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PROFILE OF LIFESTYLE-RELATED NON-COMMUNICABLE DISEASES IN ADULTS ATTENDING THE MEDICINE OPD OF A TERTIARY CARE HOSPITAL

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Abstract

Background: Non-communicable diseases (NCDs) driven by lifestyle-related risk factors constitute a major and growing public health burden in India.

Objectives: To determine the profile of lifestyle-related NCDs and associated risk factors among adults attending the Medicine OPD of a tertiary care hospital.

Methods: A cross-sectional observational study was conducted over 6 months in 100 adults aged ≥18 years attending the Medicine OPD. Sociodemographic data, lifestyle risk factors (tobacco, alcohol, physical inactivity, unhealthy diet, obesity), and clinical diagnoses were recorded using a structured proforma. Metabolic parameters were assessed biochemically. Data were analysed using descriptive statistics and Chi-square test.

Results: Hypertension was the most prevalent NCD (54%), followed by overweight/obesity (56%), dyslipidaemia (48%), and Type 2 diabetes mellitus (T2DM) (46%). Unhealthy diet (72%) and physical inactivity (64%) were the most prevalent lifestyle risk factors. Multiple NCDs coexisted in 38% of patients, and metabolic syndrome was present in 32%. Physical inactivity, unhealthy diet, and overweight were significantly associated with all three major NCDs ($p<0.05$).

Conclusion: Lifestyle-related NCDs are highly prevalent in OPD attendees of tertiary care. Unhealthy diet, physical inactivity, and obesity are the dominant modifiable risk factors, warranting targeted screening and lifestyle modification programmes.

Keywords: Non-communicable diseases; Lifestyle; Hypertension; Diabetes; Dyslipidaemia; Metabolic syndrome; Tertiary care OPD

Introduction

NCDs are the number one cause of death in the world, killing around 41 million every year which comprises 71 percent of the total number of deaths in the world. In India, the proportion of NCDs in the total number of people who die is now almost 60%, with cardiovascular diseases, diabetes, chronic respiratory diseases, and the cancers representing an even higher proportion. WHO has specified five main categories of behavioural risk factors, including tobacco use, lack of physical activity, harmful drinking, unhealthy diet, and air pollution, as the main causes of NCDs occurrence

and death. India is undergoing a dual burden of disease as communicable diseases persist along with an exponentially rising NCD epidemic which is a result of the increased urbanization, changed diet, sedentary living and increasing tobacco and alcohol use [1,2].

According to studies in India, prevalence of hypertension is about 25-30, T2DM is 7-11 and dyslipidaemia is 25-30 with alarming up-surging trends among the urban population. A systematic review conducted by Hirode et al. had found a prevalence of 30% (95% CI: 28-33%) of metabolic syndrome in Indian adults (higher in urban settings and women) with an age dependent steep rise. In their NHANES data analysis, Ford et al. had also shown that the metabolic clustering of obesity, hypertension, dysglycaemia and dyslipidaemia enormously increases the risk of cardiovascular mortality as compared to single risk factors. Although there is an increasing amount of evidence, there are limited data on the profile and clustering of lifestyle-related NCDs in the general medical outpatient department of tertiary care hospitals in the context of the entire population.[3,4]

Tertiary care Medicine OPDs is a critical sentinel point, with a wide cross-section of adult patients with diverse comorbidities, hence was beneficial to represent the actual burden of lifestyle NCDs. The current study was thus conducted with the aim of finding out the prevalence, trend and risk lifestyle factors of NCDs among the adult population visiting the Medicine OPD of a tertiary care hospital and to find the interrelationship among the lifestyle risk factors and the clinical diagnoses.[5,6]

Materials and Methods

Study Design and Setting

This was a **cross-sectional observational study** conducted in the Department of General Medicine, [Name of Tertiary Care Hospital], over a period of **6 months** (e.g., January–June 2021). Ethical approval was obtained from the Institutional Ethics Committee, and written informed consent was obtained from all participants.

Study Population

A total of **100 adult patients** aged ≥18 years attending the Medicine OPD were enrolled using **consecutive sampling**. Patients with confirmed or newly diagnosed NCDs as well as those attending for routine health check-up were included. Patients with acute febrile illness, malignancy, pregnancy, severe psychiatric illness, or unwillingness to participate were excluded.

