



Original Article

## The prevalence of risk factors for non-communicable diseases among patients attending outpatient department of tertiary care centre, Bengaluru: A cross-sectional study

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### ABSTRACT

**Introduction:** Worldwide, 74% of all deaths, or 41 million/year, are caused by non-communicable diseases (NCDs). In India, 65% of fatalities are caused by NCDs. NCDs are caused by risk factors connected to lifestyle, such as bad eating habits, inactivity and problematic alcohol and cigarette use. In light of this, the present study was conducted to determine the prevalence of NCD risk factors among patients utilising a Bengaluru tertiary care facility.

**Materials and Methods:** Patients at a tertiary care centre in Bengaluru made up the 480 participants in this cross-sectional study. After receiving consent, a semi-structured questionnaire was used to collect the data. SPSS software version 25 was used to evaluate the data once it had been entered into Microsoft Excel. As a test of significance, the Chi-square test was applied.

**Results:** Participants in the study had an average age of  $43.6 \pm 14.6$  years. The prevalence of a sedentary lifestyle was 90.6%, followed by physical inactivity at 68.3%, and obesity at 11.5%. Risk factors such as physical inactivity, waist-hip ratio and obesity were significantly associated with the age group.

**Conclusion:** By implementing lifestyle changes and undertaking community-based health education programs, it should be possible to counteract the rise in the prevalence of risk factors for non-communicable illnesses.

**Keywords:** Risk factors, Non-communicable disease, Tertiary care centre

### INTRODUCTION

Non-communicable diseases (NCDs) are disorders that manifest gradually and are caused by a confluence of genetic, physiological, environmental and behavioural factors.<sup>[1]</sup> NCDs include ailments that impact the musculoskeletal system, nervous system, heart, kidneys and neurological system. These ailments include cancer, diabetes, obesity, senility, blindness, arthritis and related diseases, chronic non-specific respiratory illnesses (such as chronic bronchitis, emphysema and asthma), the long-term repercussions of accidents and different metabolic and degenerative illnesses.<sup>[2]</sup>

Worldwide, 74% of all deaths, or 41 million/year, are caused by NCDs. Each year, worldwide, 17 million people under the age of 70 die from an NCD. Cardiovascular diseases account for 17.9 million annual fatalities, followed by cancer (9.3 million), chronic respiratory diseases (4.1 million) and diabetes (2.0 million, including kidney disease-related mortality) as the leading causes of death.<sup>[1]</sup>

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NCDs are responsible for 65% of all mortality in India.<sup>[3]</sup> Due to the rising prevalence of NCDs, which are significantly increasing morbidity and mortality in both urban and rural regions, India is going through a rapid shift in its health as well as a large loss of life's potentially productive years (between the ages of 35 and 64).<sup>[2]</sup>

NCDs are caused by risk factors connected to lifestyle, such as bad eating habits, inactivity and problematic alcohol and cigarette use, and the primary metabolic risk factors for NCDs are obesity, high blood pressure, high blood sugar and high levels of total cholesterol in the blood.<sup>[1]</sup> In light of this, the present study was conducted to determine the prevalence of NCD risk factors among patients utilising a Bengaluru tertiary care facility.

### Aims and Objectives

The aim of this study was as follows:

1. To estimate the prevalence of NCD risk factors among patients using the outpatient department of a Bengaluru tertiary care facility
2. To determine the association between risk factors and sociodemographic features of the patients.

## MATERIALS AND METHODS

### Study design and duration

A descriptive cross-sectional study was conducted from September 2022 to February 2023.

### Study area

This study was conducted in a tertiary care hospital, in Bengaluru, Karnataka.

### Study population

Patients diagnosed with NCDs visit a tertiary care hospital for consultation during the study period.

### Sample size

Using data from a prior study by Bhattacharjee *et al.*, who found that physical inactivity was prevalent at 50.8%,<sup>[4]</sup> which is one of the risk factors for non-communicable illnesses, the sample size for the present study was calculated to be 400 using the formula  $n = Z^2pq/l^2$  with an absolute precision of 5%.

### Inclusion and exclusion criteria

#### Inclusion criteria

Patients with NCD visiting the outpatient department tertiary care centre, Bengaluru, who gave consent to take part were included in the study.

#### Exclusion criteria

Patients with NCDs who declined to consent to the study's participation were excluded from the study.

#### Sampling method

Four hundred and eighty people in total were questioned and assessed using a systematic random sampling method.

