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Prevalence and Patterns of Multisystem Morbidity in Elderly Urban Population of a Tier-2 Indian City: A Cross-Sectional Community-Based Study.

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ABSTRACT:

Background:

India is experiencing rapid population aging, with a growing concentration of elderly individuals in urban areas. Tier-2 cities, in particular, are expanding quickly but often lack adequately developed geriatric health services. Despite this, community-based evidence on the burden of multisystem morbidity among the urban elderly in these settings continues to be scarce.

Objectives:

To estimate the prevalence of cardiovascular, respiratory, cognitive, and psychological morbidities and to examine their sociodemographic distribution among community-dwelling elderly individuals in a Tier-2 Indian city.

Methods:

A community-based cross-sectional study was conducted among 180 individuals aged 60 years and above, selected using stratified random sampling from urban wards. Data collection included sociodemographic and lifestyle information, physiological assessments (blood pressure, anthropometry, spirometry, and electrocardiography), cognitive screening using the Mini-Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA), and psychological assessment using the General Health Questionnaire-12 (GHQ-12). Data were analysed using descriptive statistics and appropriate inferential tests.

Results:

The mean age of participants was 72.4 ± 8.1 years, and 51.7% were female. Hypertension was observed in 70.0% of participants, with 46.7% having uncontrolled blood pressure. The prevalence of chronic obstructive pulmonary disease was 17.1%, cognitive impairment 26.5%, and psychological morbidity (GHQ-12 ≥ 3) 33.3%. Multimorbidity, defined as the presence of two or more chronic conditions, was

present in 58.9% of participants. Increasing age was significantly associated with higher systolic blood pressure and worsening respiratory parameters. Psychological morbidity was more common among females and those belonging to lower socioeconomic strata.

Conclusion:

A substantial burden of multisystem morbidity and multimorbidity exists among the elderly population in Tier-2 urban settings in India. These findings highlight the need for integrated, accessible, and preventive geriatric health services tailored to rapidly urbanizing non-metropolitan cities.

Keywords: Elderly, Aging, Multimorbidity, Prevalence, Tier-2 City, Urban Health

INTRODUCTION:

Population aging has become one of the most significant demographic changes of the 21st century, with far-reaching implications for health systems worldwide [1]. Unlike high-income countries, where population aging occurred gradually over several decades, low- and middle-income countries such as India are experiencing a much faster transition. This phenomenon, often described as a “compressed demographic transition,” has resulted in countries aging before achieving comparable economic growth and health system preparedness [2]. India currently has one of the largest elderly populations globally and is projected to have nearly 300 million individuals aged 60 years and above by 2050 [3].

This demographic shift is occurring alongside an ongoing epidemiological transition. While communicable diseases remain relevant, non-communicable diseases (NCDs) now account for a substantial and increasing share of morbidity and mortality, particularly among older adults [4]. In this age group, multimorbidity—the coexistence of two or more chronic conditions—has become increasingly common and is associated with functional decline, poor quality of life, increased healthcare utilization, and higher mortality [5]. Data from the Longitudinal Ageing Study in India (LASI) indicate that nearly half of the Indian elderly population lives with multimorbidity [6].

Most geriatric health research and service planning in India has traditionally focused on either metropolitan cities or rural populations. In contrast, Tier-2 cities—defined by their rapidly growing populations and expanding urban footprints—have received relatively limited attention. These cities are experiencing rapid urbanization and lifestyle changes but often lack well-developed, age-friendly healthcare infrastructure and social support systems [7]. Elderly residents in such settings are therefore exposed to urban risk factors, including physical inactivity, dietary changes, and environmental pollution, without consistent access to specialized geriatric care [8].

Existing evidence on elderly morbidity in India is largely derived from hospital-based studies or investigations focusing on single disease conditions, which limits their applicability to community settings [9,10]. Moreover, few studies have examined cardiovascular, respiratory, cognitive, and psychological morbidities together, despite their frequent co-occurrence and shared determinants in older adults. This lack of integrated community-level data from Tier-2 cities poses a significant barrier to evidence-based planning of geriatric health services.

In this context, the present study was undertaken to provide a comprehensive, community-based assessment of major age-related morbidities among elderly individuals residing in a Tier-2 Indian city. By estimating the prevalence of key chronic conditions and examining their sociodemographic

correlates, this study aims to generate locally relevant evidence to support the development of integrated and responsive geriatric healthcare strategies in rapidly urbanizing settings.

