection period.

Exclusion Criteria

- Adults with cognitive impairment, communication difficulties, severely ill clients, visitors and who were known case of NCD.

Description of the Tool

- The data collection tool consisted of two sections:
Section A: Demographic variables, including gender, education, occupation, and socio-economic status
Section B: Life style and clinical variables including diet, frequency of food consumption outside, sleep and BMI calculation
Section C: Assessment of NCD risk factors by CBAC scale including age, smoking habits, alcohol consumption, waist circumference, physical activities, and family history of NCD

Data Collection Procedure

Data were collected using a structured questionnaire comprising three sections: socio-demographic characteristics,

life style and clinical variables and Community-Based Assessment Checklist (CBAC) for assessing the risk of non-communicable diseases (NCDs). Prior to data collection, permission was obtained from the local authorities. A house-to-house survey was conducted, and eligible participants were selected from each household based on the inclusion criteria.

Ethical approval was obtained from the Institutional Ethics Committee prior to commencement of the study. Oral informed consent was obtained; Data were collected through face-to-face interviews using the structured questionnaire. Body weight was measured

using a calibrated weighing scale. Confidentiality and anonymity of all

participants were maintained throughout the study.

The collected data were coded, entered into Microsoft Excel, and analysed using descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize the data. Inferential statistics such as the Chi-square test were used to determine the association between selected demographic variables and NCD risk factors. A p-value of <0.05 was considered statistically significant.

IV. RESULTS AND DISCUSSION

Table-1 : Frequency and percentage distribution of demographic variables (N=300)

S.no	Demographic variables	Frequency	Percentage %
1	Gender		
	a) Male	121	40
	b) Female	179	60
2	Education		
	a) Illiterate	0	0
	b) Primary education	6	2
	c)Secondary and higher secondary education	197	66
	d)Diploma		
	e) Undergraduate	78	26
	f) Postgraduate	15	5
3	Occupation		
	a) Employed	233	78
	b) Unemployed	67	22
4	Socio economic status		
	a) Upper class	13	4
	b) Middle class	287	96
	c)Lower class	0	0

Table-2 : Frequency and percentage distribution of lifestyle and clinical variables

(N=300)

S.no	Demographic variables	Frequency	Percentage %
1	Diet		
	a) Vegetarian	14	5
	b) Non-vegetarian	286	95

2	Frequency of food consumption outside a) Weekly once b) Monthly once	150 150	50 50
3	Sleep a) < 8 hours b) > 8 hours	165 135	55 45
4	BMI Classification a) Underweight b) Healthy weight c) Overweight d) Obese	15 150 94 41	5 50 31 14

Table 1: Presents distribution of study participants according to socio-demographic characteristics. Out of 300 participants majority were female 60% and 40% were male. Maximum number of participants 197 (66%) had completed secondary and higher secondary education while 78 (26%) completed diploma level education. Maximum 287(96%) belonged to socio economic class II, and 78% of participants were employed.

Table 2: presents clinical and life style variables among the participants. Among 300 participants maximum 95% were consuming both non vegetarian and vegetarian diet. About 50% consume food from outside weekly once. About 56% follows sedentary lifestyle practices and 55% of participants has less than 6-8 hours of sleep. About 150 participants (50%) maintains healthy weight and 94 (31%) and 41 (14%) participants falls under overweight and obesity category respectively.

Table 3: Distribution of study participants based on the community-based assessment checklist (CBAC)

CBAC Variables	Range		Frequency		Percentage %	
Age	30-39 years		79		26	
	40-49 years		123		41	
	≥ 50 years		98		33	
Smoking	Never		162		54	
	Used to consume in the past/ Sometimes now		88		29	
	Daily		50		17	
Consumption of alcohol	No		288		96	
	Yes		12		4	
Measurement of waist (in cm)	Female	Male	Female	Male	Percentage	
	80 cm or less	90 cm or less	9	49	5%	41%
	81-90 cm	91-100 cm	20	62	11%	51%
	More than 90cm	More than 100cm	150	10	84%	8%
Physical activities for minimum of 150 minutes in a week	At least 150 minutes in a week		114		38	

	Less than 150 minutes in a week	186	62
Family history of NCD	No	151	50
	Yes	149	50%

Table 3 : Shows distribution of study participants as per Community based assessment checklist (CBAC) variables, most study participants 123 (41%) belonged to age group 40-49. 54% of study population never used tobacco in lifetime. 88 (29%) of participants consumed in past or sometimes, whereas 50 (17%) participants were daily smokers. 179 females were lifetime abstainers of alcohol, 109 male participants reported they had consumed alcohol in past or

sometimes. Whereas 12 (4%) of male participants were daily drinkers. Among the male participants 62 (51%) had waist circumference 91 cm – 100cm while majority number of female participants 150 (84%) had waist circumference more than 90cm. Majority participants 186 (62 %) performed physical activity less than 150 minutes/week. 149(50%) of participants had family history of High Blood pressure, Diabetes and heart diseases