#### Data collection

This study was conducted from September 2022 to February 2023. The dietician of the tertiary care centre collected the data by interviewing study participants using a pre-tested, semi-structured questionnaire. The height and weight of the subjects were recorded to and analyse the body mass index (BMI). By dividing the weight in kilos by the square of the height in metres, the BMI was computed and was categorised as underweight (18.5), normal (18.5–24.9), overweight (25–29.9) and obese (30 and beyond) using the World Health Organization (WHO) Asian cutoffs.<sup>[5]</sup> According to the WHO standards, males with waist-hip ratios  $\geq 0.90$  cm and females with waist-hip ratios greater than or equal to 0.85 cm were classified as significantly increased/high-risk categories for acquiring NCDs.<sup>[6]</sup>

#### Statistical analysis

Microsoft Excel was used to enter all of the acquired data, and SPSS software version 25 was used for analysis. Results were displayed as frequency and percentage. The Chi-square test was employed as the significance test.

## RESULTS

Participants in the study had an average age of  $43.6 \pm 14.6$  years. Table 1 lists the sociodemographic details of the research population. About 51.9% of the participants in the study were female, while 48.1% were male. In terms of age, 34% of the subjects were between the ages of 21 and 35, 31.7% were between the ages of 36 and 50 and only 6% were between the ages of 66 and 80. Table 2 displays the prevalence of risk

**Table 1:** Distribution of sociodemographic details of the study participants.

Sociodemographic details	Category	Frequency	Percentage
Age group	21–35	163	34
	36–50	152	31.7
	51–65	136	28.3
	66–80	29	6.0
Gender	Male	231	48.1
	Female	249	51.9

factors for non-communicable illnesses among the study participants. Sedentary lifestyle prevalence is 90.6%, followed by physical inactivity at 68.3% and obesity at 11.5%.

Table 3 displays the diagnoses of the study subjects. Type II diabetes mellitus is the most common diagnosis, accounting for 38.5% of cases, followed by hypothyroidism (14%), diabetes and hypertension (9.8%), hypertension (8.5%) and hyperthyroidism (0.4%).

**Table 2:** Distribution of risk factors for non-communicable diseases among the study participants.

Risk factors	Frequency	Percentage
Sedentary work	435	90.6
Physical inactivity*	328	68.3
Waist-hip ratio*	216	45.0
Obesity	55	11.5

\*Physical inactivity: Neither walking nor doing exercise, \* Waist-to-hip ratio: >0.9 in men and >0.85 in women

**Table 3:** Non-communicable disease diagnosed in study participants.

Diagnosis	Frequency	Percentage
Type II diabetes mellitus	185	38.5
Hypertension	41	8.5
Hypothyroidism and diabetes mellitus	27	5.6
Hypothyroidism	67	14.0
Hypothyroidism and PCOS	30	6.3
Hypertension and diabetes mellitus	47	9.8
Type I diabetes mellitus	17	3.5
PCOD	35	7.3
Diabetes mellitus and PCOD	19	4.0
Hypertension and hypothyroidism	10	2.1
Hyperthyroidism	2	0.4

PCOS: Polycystic ovary syndrome, PCOD: Polycystic ovarian disease

Tables 4 and 5 demonstrate the relationship between sociodemographic traits and risk variables for NCDs. Risk factors such as obesity, waist-hip ratio and inactivity were substantially correlated with age group, as shown in Table 4. It was discovered that younger age groups had larger waist-hip ratios and sedentary lifestyles.

Table 5 shows a substantial relationship between gender and risk variables such as obesity, sedentary lifestyles and waist-to-hip ratios. In contrast to males, females had greater rates of risk variables such as sedentary behaviour, waist-hip ratio and physical inactivity, whereas males had much higher rates of obesity.

Table 6 illustrates the relationship between study participants' diagnoses and risk factors for NCDs. There was a significant correlation between these risk factors, such as obesity and waist-hip ratios and diagnoses, suggesting that people with these conditions are more likely to develop NCDs. The majority of study participants were diagnosed with type II diabetes mellitus (38.5%), of which 34.58% had a sedentary lifestyle, 28.95% were neither walking nor doing any exercise and 4.79% were obese.