MATERIALS AND METHODS:

2.1 Study Design and Setting:

This was a community-based, cross-sectional, descriptive study conducted between January 2024 and June 2024 in a Tier-2 city. The city was purposively selected for its representative urban characteristics, including a mix of planned residential areas, slums, and transitional zones.

2.2 Study Population and Sampling:

The target population was individuals aged 60 years and above residing in selected urban wards. A multistage random sampling strategy was employed:

Stage 1: Two administrative wards (one slum, one non-slum) were randomly selected from the municipal corporation list.

Stage 2: From each ward, 90 elderly individuals were selected using a systematic random sampling method.

The sample size was calculated as **180**, based on an expected prevalence of morbidity of **65%**, a **95% confidence level**, and **10% relative precision**.

2.3 Eligibility Criteria:

Inclusion Criteria:

1. Age ≥ 60 years
2. Permanent resident of the selected ward for ≥ 6 months
3. Able to provide informed consent
4. Mentally oriented to understand questions

Exclusion Criteria:

1. Bedridden or terminally ill
2. Unwilling to participate

2.4 Data Collection Tools and Procedures:

Data were collected by a trained team of investigators and health workers. The assessment lasted approximately **60–90 minutes per participant** and included:

1. Socio-Demographic and Lifestyle Questionnaire:

A pretested structured questionnaire collected information on:

- Age
- Gender
- Education
- Occupation
- Income
- Marital status
- Living arrangement
- Lifestyle factors (diet, physical activity, sleep, tobacco/alcohol use)

2. Physiological Assessments:

Blood Pressure & Heart Rate:

Measured using a calibrated digital sphygmomanometer (Omron HEM-7120) in a seated position after 5 minutes of rest. Two readings were taken 5 minutes apart; the average was recorded.

Anthropometry:

Height and weight were measured using a stadiometer and digital scale to calculate Body Mass Index (BMI).

Spirometry:

Performed using a portable spirometer (Contec SP10) according to ATS/ERS guidelines to measure:

- Forced Expiratory Volume in 1 second (FEV1)
- Forced Vital Capacity (FVC)
- FEV1/FVC ratio

Electrocardiography (ECG):

A standard 12-lead resting ECG was performed using a portable ECG machine (BPL Cardiart 6108T).

3. Cognitive Assessment:

The Mini-Mental State Examination (MMSE, score 0–30) and the Montreal Cognitive Assessment (MoCA) were used.

The **Montreal Cognitive Assessment (MoCA, score 0–30)** was administered in the local language. A score of **<24 on MMSE** and **<26 on MoCA** was considered indicative of cognitive impairment [11,12].

4. Psychological Assessment:

The **12-item General Health Questionnaire (GHQ-12)** was used with Likert scoring (0–1–2–3). A total score of ≥ 3 was used to indicate the likelihood of psychological morbidity [13].

2.5 Data Management and Statistical Analysis:

Data were coded, cleaned, and analysed using **SPSS version 25.0** following initial entry and verification.

Descriptive statistics were presented as **mean $\pm$ standard deviation (SD)** for continuous variables and **frequency (percentage)** for categorical variables.

Prevalence rates were calculated with **95% confidence intervals (CI)**. Group comparisons were made using the **Chi-square test** for categorical variables and **ANOVA or independent t-test** for continuous variables.

Statistical significance was assessed using a **two-sided p-value threshold of <0.05** .

2.6 Ethical Considerations:

The study protocol was approved by the **Institutional Ethics Committee**.

