e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2025; 17(9); 874-879

Original Research Article

# Multimorbidity Patterns in Elderly Diabetes, Hypertension, COPD, Depression

**Gamit Jyotiben Rakeshbhai[1], Siddharth Natvarlal Parikh[2], Patel Harshitakumari Champakbhai[3]**

[1]MBBS, Government Medical College, Bhavnagar, Gujarat, India
[2]MBBS, GCS Medical College, Ahmedabad, Gujarat, India
[3]MBBS, GMERS Medical College, Valsad, Gujarat, India

**Received: 21-07-2025 / Revised: 20-08-2025 / Accepted: 21-09-2025**
**Corresponding Author: Siddharth Natvarlal Parikh**
**Conflict of interest: Nil**

**Abstract:**

**Background:** Multimorbidity, or the coexistence of two or more chronic diseases, is increasing in the elderly population. Diabetes mellitus, Hypertension, chronic obstructive pulmonary disease (COPD), and Depression are some of the most prevalent and incapacitating diseases in this group. These comorbid diseases interact to exacerbate functional impairment, lower quality of life, and add to the healthcare burden. Recognizing patterns of multimorbidity is crucial in designing coordinated, patient-focused care strategies.

**Objectives:** To determine the prevalence and multimorbidity patterns among older patients, with an emphasis on the co-morbidity of diabetes, Hypertension, COPD, and Depression, and to identify the most common patterns to guide clinical and public health interventions.

**Materials and Methods:** A cross-sectional survey was conducted among 217 elderly patients. Information on sociodemographic factors and the presence of chronic diseases was obtained through clinical evaluations and validated questionnaires. The prevalence of individual conditions and prevalent multimorbidity patterns was calculated using descriptive statistics.

**Results:** The most common conditions were Hypertension (87.6%) and diabetes mellitus (73.7%), followed by COPD (50.7%) and Depression (43.8%). The most common multimorbidity combinations were diabetes and Hypertension (39.2%), Hypertension and Depression (27.6%), diabetes and COPD (18.4%), and all four conditions (14.7%). Overlaps involving cardiometabolic and psychiatric conditions were especially prevalent and reflect the additive burden of disease and mental illness.

**Conclusion** Multimorbidity is very common among older people, with cardiometabolic and mental health disorders clustering most notably. These results underscore the importance of integrated care practices that address both physical and psychological well-being to optimize treatment, reduce hospitalization, and improve the quality of life in older age groups.

**Keywords:** Multimorbidity, Elderly, Diabetes, Hypertension, COPD, Depression.



## Introduction

Multimorbidity, or the coexistence of two or more chronic conditions in an individual, is increasingly recognized as a significant issue in contemporary healthcare. Population aging and improvements in healthcare have enabled older people to live longer, but with several comorbid diseases that make them more challenging to manage [1]. Some of the most prevalent and debilitating diseases in the elderly include diabetes mellitus, Hypertension, chronic obstructive lung disease (COPD), and depression [2]. Each of these conditions, when isolated, results in a significant amount of morbidity and a poor quality of life. Still, when they coexist, their interactions produce a compounded clinical situation that strains patients, caregivers, and healthcare systems. Appreciation of the modes in which these conditions cluster is critical to designing combined care approaches responsive to the individualized needs of the elderly [3].

Diabetes and Hypertension often coexist, having overlapping risk factors like obesity, physical inactivity, and eating habits. This co-morbidity is especially troublesome because the two diseases synergize to expedite vascular injury and thus enhance the risk of cardiovascular events, renal impairment, and death [4]. When COPD is included in this equation, the load is doubled. COPD, a chronic respiratory illness, restricts physical function and oxygenation, further complicating the management of diabetes and Hypertension [5].

Exercise tolerance is limited, which may exacerbate insulin resistance and blood pressure, and drugs prescribed in COPD, like corticosteroids, adversely influence glycemic control. The three conditions thus form a pattern that is physiologically intertwined, accelerating frailty and disability in the elderly [6].