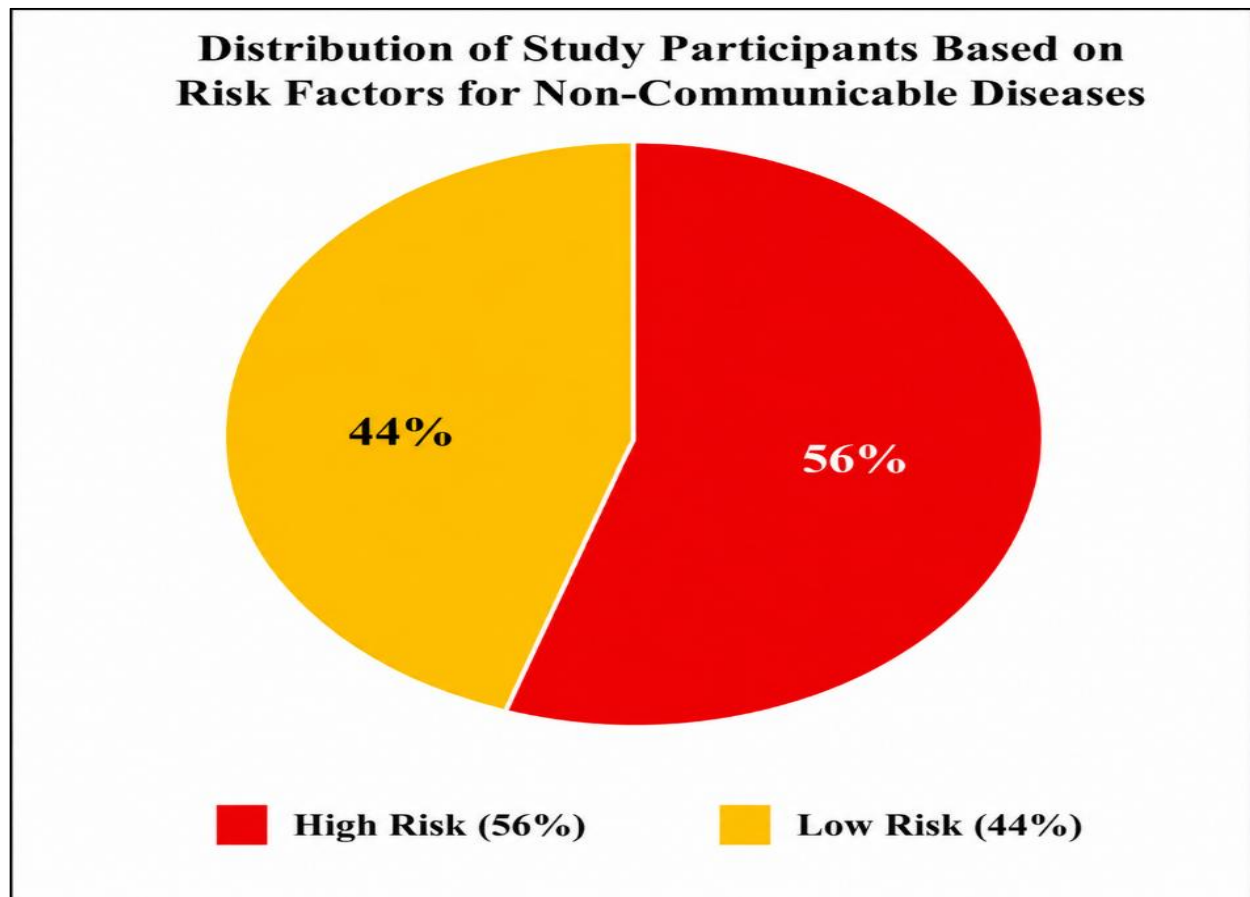


Figure-1 Distribution of study participants based on risk factors for

non-communicable diseases

Related to fig.1 the study reveals that 56% of participants were at high risk of common NCDs such as high blood pressure, diabetes, and heart diseases

with a CBAC score of >4, while 46% of study participants are at low risk of developing NCD with a CBAC score <4.