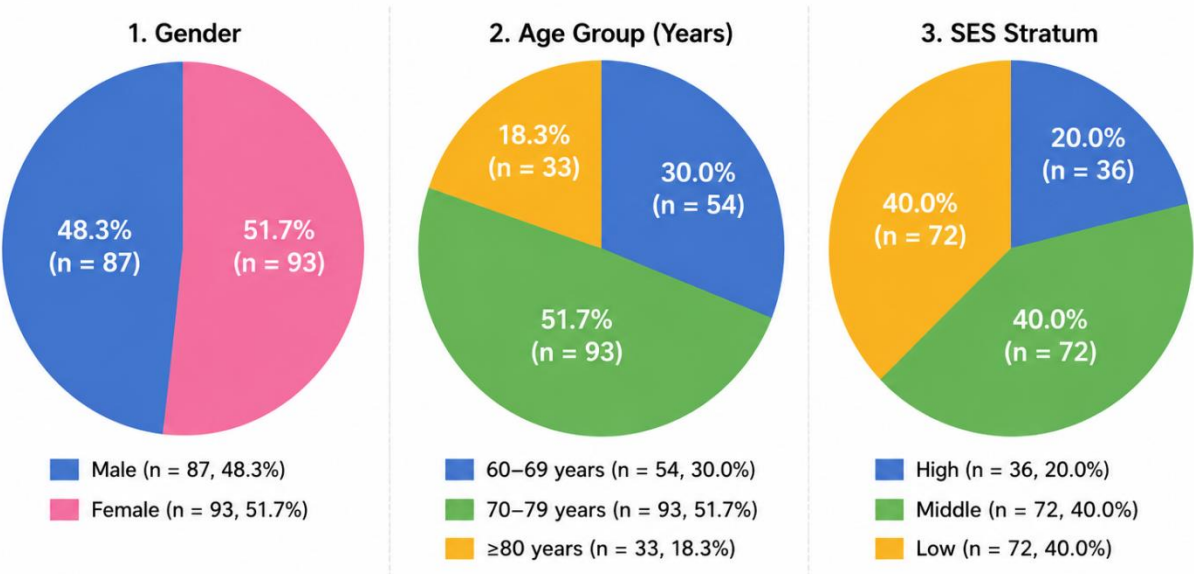
RESULTS:

A total of **180 elderly individuals participated**, achieving the target sample size across all strata (Table 1). The mean age was **72.4 $\pm$ 8.1 years**. There was a slight female predominance (**51.7%**). A significant proportion had low education, with **23.3% being illiterate** and only **20.0% having graduate-level education**. Widowhood was prevalent (**30.0%**), and **16.7% lived alone**. Economic vulnerability was notable, with **40.0% belonging to the low SES stratum**.

Table 1: Stratified Distribution of Participants by Age, Gender, and Socioeconomic Status (SES) (n=180)

Characteristic	Category	n	%
Gender	Male	87	48.3
	Female	93	51.7
Age Group	60–69 years	54	30.0
	70–79 years	93	51.7
	≥ 80 years	33	18.3
SES Stratum	High	36	20.0
	Middle	72	40.0
	Low	72	40.0

Distribution of Participants by Demographic Characteristics (N = 180)



Summary (N = 180)

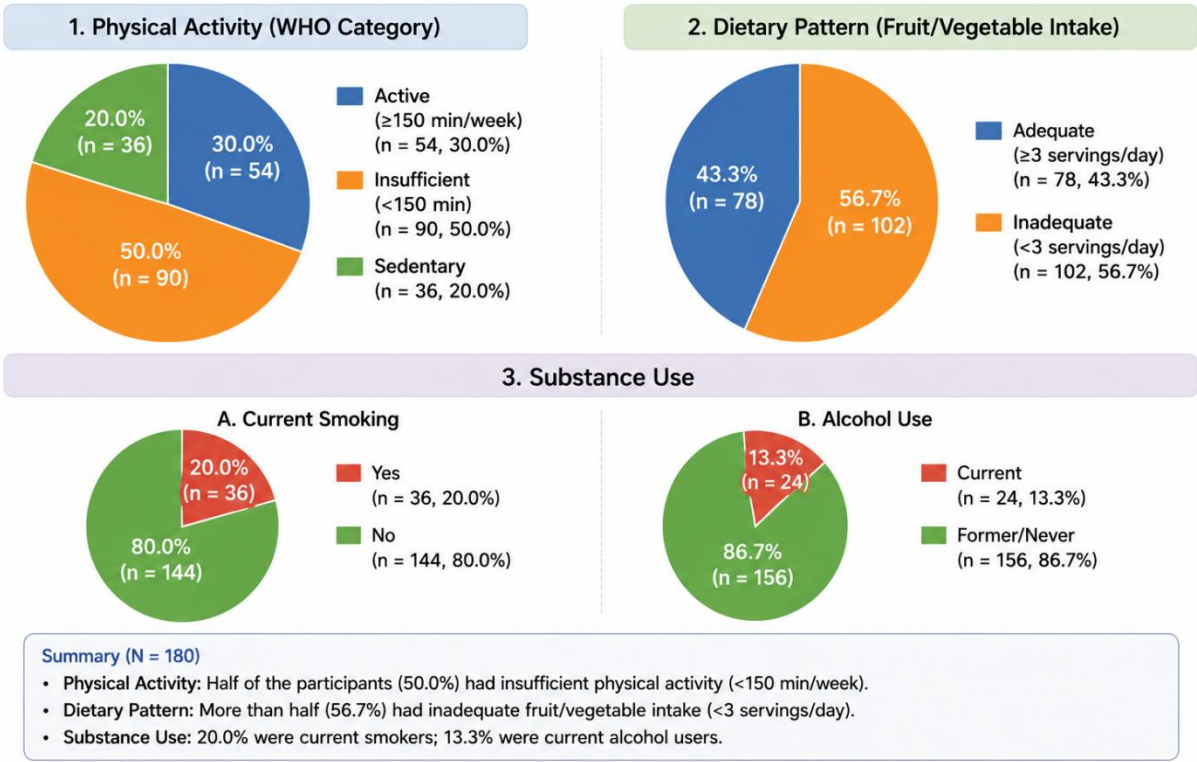
- Gender: Females (51.7%) slightly more than Males (48.3%).
- Age Group: Majority (51.7%) were 70–79 years, followed by 60–69 years (30.0%) and ≥80 years (18.3%).
- SES Stratum: Equal proportion (40.0%) belonged to Middle and Low stratum; 20.0% were from High stratum.