Depression, which can be underdiagnosed in the elderly, becomes an essential co-morbidity that both complicates and is complicated by these physical conditions. Depression not only lowers medication compliance and lifestyle changes but also heightens the perception of symptom severity, thus multiplying the disability of diabetes, Hypertension, and COPD [7]. On the other hand, the chronic stress and physical impairments of these illnesses raise the probability of acquiring depressive symptoms [8]. For instance, shortness of breath in COPD, constant hospitalization for diabetes and Hypertension, and gradual loss of autonomy tend to wear down psychological resilience in the elderly. The interdependency of physical and mental health leads to a vicious circle and makes Depression an inherent part of multimorbidity patterns in the elderly [9].

The analysis of these multimorbidity patterns is crucial for clinical practice, public health, and policy-making. Traditional models of healthcare, which address single conditions in isolation, cannot meet the interlinked needs of older patients who have multiple conditions [10]. What is needed is an integrated approach with a focus on care pathways, integrated medication management, mental health care, and patient-centred strategies that address quality of life [11]. The study aims to examine how diabetes, Hypertension, COPD, and Depression tend to cluster and interact, so that health systems can better predict complications, lower hospitalization rates, and maximize outcomes for older persons. Ultimately, charting multimorbidity patterns is as much a moral imperative as it is a scientific pursuit, aiming to optimize dignified, efficient, and holistic care for the aging.

## Methodology

**Study Design:** The current study is a hospital-based, cross-sectional observational study aimed at determining the patterns of multimorbidity in elderly diabetic patients with Hypertension, chronic obstructive pulmonary disease (COPD), and Depression.

**Study Setting:** The study will be conducted at a tertiary care hospital that offers comprehensive healthcare facilities, catering to a large and diverse patient population, thereby ensuring a good representation of elderly patients with chronic diseases.

**Study Population:** The study population will comprise elderly patients aged 60 years and older who visit outpatient and inpatient facilities at the tertiary care hospital and are found to have at least one of the studied chronic conditions.

**Study Duration:** The study will last for one year.

**Sample Size:** A total of 217 elderly patients will be enrolled in the study to ensure adequate statistical power to detect patterns of multimorbidity.

**Inclusion Criteria:**

- Older patients ≥60 years.
- Patients with a diagnosis of one or more of the following: diabetes mellitus, Hypertension, COPD, or Depression.
- Patients who are willing to give informed consent.

**Exclusion Criteria:**

- Patients with severe cognitive impairment are not able to participate.
- Patients with terminal illness or under palliative care.
- Patients who are not willing to consent.

**Sampling Technique:** Recruitment of eligible participants from outpatient and inpatient departments will be done using a purposive sampling technique.

**Data Collection:** Information will be obtained using a structured proforma, which includes sociodemographic details, clinical history, comorbidities, and standardized tools for assessing Depression and the severity of COPD.

**Study Procedure:** Screening will be conducted in eligible patients, and enrolled patients will meet the inclusion criteria after obtaining informed consent. Data collection will be conducted through patient interviews and review of clinical records.

**Statistical Analysis:** Data will be loaded into statistical packages (SPSS/Excel) and analyzed via descriptive statistics, chi-square tests, and logistic regression to determine patterns of multimorbidity.

## Results

Table 1 shows that the sample population (N = 217) was mainly comprised of individuals in the 60–69 years age group (47%), followed by fewer participants aged 80 years or older (17.1%). More participants were male (59%) than female (41%). The majority of participants were from rural locations (62.2%), reflecting a greater representation from non-rural settings.

**Table 1: Baseline Characteristics of the Study Population (N = 217)**

| Characteristic | Frequency (n) | Percentage (%) |
|---|---|---|
| Age 60–69 years | 102 | 47.0 |
| Age 70–79 years | 78 | 35.9 |
| Age ≥80 years | 37 | 17.1 |
| Male | 128 | 59.0 |
| Female | 89 | 41.0 |
| Rural Residence | 135 | 62.2 |
| Urban Residence | 82 | 37.8 |

Table 2 shows that hypertension was the most common condition (87.6%), with diabetes mellitus (73.7%) being the second most common, reflecting the high prevalence of cardiometabolic conditions. COPD was experienced by roughly half of the study sample (50.7%), whereas Depression was experienced by 43.8% of the sample. The results point towards the coexistence of both physical and mental health conditions in older adults.