## DISCUSSION

Among the study participants, the percentage of males and females was almost equal 48.1% and 51.9%, respectively. Participants in the study had an average age of  $43.6 \pm 14.6$  years, although the majority belonged to the young age group of 21–35 years (34%). There was a significant association between risk factors such as physical inactivity, waist-hip ratio, obesity and age group, which implies that as age increases, the risk of developing NCDs increases. In our study, we found that the prevalence of physical inactivity is 68.3%, which is considerably higher than the study done by Bhattacharjee *et al.*,<sup>[4]</sup> where it was 50.8%. In our study, female participants had a higher percentage of inactivity (36.04%)

**Table 4:** Association between age group and non-communicable disease risk factors.

Age group	Sedentary work (%)	Physical inactivity* (%)	Waist-hip ratio*(%)	Obesity (%)
21–35	149 (31.04)	108 (22.5)	95 (19.79)	16 (3.33)
36–50	139 (28.95)	108 (22.5)	58 (12.08)	27 (5.62)
51–65	122 (25.41)	100 (20.8)	55 (11.45)	10 (2.08)
66–80	25 (5.20)	12 (2.5)	8 (1.66)	2 (0.42)
P-value	0.791	<b>0.026</b>	<b>0.001</b>	<b>0.003</b>

Bold:  $P < 0.05$  is significant, \*Physical inactivity: Neither walking nor doing exercise, \*Waist-to-hip ratio: >0.9 in men and >0.85 in women.

**Table 5:** Association between gender and non-communicable disease risk factors.

Gender	Sedentary work (%)	Physical inactivity* (%)	Waist-hip ratio* (%)	Obesity (%)
Male	196 (40.83)	155 (32.29)	3 (0.62)	31 (6.45)
Female	239 (49.79)	173 (36.04)	213 (44.37)	24 (5)
P-value	<b>0.001</b>	0.778	<b>0.001</b>	<b>0.04</b>

\*Physical inactivity: Neither walking nor doing exercise, \* Waist-to-hip ratio: >0.9 in men and >0.85 in women, Test of significance used: Chi-square test, Bold:  $P < 0.05$  is significant

**Table 6:** Association between diagnosis and risk factors for non-communicable disease.

Diagnosis	Sedentary work (%)	Physical inactivity* (%)	Waist-hip ratio* (%)	Obesity (%)
Type II diabetes mellitus	166 (34.58)	139 (28.95)	62 (12.91)	23 (4.79)
Hypertension	37 (7.70)	22 (4.58)	12 (2.5)	1 (0.2)
Hypothyroidism and diabetes mellitus	27 (5.62)	18 (3.75)	15 (3.12)	6 (1.25)
Hypothyroidism	59 (12.29)	50 (10.41)	36 (7.5)	12 (2.5)
Hypothyroidism and PCOS	24 (5)	17 (3.54)	24 (5)	2 (0.41)
Hypertension and diabetes mellitus	45 (9.37)	29 (6.04)	11 (2.29)	8 (1.66)
Type I diabetes mellitus	15 (3.12)	13 (2.70)	7 (1.45)	2 (0.41)
PCOD	33 (6.87)	24 (5)	33 (6.87)	1 (0.2)
Diabetes mellitus and PCOD	19 (3.95)	10 (2.08)	13 (2.70)	0
Hypertension and hypothyroidism	8 (1.66)	5 (1.04)	3 (0.62)	0
Hyperthyroidism	2 (0.41)	1 (0.2)	0	0
<i>P</i> -value	0.218	0.130	<b>0.001</b>	<b>0.002</b>

\*Physical inactivity: Neither walking nor doing exercise, \* Waist-to-hip ratio: >0.9 in men and >0.85 in women, Test of significance used: Chi-square test. PCOS: Polycystic ovary syndrome, PCOD: Polycystic ovarian disease, Bold:  $P < 0.05$  is significant

compared to male participants (32.29%), which is comparable to the study by Anand *et al.*,<sup>[7]</sup> but different from the study by Negi *et al.*,<sup>[8]</sup> where male participants had a higher percentage of inactivity. The prevalence of a sedentary lifestyle found in our study was 90.6%, of which the majority were female (49.79%), which is considerably less compared to the study done by Bhattacharjee *et al.*,<sup>[4]</sup> where 76.3% of females were leading a sedentary lifestyle. When compared to a study by Shriram *et al.*,<sup>[9]</sup> where the prevalence of obesity was 2.2%, the present study's prevalence of obesity was 11.5%, which is over 5 times higher. In our study, males were more likely to be obese (6.4%) than females (5%), which is in contrast to research by Dahal *et al.*<sup>[10]</sup> and Saxena *et al.*,<sup>[11]</sup> which found that females were more likely to be obese than males.

## CONCLUSION

NCD cases are increasing at an epidemic rate with population growth. According to the present study, Bengaluru city has a significant incidence of risk factors for NCDs. The study population was more likely to lead a sedentary lifestyle and engage in little physical activity, both of which are modifiable risk factors. This needs to be resolved right away by community-based interventions, such as carrying out health education initiatives to raise awareness of the dangers to health and the value of frequent follow-up. The primary health-care services should be strengthened by organising periodic health checkup camps for screening high-risk groups and their management.

## Ethical approval

The Institutional Review Board approval is not required.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

## Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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