Unhealthy lifestyle patterns were common (Table 2). Only **30.0% met WHO physical activity recommendations (≥150 min/week)**, while **50.0% were insufficiently active** and **20.0% sedentary**. Dietary intake of fruits/vegetables was inadequate (<3 servings/day) in **56.7%** of participants. Current tobacco use was reported by **20.0% (predominantly men)**, and **13.3% reported current alcohol use**.

Table 2: Lifestyle Factors and Health Behaviours (n=180)

Lifestyle Domain	Indicator	Category/Value	n	%
Physical Activity	WHO Category	Active (≥150 min/week)	54	30.0
		Insufficient (<150 min)	90	50.0
		Sedentary	36	20.0
Dietary Pattern	Fruit/Vegetable Intake	Inadequate (<3 servings/day)	102	56.7
		Adequate (≥3 servings/day)	78	43.3
Substance Use	Current Smoking	Yes	36	20.0
		No	144	80.0
	Alcohol Use	Current	24	13.3
		Former/Never	156	86.7

Distribution of Participants by Lifestyle Domain Indicators (N = 180)

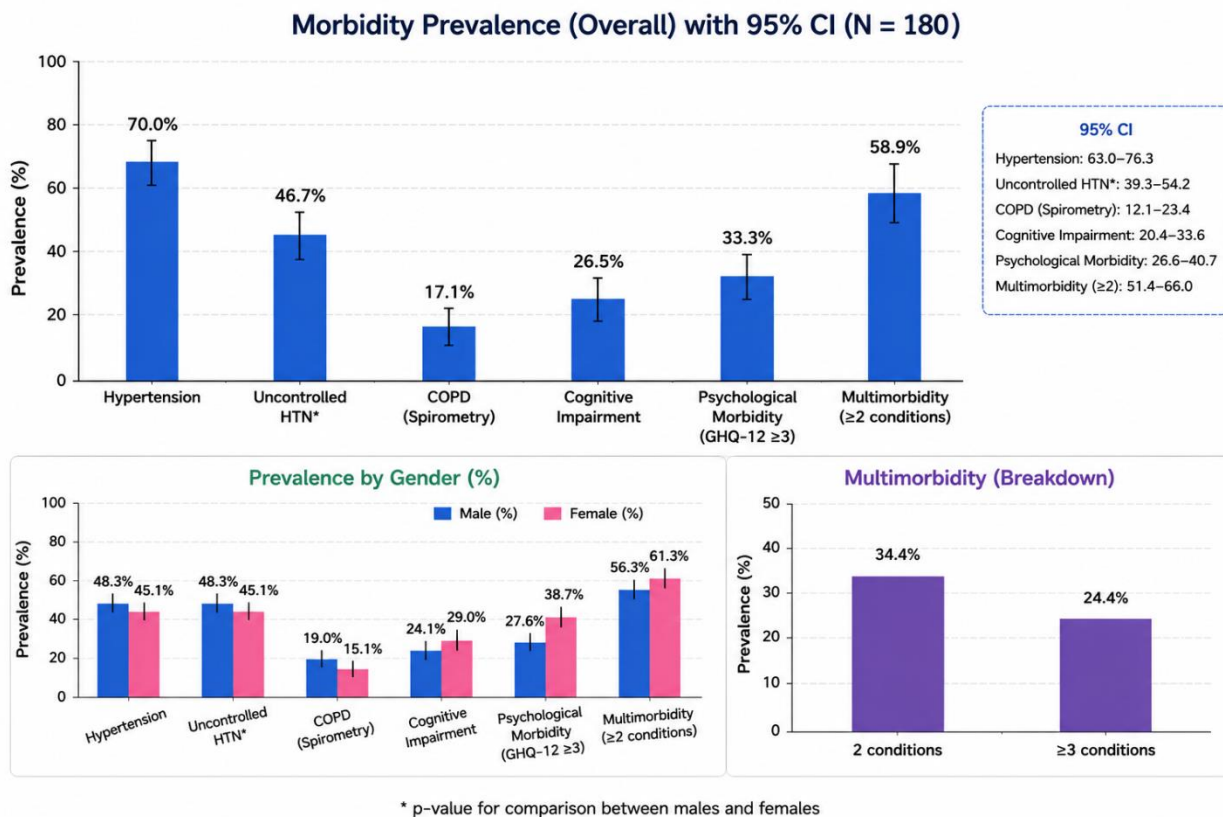


The overall burden of morbidity was high (Table 3). Hypertension was the most prevalent condition, affecting **126 participants (70.0%, 95% CI: 63.0–76.3)**. Among these, only **23.3% had controlled blood pressure**, while **46.7% of the total sample had uncontrolled hypertension**. The mean systolic blood pressure was **142.6 ± 18.3 mmHg**, with a significant age-related increase (**p-trend <0.001**). Obstructive hypotension was present in **16.7%**.

Table 3: Prevalence of Key Morbidities among Study Participants (n=180)

Morbidity	Overall Prevalence n (%)	95% CI	Male (%)	Female (%)	p-value*
Hypertension	126 (70.0)	63.0–76.3	48.3	45.1	0.607
Uncontrolled HTN*	84 (46.7)	39.3–54.2	48.3	45.1	0.607
COPD (Spirometry)	31 (17.1)	12.1–23.4	19.0	15.1	0.483
Cognitive Impairment	48 (26.5)	20.4–33.6	24.1	29.0	0.456
Psychological Morbidity (GHQ-12 ≥3)	60 (33.3)	26.6–40.7	27.6	38.7	0.112
Multimorbidity (≥2 conditions)	106 (58.9)	51.4–66.0	56.3	61.3	0.502
2 conditions	62 (34.4)	27.7–41.8	—	—	—
≥3 conditions	44 (24.4)	18.5–31.4	—	—	—

*Chi-square test for gender difference.



DISCUSSION:

The present study offers community-level evidence on the health profile of older adults residing in a Tier-2 Indian city and highlights the extent to which chronic conditions cluster in this population. The observed pattern of multisystem morbidity reflects the growing mismatch between the health needs of the urban elderly and the capacity of existing healthcare services in non-metropolitan settings.