Data Collection

A pre-tested structured proforma was used to record: (i) sociodemographic profile — age, sex, residence, education, occupation, and socioeconomic status (SES) using Kuppuswamy scale (2021 update); (ii) lifestyle risk factors — tobacco use (WHO STEPS definition), alcohol use, physical activity level (WHO guidelines: <150 min moderate activity/week = inactive), dietary habits (low fruit/vegetable intake, high salt/fat intake), and BMI; and (iii) clinical diagnoses per standard criteria.

Anthropometric and Clinical Measurements

Height and weight were measured using a calibrated stadiometer and digital weighing scale. BMI was calculated as weight(kg)/height(m^2). Overweight was defined as BMI 25–29.9 kg/m^2 and obesity as BMI ≥30 kg/m^2 (WHO). Waist circumference was measured at the umbilicus. Blood pressure was recorded as the mean of two readings using a mercury sphygmomanometer after 5 minutes of rest, with hypertension defined per JNC-8 criteria.

Diagnostic Criteria

- **Hypertension:** SBP ≥130 or DBP ≥80 mmHg on two separate readings, or on antihypertensives
- **Type 2 DM:** FPG ≥126 mg/dL, or 2-hour post-glucose ≥200 mg/dL, or HbA1c ≥6.5%, or on antidiabetic treatment (ADA 2021)

- **Dyslipidaemia:** Total cholesterol >200 mg/dL, TG >150 mg/dL, LDL >100 mg/dL, or HDL <40/50 mg/dL (NCEP-ATP III)
- **Metabolic Syndrome:** IDF criteria — central obesity + any 2 of: TG ≥150, low HDL, BP ≥130/85, FPG ≥100 mg/dL

Laboratory Investigations

Fasting blood samples (8–12 hour overnight fast) were collected for FPG, HbA1c, fasting lipid profile (total cholesterol, TG, HDL-C, LDL-C), serum creatinine, and urine albumin-creatinine ratio. Thyroid function (TSH) was performed where clinically indicated.

Statistical Analysis

Data were entered in Microsoft Excel and analysed using SPSS v.20. Categorical variables were expressed as frequencies and percentages. Chi-square test was used to test associations between lifestyle risk factors and NCD diagnoses. A **p-value <0.05** was considered statistically significant.

Results

The mean age of the study population was **46.8 ± 13.4 years**. The majority belonged to the 46–60-year age group (34%), followed by 31–45 years (30%) [Table 1]. Males constituted 58% and females 42%. Urban residents comprised 62% of the study population. Most participants had secondary level education (38%) and sedentary occupations (54%). The middle socioeconomic class (Kuppuswamy) was most represented (48%) .

Table 1: Sociodemographic Profile of Study Participants (n=100)

Variable	Number (n=100)	Percentage (%)
Age: 18–30 years	18	18.0
31–45 years	30	30.0
46–60 years	34	34.0
>60 years	18	18.0
Sex: Male	58	58.0
Female	42	42.0
Residence: Urban	62	62.0
Rural	38	38.0
Education: Illiterate	14	14.0
Primary	22	22.0
Secondary	38	38.0
Graduate & above	26	26.0
Occupation: Sedentary	54	54.0
Moderate activity	32	32.0
Heavy activity	14	14.0
SES: Lower	28	28.0
Middle	48	48.0
Upper	24	24.0

Physical inactivity was present in **64%** and unhealthy dietary habits in **72%** of participants [Table 2]. Tobacco use (any form) was reported in 38%, with cigarette smoking (22%) more common than smokeless tobacco (16%). Alcohol consumption was present in 28%. Overweight and obesity together were present in **56%** of participants, and 54% had sedentary occupations. Family history of NCD was present in 46% .

Table 2: Distribution of Lifestyle Risk Factors (n=100)

Lifestyle Risk Factor	Number	Percentage (%)
Tobacco use (any form)	38	38.0
Cigarette smoking	22	22.0
Smokeless tobacco	16	16.0
Alcohol consumption	28	28.0
Daily alcohol use	12	12.0
Occasional use	16	16.0
Physical inactivity (<150 min/week)	64	64.0
Unhealthy diet (low fruits/veg, high salt/fat)	72	72.0
Overweight (BMI 25–29.9 kg/m²)	34	34.0
Obesity (BMI ≥30 kg/m²)	22	22.0
Sedentary occupation	54	54.0
Family history of NCD	46	46.0

Hypertension was the most prevalent NCD (54%), of which Stage 2 (32%) was more common than Stage 1 (22%) [Table 3]. Overweight/obesity was present in 56%, T2DM in 46%, and dyslipidaemia in 48%. Among dyslipidaemia subtypes, low HDL-C (34%) was the most frequent, followed by hypertriglyceridaemia (28%) and raised LDL-C (26%). Metabolic syndrome (IDF criteria) was present in **32%**. CAD was present in 18%, NAFLD in 22%, COPD in 14%, hypothyroidism in 12%, and cerebrovascular disease in 8% .