**Table 2: Prevalence of Individual Chronic Conditions**

| Condition | Frequency (n) | Percentage (%) |
|---|---|---|
| Diabetes Mellitus | 160 | 73.7 |
| Hypertension | 190 | 87.6 |
| COPD | 110 | 50.7 |
| Depression | 95 | 43.8 |

Figure 1 demonstrates that the most frequent condition (≈approximately 190 patients) among the elderly is Hypertension, followed by diabetes mellitus (≈approximately 160 patients). COPD (≈110 patients) and Depression (≈95 patients) are less frequent but still affect a considerable group, displaying important multimorbidity in this group.

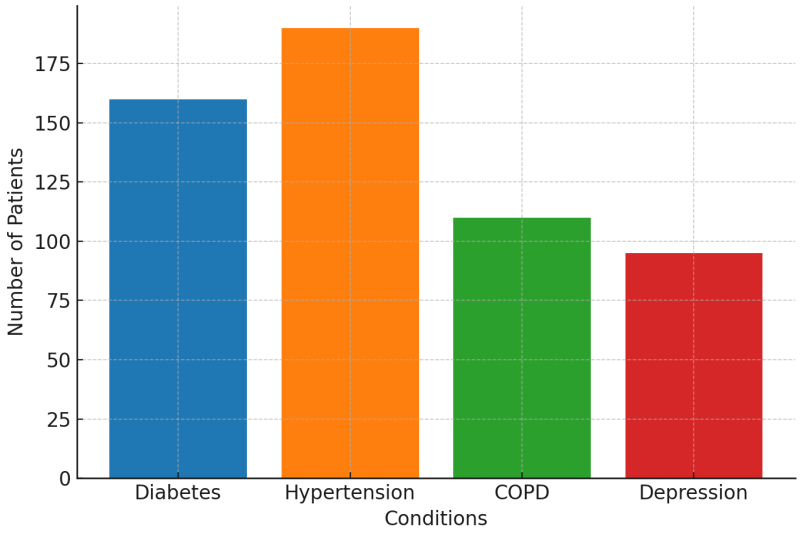


**Figure 1: Distribution of Conditions among Elderly Patients**

Figure 2 shows that Diabetes + Hypertension (≈85 patients) is the most common multimorbidity combination, with a close second being Hypertension + Depression (≈60 patients). Diabetes + COPD (≈40) and all four diseases together (≈32) are less common, which demonstrates that cardiometabolic and mental health overlaps represent the most common combinations among the elderly.