Hypertension was identified as the most prevalent condition, affecting **70.0% of participants**, with nearly half of the study population having uncontrolled blood pressure. This prevalence is higher than estimates reported by the **Longitudinal Ageing Study in India (LASI)**, which documented hypertension prevalence of approximately **60% among older adults [6]**. The higher burden observed in the present study may be attributed to urban lifestyle factors such as:

- physical inactivity
- dietary transition
- psychosocial stress
- suboptimal long-term follow-up for chronic disease management

The large proportion of uncontrolled hypertension highlights gaps not only in detection but also in treatment adherence, monitoring, and continuity of care at the primary healthcare level.

Respiratory morbidity, as assessed objectively using spirometry, was also considerable, with **17.1% of participants meeting criteria suggestive of chronic obstructive pulmonary disease**. This estimate is comparable to other Indian community-based studies among middle-aged and elderly populations [17,18].

While smoking remains a major risk factor, the contribution of non-smoking-related exposures such as:

- indoor biomass fuel use
- ambient urban air pollution

is likely substantial, particularly among individuals from lower socioeconomic strata. These findings emphasize the need for routine respiratory screening in elderly populations, which is rarely prioritized in primary care settings.

More than one-quarter of participants screened positive for cognitive impairment, a prevalence similar to that reported in other community-based Indian studies using screening instruments such as **MMSE and MoCA [20]**. Cognitive decline often remains under-recognized in routine clinical practice, especially in resource-limited settings, where symptoms may be mistakenly attributed to “normal aging.” Early identification through simple screening tools at the community level could allow timely referral and supportive interventions aimed at preserving functional independence.