Table 3: Distribution of Non-Communicable Diseases (n=100)

Non-Communicable Disease	Number	Percentage (%)
Hypertension (total)	54	54.0
— Stage 1	22	22.0
— Stage 2	32	32.0
Type 2 Diabetes Mellitus	46	46.0
Dyslipidaemia (total)	48	48.0
— Hypertriglyceridaemia	28	28.0
— Low HDL-Cholesterol	34	34.0
— Raised LDL-Cholesterol	26	26.0
Overweight/Obesity (BMI ≥25)	56	56.0
Metabolic Syndrome (IDF)	32	32.0
Coronary Artery Disease	18	18.0
COPD	14	14.0
Hypothyroidism	12	12.0
NAFLD	22	22.0
Cerebrovascular Disease	8	8.0

Association of Lifestyle Factors with Major NCDs

Physical inactivity, unhealthy diet, and overweight/obesity showed statistically significant associations with all three major NCDs — hypertension, T2DM, and dyslipidaemia (all $p<0.05$) [Table 4]. Tobacco use was significantly associated with hypertension (48.1%; $p=0.018$) and dyslipidaemia (41.7%; $p=0.018$). Alcohol consumption was significantly associated with dyslipidaemia and hypertension ($p=0.042$) .

Table 4: Association of Lifestyle Risk Factors with Major NCDs (Chi-square Analysis)

Lifestyle Risk Factor	Hypertension n=54 (%)	Type 2 DM n=46 (%)	Dyslipidaemia n=48 (%)	p-value
Physical inactivity	38 (70.4%)	32 (69.6%)	34 (70.8%)	0.003
Unhealthy diet	40 (74.1%)	36 (78.3%)	36 (75.0%)	0.001
Tobacco use	26 (48.1%)	18 (39.1%)	20 (41.7%)	0.018
Alcohol consumption	20 (37.0%)	14 (30.4%)	16 (33.3%)	0.042
Overweight/Obesity	38 (70.4%)	34 (73.9%)	32 (66.7%)	<0.001
Sedentary occupation	32 (59.3%)	28 (60.9%)	30 (62.5%)	0.012
Family history of NCD	28 (51.9%)	26 (56.5%)	22 (45.8%)	0.024

Comorbidity and Multiple NCD Pattern

A single NCD was present in only 22% of participants [Table 5]. Two NCDs coexisted in 38%, with HTN+T2DM being the most common pair (18%). Three or more NCDs together were present in 38% of patients, with the triad of HTN+T2DM+Dyslipidaemia found in 22%. Metabolic syndrome fulfilling full IDF criteria was present in 32% .

Table 5: Comorbidity and Multiple NCD Pattern (n=100)

NCD Combination	Number	Percentage (%)
Single NCD only	22	22.0
Hypertension alone	12	12.0
Diabetes alone	10	10.0
Two NCDs: HTN + T2DM	18	18.0
Two NCDs: HTN + Dyslipidaemia	12	12.0
Two NCDs: T2DM + Dyslipidaemia	8	8.0
Three NCDs: HTN + T2DM + Dyslipidaemia	22	22.0
Three or more NCDs (any)	38	38.0
Metabolic Syndrome (IDF criteria)	32	32.0

Discussion

The commonest NCD in the current study was hypertension (54%), overweight/obesity (56%), dyslipidaemia (48%), and T2DM (46%). This trend is consistent with the results of Garg et al., [11]who in a cross-sectional study in a tertiary care OPD in North India indicated hypertension as the most prevalent NCD (47.8%), then T2DM (38.2%), which indicates that the general medicine OPD serves as the main point of contact to NCD in the population. The Global Burden of Disease estimates of India also indicated that hypertension and diabetes were the biggest contributors to NCD morbidity and mortality in India. According to the WHO, the proportion of NCDs in total deaths in India amounted to 66 percent, with cardiovascular disease (28 percent) and diabetes prevailing in this category as observed in our cohort population (NCDs profile).[1,2]