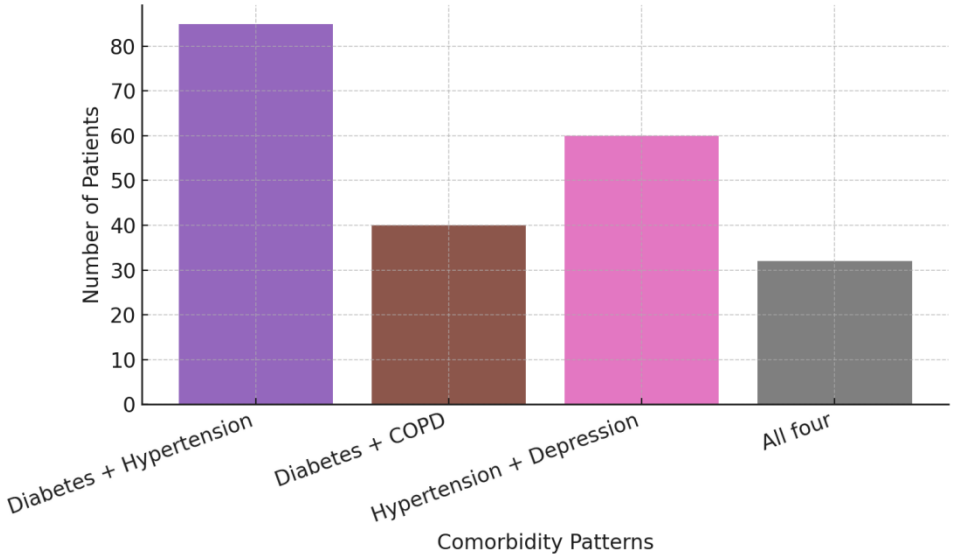


**Figure 2: Common Multimorbidity Patterns in Elders**

Table 3 shows that the most common multimorbidity combination was diabetes and hypertension (39.2%), followed by hypertension and depression (27.6%). Diabetes + COPD occurred in 18.4% of the patients, and four conditions occurring together were found in 14.7%, indicating a high clustering of cardiometabolic and psychiatric disorders among the elderly.

**Table 3: Distribution of Multimorbidity Patterns**

| Co-morbidity Pattern | Frequency (n) | Percentage (%) |
|---|---|---|
| Diabetes + Hypertension | 85 | 39.2 |
| Diabetes + COPD | 40 | 18.4 |
| Hypertension + Depression | 60 | 27.6 |
| All four (Diabetes + Hypertension + COPD + Depression) | 32 | 14.7 |

## Discussion

The present study reveals a high prevalence of multimorbidity among elderly patients, with Hypertension (87.6%) and diabetes mellitus (73.7%) being the most frequent conditions. These findings are consistent with previous research indicating that cardiometabolic disorders dominate the multimorbidity landscape in older adults. For instance, research by the study noted that Hypertension and diabetes commonly coexist among the elderly, with a large number of cases resulting from common risk factors such as obesity, physical inactivity, and unhealthy eating habits [12]. In a similar vein, the co-morbidity of COPD (50.7%) and Depression (43.8%) underscores the dynamic interplay between physical and mental health among aging populations, which is substantiated by a similar longitudinal study that showed how chronic cardiovascular and respiratory diseases tend to co-morbid with Depression, yet also decrease functional capacity and quality of life [13].

Most prevalent multimorbidity pattern found—diabetes and Hypertension (39.2%)—concurs with earlier epidemiological literature, which highlights the synergistic interaction between these disorders to impair vascular function with an increased risk of cardiovascular events, renal disease, and premature death. Surprisingly, Hypertension + Depression (27.6%) stood as the second most prevalent pattern, indicative of the growing awareness of mental health as a core part of multimorbidity. Past research indicates that depressive symptoms among hypertensive older adults are not only common but also partly cause poorer adherence to treatment courses and lifestyle changes, thus worsening disease progression [14]. The presence of Diabetes + COPD (18.4%) and all four conditions clustering together (14.7%) highlights the evolving clinical burden of interrelated cardiometabolic, respiratory, and psychiatric multimorbidities, consistent with evidence from studies, which reported that complex multimorbidity patterns have significant effects in increasing healthcare use and functional impairment in older adults [15, 16].

The findings indicate that the most common pairing is between cardiometabolic conditions with or without the presence of mental health conditions, while respiratory co-morbidities such as COPD, though common, occur less commonly in conjunction with Depression alone. These trends underscore the need for integrated care models that prioritize specialty coordination, followed by combined pharmacological treatment and targeted

mental health interventions. In comparison to singular disease strategies, identifying these clusters enables healthcare professionals to adopt comprehensive strategies that aim to minimize hospitalizations, maximize medication adherence, and improve overall quality of life for older patients.

In summary, these results substantiate the imperative for healthcare systems to implement multimorbidity-directed care pathways that address physical and psychological health. Early detection of high-risk clusters, particularly cardiometabolic and psychiatric clusters, is essential to prevent complications, maximize treatment outcomes, and foster healthy aging.

## Conclusion

This research concludes that the elevated prevalence and intricate clustering of multimorbidity among the aged, with Hypertension and diabetes proving to be the most prevalent conditions, frequently occur alongside COPD and Depression. Cardiometabolic and mental illness overlaps are the most common multimorbidity patterns, adding to functional impairment and decreasing quality of life. These results underscore the importance of integrated, patient-focused care strategies that address both physical and psychological well-being, rather than merely managing disease in isolation. Early detection of high-risk clusters can inform targeted interventions, maximize treatment benefits, reduce hospitalization rates, and promote holistic, respectful care for older populations.