Psychological morbidity was identified in **one-third of participants** and showed higher prevalence among:

- females
- those living alone
- individuals belonging to lower socioeconomic groups

This finding underscores the strong influence of social and economic determinants on mental health in later life. Loneliness, financial insecurity, and reduced social participation are common yet under-addressed challenges among the urban elderly and may substantially worsen overall health outcomes if left unrecognized [21].

A key observation of this study is the high prevalence of **multimorbidity**, affecting nearly **59% of the elderly population**. This aligns with national data from **LASI** and other studies highlighting multimorbidity as a dominant feature of aging in India [6,22]. The coexistence of multiple chronic conditions complicates clinical management, increases healthcare utilization, and places significant strain on individuals, caregivers, and health systems. These findings call into question the adequacy of disease-specific, specialist-oriented models of care and support the need for integrated, person-centered approaches to geriatric health management.

The results of this study should be interpreted considering certain limitations. The cross-sectional design limits causal inference, and findings from a single Tier-2 city may not be generalizable to all urban settings in India. Additionally, cognitive and psychological assessments were based on screening tools rather than diagnostic evaluations. Nevertheless, the study has several strengths including:

- community-based design
- stratified sampling approach

- use of objective physiological measurements
- focus on an under-represented yet rapidly expanding urban elderly population

CONCLUSION:

The present study demonstrates a **high and interrelated burden of chronic morbidities among elderly individuals residing in a Tier-2 Indian city**. Hypertension, respiratory impairment, cognitive decline, and psychological morbidity were common, with multimorbidity affecting nearly **six out of ten participants**.

The substantial proportion of uncontrolled hypertension and unrecognized mental health concerns points to important gaps in current geriatric care delivery at the community level.

RECOMMENDATIONS:

Urban **Primary Health Centres in Tier-2 cities** should conduct annual health check-ups for elderly patients that include:

- Blood pressure measurement
- Basic lung function tests
- Memory screening
- Mental health assessment

Primary care doctors need mandatory continuing medical education training on:

- Geriatric assessment techniques
- Multimorbidity management

Community-based **“Healthy Ageing Hubs”** should be established in urban wards to offer:

- Group yoga sessions
- Walking sessions
- Simple nutrition advice
- Social activities for seniors

Clear referral pathways must connect community screening findings to district-level geriatric clinics for specialized care when needed.

Ethical Permission:

Ethical permission taken from **Institutional Ethics Committee**

REFERENCES

1. United Nations. **World Population Prospects 2022**. New York: UN; 2022.
2. Bloom DE, et al. **Population ageing: facts, challenges, and responses**. Lancet. 2015;385:649–57.
3. Longitudinal Ageing Study in India (LASI) Wave 1. International Institute for Population Sciences. 2020.
4. Patel V, et al. **Research priorities for prevention and control of NCDs in India**. Indian J Med Res. 2011;134:61–8.
5. Ankomah P, et al. **Multimorbidity in Indian elderly: LASI evidence**. BMJ Open. 2021;1:e050545.
6. LASI Wave 1, 2020 (as above).
7. Srivastava K, et al. **Urban health challenges for elderly in India**. J Geriatr Care Res. 2019;6(2):43–9.
8. Ingle GK, et al. **Evaluation of NPHCE implementation**. Indian J Public Health. 2013;57:68–74.
9. Maniyara K, et al. **Prevalence of hypertension in elderly Indians**. Indian J Community Med. 2023;48:210–5.
10. Jindal SK, et al. **COPD prevalence in India**. Chest. 2012;142:417–54.
11. Folstein MF, et al. **Mini-mental state**. J Psychiatr Res. 1975;12(3):189–98.
12. Nasreddine ZS, et al. **The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment**. Am Geriatr Soc. 2005;53(4):695–9.
13. Goldberg DP, et al. **The validity of two versions of the GHQ in the WHO study of mental illness in general health care**. Psychol Med. 1997;27(1):191–7.
14. Williams B, et al. **2018 ESC/ESH Guidelines for the management of arterial hypertension**. Eur Heart J. 2018;39(33):3021–104.
15. Global Initiative for Chronic Obstructive Lung Disease. **Global Strategy for Diagnosis, Management, and Prevention of COPD – 2023 Report**.