Table 4: Association between the NCD risk factors and selected demographic variables

S.no	Variable	Categories	χ^2 value	df	p-value	Result
	Gender	Male, female	5.618	1	<0.05	Significant
	Educational status	Primary, Secondary, Diploma, UG, PG	10.17	4	<0.05	Significant
	Occupation	Employed, unemployed	3.042	1	<0.05	Not significant
	Socioeconomic status	Upper class, Middle class	0	1	0.993	Not Significant
	Sleep	<8 hours, > 8 hours	7.00	1	<0.05	Significant
	Body Mass Index (BMI)	Underweight, Healthy weight, Overweight, Obese	12.75	3	0.005	Significant
	Age group	30–39, 40–49, ≥50 years	11.76	2	<0.01	Significant
	Smoking status	Smoking, Past smoker, Daily smoker	7.13	2	<0.05	Significant
	Alcohol consumption	Yes, No	3.63	1	0.057	Not Significant
	Female waist circumference	≤80 cm, 81–90 cm, >90 cm	8.23	2	<0.05	Significant
	Male waist circumference	<90 cm, 91–100 cm, >100 cm	9.94	2	<0.01	Significant
	Physical activity	≥150 min/week, <150 min/week	17.57	1	<0.001	Highly Significant
	Family history of NCD	Yes, No	24	1	<0.001	Significant

Chi-square analysis revealed significant associations between the risk of non-communicable diseases (NCDs) and several demographic, anthropometric, and lifestyle variables. Gender ($\chi^2 = 5.618$, $p < 0.05$), educational status ($\chi^2 = 10.17$, $df = 4$, $p < 0.05$), sleep duration ($\chi^2 = 7.00$, $p < 0.05$), body mass index (BMI) ($\chi^2 = 12.75$, $df = 3$, $p = 0.005$), age group ($\chi^2 = 11.76$, $df = 2$, $p < 0.01$), smoking status ($\chi^2 = 7.13$, $df = 2$, $p < 0.05$), female waist circumference ($\chi^2 = 8.23$, $df = 2$, $p < 0.05$), male waist circumference ($\chi^2 = 9.94$, $df = 2$, $p < 0.01$), physical activity ($\chi^2 = 17.57$, $df = 1$, $p < 0.001$), and family history of NCDs ($\chi^2 = 24.00$, $df = 1$, $p < 0.001$) were significantly associated with NCD risk. Among these variables, physical activity and family history of NCDs demonstrated the strongest associations.

Conversely, occupation ($\chi^2 = 3.042$, $df = 1$, $p > 0.05$), socioeconomic status ($\chi^2 = 0.00$, $df = 1$, $p = 0.993$), and alcohol consumption ($\chi^2 = 3.63$, $df = 1$, $p = 0.057$) were not significantly associated with the risk of non-communicable diseases.

V. DISCUSSION

Early detection and screening of non-communicable diseases are a crucial component in health care. The burden of NCD is growing, and addressing it requires an early intervention strategy to improve health outcomes. A cost-effective early risk detection strategy will improve patient outcomes and higher quality of life. The Community-Based Assessment Checklist (CBAC) is the population-based high-risk screening strategy for NCDs introduced in India at the primary health care level. Our study found the overall risk of common NCDs was 54 % with a CBAC score ≥ 4 while 46% had score <4 . The present study found a higher risk of non-communicable diseases (NCDs) among urban participants. This may be due to unhealthy dietary habits, physical inactivity, obesity, stress, tobacco use, and alcohol consumption. Studies from urban Karnataka, Haryana, and Odisha have similarly reported high-risk prevalence ranging from

34% to 57%, highlighting the widespread nature of NCD risk across diverse geographic and socio-cultural contexts (Bhankhariya, M. et al., 2025). The findings highlight the importance of health education, regular screening, and lifestyle modification to reduce the burden of NCDs.

There were more females, 179 (60%), than males, 121(48%) in this study. This finding is consistent with the study conducted by Seema P et al. (2022) in which females 192(51.1%) outnumbered males 184(48%). Furthermore, 41% of study participants belonged to the age group 40-49 years, and this finding is in line with the study conducted by Nabi S et al. (2023) where the majority (38.6%) of the participants were in the age group of 41–50 years. This may be because most of the individuals over 50 years surveyed from the population in our study have been diagnosed with any of the NCD, hence they were excluded. In the present study, the majority of participants 96% belong to middle class in socioeconomic status. This is consistent with the study conducted by Merin et al. (2025) where nearly half (49.7%) of the study participants belonged to the middle class. Most of the participants (78%) in this study are employed, and most of the females identified housewife as their occupation

Most participants had completed secondary or higher secondary education (66%), and educational status showed a statistically significant association with the study outcome. Education is an important determinant of health literacy and healthy behaviour. This finding is consistent with Marmot et al. (2008), who reported that individuals with lower educational attainment have poorer health outcomes because of limited access to health information and preventive healthcare services. Similar observations have also been reported in the National Family Health Survey (NFHS-5, 2019–21), which demonstrated that educational status significantly influences awareness and prevention of NCD risk factors.