## Limitations

The cross-sectional design of the study limited it, precluding causal inference between conditions. The sample was largely rural, which might constrain generalizability to urban populations. Self-reported illness and some co-morbidities about Depression might introduce reporting bias, and medication adherence or lifestyle factors that influence multimorbidity patterns were not controlled for in the study.

## Recommendations

Longitudinal research designs should be employed in future studies to evaluate causal associations and the trajectory of multimorbidity among various populations. Physical and mental health-oriented integrated models of care are suggested. Depression and respiratory complication screening in cardiometabolic patients, along with patient-centered interventions, may enhance outcomes and quality of life for older adults**.**

## References

1. Marengoni, Alessandra, et al. "Patterns of multimorbidity in a population-based cohort of older people: sociodemographic, lifestyle, clinical, and functional differences." The Journals of Gerontology: Series A 75.4 (2020): 798-805.
2. Lu, Jiao, et al. "Multimorbidity patterns in old adults and their associated multi-layered factors: a cross-sectional study." BMC geriatrics 21.1 (2021): 372.
3. Castro-de-Araujo, Luis Fernando Silva, et al. "Patterns of multimorbidity and some psychiatric disorders: A systematic review of the literature." Frontiers in psychology 13 (2022): 940978.
4. Kuan, Valerie, et al. "Identifying and visualising multimorbidity and comorbidity patterns in patients in the English National Health Service: a population-based study." The Lancet Digital Health 5.1 (2023): e16-e27.
5. Yao, Shan-Shan, et al. "Associations between somatic multimorbidity patterns and depression in a longitudinal cohort of middle-aged and older Chinese." Journal of the American Medical Directors Association 21.9 (2020): 1282-1287.
6. Xie, Zhanpeng, et al. "Association between depression and multimorbidity in Chinese middle-aged and older adults: a prospective cohort study." Journal of Affective Disorders (2025): 119445.
7. Alvarez-Galvez, Javier, et al. "Social determinants of multimorbidity patterns: A systematic review." Frontiers in Public Health 11 (2023): 1081518.
8. Blümel, Juan E., et al. "Multimorbidity in a cohort of middle-aged women: risk factors and disease clustering." Maturitas 137 (2020): 45-49.
9. Stafford, Grant, et al. "Combined multimorbidity and polypharmacy patterns in the elderly: a cross-sectional study in primary health care." International journal of environmental research and public health 18.17 (2021): 9216.
10. Vetrano, Davide L., et al. "Multimorbidity patterns and 5-year mortality in institutionalized older adults." Journal of the American Medical Directors Association 23.8 (2022): 1389-1395.
11. Ioakeim-Skoufa, Ignatios, et al. "Multimorbidity patterns and trajectories in young and middle-aged adults: a large-scale population-based cohort study." Frontiers in Public Health 12 (2024): 1349723.
12. Fabbri, Leonardo M., et al. "COPD and multimorbidity: recognising and addressing a syndemic occurrence." The Lancet Respiratory Medicine 11.11 (2023): 1020-1034.
13. Kshatri, Jaya Singh, et al. "Prevalence and patterns of multimorbidity among rural elderly: findings of the AHSETS study." Frontiers in public health 8 (2020): 582663.

14. Aoki, Takuya, et al. "Physical multimorbidity patterns and depressive symptoms: a nationwide cross-sectional study in Japan." Family Medicine and Community Health 8.1 (2020): e000234.
15. Quiñones, Ana R., et al. "Prevalent multimorbidity combinations among middle-aged and older adults seen in community health centers." Journal of general internal medicine 37.14 (2022): 3545-3553.
16. Fan, Junning, et al. "Multimorbidity patterns and association with mortality in 0.5 million Chinese adults." Chinese medical journal 135.06 (2022): 648-657.