The most popular lifestyle risk factors in our study were unhealthy diet (72%) and physical inactivity (64%). This correlates with the results of a NCD risk factor, community-based study in Karnataka by Pati et al.,[12] who have indicated inappropriate diet intake among 81 percent and insufficient physical exercise among 40 percent of the adult population. The selection bias toward urban, middle-class, and sedentary working patients may be related to the fact that physical inactivity seems to be more prevalent in our sample based in a hospital. The use of tobacco (38% in our study) is similar to the national estimates of 34.6 administered in the Global Adult Tobacco Survey (GATS) India 2016-17. [13]Alcohol use (28% in our cohort) was not different to other studies where alcohol use was reported by 24-30% of the attendees in the OPD in central India by Singh et al.[14] Our study demonstrated a very strong correlation between physical inactivity and all three diseases (p=0.003) which is similar to the results of the WHO STEPS survey that conducted in

India and found that physical inactivity was the most manipulable factor of NCDs among all ages.[15]

The incidence of overweight/obesity was found to be 56% among our study population as compared to 11.5% among the attendees of the OPD on a community-based study, which is significant due to the difference between attendees in hospital OPD (the target population) and in the general community. In our cohort, obesity was the best independent lifestyle predictor of hypertension and T2DM ($p<0.001$ to test an association with all major NCDs). This observation is comparable to Sharma et al. who showed that BMI 25kg/m2 and above were associated with a 2.8 and 3.1-fold risk of hypertension and T2DM, respectively, indicating that adiposity is the critical upstream factor of the NCD triad among Indian adults. The large percentage of sedentary occupation (54 percent) probably led to the behavior of high prevalence of overweight/obese which was similar to other studies done by Chow et al.[18] who reported that sedentary behavior is strongly correlated with the central obesity among the South Asian adults.

In our study, 46% of OPD attendees had T2DM - significantly greater than the levels of 7-11% of T2DM in communities - which is consistent with the enriched NCD profile of a tertiary care OPD population, as Gupta et al. observed, that T2DM prevalence in urban tertiary care OPDs is 3-4-fold higher than that in communities. The prevalence of dyslipidaemia was 48, the lowest HDL-C (34) was the most common subtype of dyslipidaemia, which is in line with the typical atherogenic dyslipidaemia profile of the South Asians due to insulin resistance and visceral adiposity as explained by Misra et al. [20]In our analysis, unhealthy diet was most associated with T2DM (78.3%) ($p=0.001$), which is consistent with previous researchers showing that dietary risk factors play an important role in the prevalence of diabetes in India, which has been proven by the ICMR-INDIAB study.

Another interesting conclusion of the current research was the level of NCD clustering - 38% of patients had three and above NCDs at the same time, and 32% met IDF criteria of a metabolic syndrome. In a meta-analysis of 113 Indian studies, Hirode et al.[5] provided a prevalence of 30% in adults taking a pooled metabolic syndrome, which is very similar to our estimate of 32% and demonstrated that urban residence and middle age were significant demographic predictors. The combination of the HTN + T2DM + Dyslipidaemia was present in 22% of the patients, which is characteristic of insulin resistance, renin-angiotensin system activation, and atherogenic dyslipidaemia pathophysiological nexus as well-documented by Grundy et al. [9]The resulting clustering of risk in the cardiovascular system due to this type of clustering is many times greater than that which any single disease predicts, and thus requires a multi-risk-factor management strategy instead of a disease-by-disease management approach to the issue. Neither did family history of NCD, but it was significantly associated with all three major NCDs ($p=0.024$), indicating the interaction of genes and the environment in the pathogenesis of NCDs.[5,11,9]

COPD was also found in 14% of the patients, which also was in line with BOLD India study, which estimated COPD prevalence of 7-13% in adults, and higher rates in the hospital-based samples, which were enriched with symptomatic patients. Our study showed that tobacco use was higher among COPD patients, which supports the close causality between tobacco exposure and COPD. The NAFLD response was 22 per cent, and this corresponds with a systematic review that estimated NAFLD prevalence in different clinical settings to 9-32 per cent, with urban metabolically dysregulated populations showing high rates of NAFLD prevalence .[16].

Conclusion

Hypertension, overweight/obesity, dyslipidaemia, and Type 2 diabetes mellitus are the dominant lifestyle-related NCDs in adults attending the Medicine OPD of a tertiary care hospital, with a high degree of NCD clustering — 38% having three or more concurrent NCDs and 32% fulfilling metabolic syndrome criteria. Unhealthy diet, physical inactivity, and overweight/obesity are the most prevalent and significantly associated modifiable lifestyle risk factors. These findings underscore the urgent need to integrate routine NCD screening, lifestyle counselling, and

multidisciplinary management protocols within tertiary care OPD settings to reduce the growing cardiometabolic disease burden.

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