More than half of the participants (56%) reported sedentary lifestyles, and nearly two-thirds performed less than the recommended 150 minutes of physical activity per week. Physical activity showed a highly significant association with the study outcome ($\chi^2 = 17.57$, $p < 0.001$). This finding agrees with the WHO Guidelines on Physical Activity (2020), which recommend at least 150–300 minutes of moderate-intensity physical activity per week to reduce the risk

of cardiovascular disease, diabetes, obesity, and certain cancers. Similar findings were reported by Katzmarzyk TP et al. (2021), who found globally 7.2% and 7.6% of all-cause and cardiovascular deaths, respectively, are attributable to physical inactivity.

Similarly, body mass index showed a strong, statistically significant relationship with the outcome ($\chi^2 = 12.75$, $p = 0.005$). In our sample, half of the population (50%) fell outside the healthy weight boundary, with (31%) classified as overweight and (14%) living with obesity. This high burden of overnutrition represents a major epidemiological shift. It aligns tightly with our observation that half of the participants (50%) consume outside food at least once a week, exposing them to energy-dense, hyper-palatable, and sodium-rich diets. The Global Burden of Disease Study (GBD 2019) reported unhealthy dietary patterns as one of the leading contributors to premature mortality due to cardiovascular diseases and diabetes worldwide. Similarly, the WHO (2022) emphasizes healthy dietary practices as a cornerstone of NCD prevention.

Approximately 55% of the participants have less than 6-8 hours of sleep. Short sleep duration shows a significant association with the study outcome ($\chi^2 = 7.00$, $p < 0.05$). Impaired sleep-wake time affects the quality of life and health of the individual. Most of the sleep disorders were overlooked as a risk factor for non-communicable diseases, which goes in line with the article by Thomas et al. (2023), who identified that ignoring sleep disorders will prevent countries from reaching the Sustainable Development Goal to reduce premature mortality from non-communicable diseases by 2030.

The present study found a statistically significant association between tobacco use and the study outcome ($\chi^2 = 7.13$, $p < 0.05$). More than half of the participants (54%) had never used tobacco, while 29% reported past or occasional tobacco use and 17% were daily tobacco users. The significant association suggests that tobacco use may be an important behavioural factor influencing the study outcome. The findings of the present study are consistent with Reitsma et al. (2021), who reported that tobacco use remains a major risk factor for cardiovascular diseases, chronic respiratory diseases, cancers, and premature mortality worldwide.

Similarly, alcohol consumption among men was common, whereas nearly all women were lifetime

abstainers. However, alcohol consumption was not significantly associated with the study outcome. This finding contrasts with evidence from GBD 2020 and Rehm et al. (2017), which reported alcohol consumption as a significant contributor to hypertension, liver disease, stroke, and several cancers. The absence of statistical significance in the present study may reflect the relatively smaller number of daily alcohol users.

The present study found that most female participants (84%) had a waist circumference of more than 90 cm, while 51% of male participants had a waist circumference between 90 and 100 cm. This indicates that females had a higher prevalence of increased waist circumference than males. This indicates urban areas traditionally report higher rates of obesity and metabolic risk indicating a shift of nutrition transition away from traditional, fiber-rich diets towards processed food and sedentary lifestyles. (Joshi K J., et.al., 2025)

The present study found a significant association between the NCD status of the family and the study variable ($\chi^2 = 24$, $p < 0.001$). Participants without NCD had higher values of the study variable than those with NCD. This suggests that the study variable may be related to the occurrence of non-communicable diseases. Promoting healthy lifestyle practices and health education may help reduce the risk of NCDs. It goes in line with the study conducted by Patel G. et al., 2024, which shows, presence of family clinical history was significantly associated with high-risk individuals.

VI. CONCLUSION

Non-communicable diseases (NCDs) have emerged as a major public health challenge in India. The present study revealed a considerable burden of NCD risk factors among adults residing in the selected urban community of Coimbatore, with more than half of the participants identified as being at high risk for developing NCDs. Significant associations were observed between the NCD risk factors with selected demographic variables. These findings highlight the need for strengthening community-based screening programmes, promoting healthy lifestyle behaviours, enhancing public awareness regarding modifiable risk factors, and encouraging regular health check-ups for early identification and management of NCDs.

Integrating evidence-based health education and risk assessment into primary health care services may contribute to reducing the burden of NCDs and improving community health outcomes. Further large-scale, multicentre, and longitudinal studies are recommended to better understand the determinants of NCD risk and to evaluate the long-term effectiveness of preventive interventions across diverse populations.

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