International Journal of Scientific Advances
ISSN: 2708-7972
Volume: 6 | Issue: 5 | Sep – Oct 2025 Available Online: www.ijscia.com
DOI: 10.51542/ijscia.v6i5.1

Prevalence and Demographic Correlates of Multimorbidity in Adults Seen by Primary Care Physicians

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ABSTRACT

Background: Multimorbidity, defined as the presence of two or more chronic conditions, is increasingly common in primary care and poses challenges for both clinical management and health policy. Understanding the demographic predictors of multimorbidity is critical for guiding resource allocation and improving patient care. ***Objective:*** To estimate the proportion of adult primary care visits involving patients with ≥2 chronic conditions and identify demographic predictors using nationally representative data from the National Ambulatory Medical Care Survey (NAMCS) 2010–2015. ***Methods:*** This cross-sectional analysis included 29,879 unweighted adult visits, representing 897,485,008 weighted visits to family physicians. Multimorbidity was defined as ≥2 chronic conditions. Survey-weighted descriptive statistics and multivariable logistic regression assessed associations with age, sex, insurance type, and race/ethnicity. ***Results:*** Multimorbidity accounted for 412,455,652 (46%) of visits. Patients with multimorbidity were older (mean 61.8 vs. 45.9 years, $p < 0.001$). Males had a slightly higher prevalence than females 183,212,644 (49%) vs. 229,243,008 (44%), though women accounted for more total visits. Insurance type showed significant differences: Medicare 1,156,366 (17%) had the lowest multimorbidity proportion, while Medicaid/CHIP 10,143,624 (25%) and Self-pay/Other 7,077,309 (36%) showed higher proportions. Private insurance accounted for the largest absolute number of multimorbidity visits, 30,067,932 (40%). Non-Hispanic Black patients had higher odds (aOR 1.47, 95% CI 1.21–1.77). ***Conclusion:*** Multimorbidity is common in U.S. primary care, particularly among older adults and socioeconomically vulnerable groups. Targeted clinical and policy strategies are needed to reduce disparities and improve management of multimorbidity in family practice.

Keywords: multimorbidity; primary care; family practice; chronic conditions; health disparities; NAMCS.

INTRODUCTION

Multimorbidity, which can be defined as the presence of at least two chronic conditions in a certain individual, has been one of the most acute problems of contemporary healthcare systems [1]. The increasing prevalence of multimorbidity in the United States has significant implications for patients, physicians, and health policy in general since chronic diseases already contribute to the major causes of morbidity, disability, and healthcare spending [2]. The concept of multimorbidity is a contrast to the old-fashioned one-disease approach to clinical guidelines since multimorbidity captures the complex and frequently interconnected health requirements of people whose disorders overlap to form greater symptom burden, lowered quality of life, and increased risk of unfavorable outcomes [3, 4].

Multimorbidity is especially conspicuous in primary care, where family physicians tend to be the initial and ongoing encounter with the patient [5]. Family medicine is uniquely placed to detect and treat patients with multiple chronic diseases due to the focus on comprehensive, continual, and coordinated care [6, 7]. Nevertheless, the extent of multimorbidity in primary care is poorly known, especially when studying it in different demographic populations [8]. As age progresses, multimorbidity becomes more widespread, while other social determinants of health, such as sex, race/ethnicity, and socioeconomic status, also influence its distribution and effects [9].

Knowledge of multimorbidity's prevalence and demographic associations is essential in several ways. First, multimorbidity adds complexity to care since patients frequently need many drugs, specialist appointments, and continuous monitoring, which can contribute to the risk of fragmented care and polypharmacy [10]. Second, multimorbid patients normally incur increased healthcare expenditures and hospitalizations that burden their families and the entire healthcare facility [11]. Third, the issue of disagreements in the application of the disease-specific guidelines is acute among family physicians since they can contradict each other under the circumstances of patients with multiple conditions, which is why the development of customized and integrated care plans is necessary [12].

Nationally representative data, such as the National Ambulatory Medical Care Survey (NAMCS), provide an opportunity to measure the extent of multimorbidity in practice [13]. Because NAMCS systematically records data about outpatient visits to non-federally employed physicians, such as family physicians, NAMCS is a valuable source for studying healthcare utilization and disease trends at the population level [14]. By taking advantage of this data type, researchers can no longer rely on anecdotal observations but can approximate the percentage of family physician visits to adults with multiple chronic conditions [15, 16]. In such a way, it will be possible to determine which types of patients are most severely impacted and whether certain demographic factors can be used to anticipate a higher occurrence of multimorbidity-related visits [17].

Despite the importance of these issues, there are still gaps in the knowledge of how multimorbidity can be manifested in the day-to-day reality of family practice in the United States [18, 19]. Moreover, although aging has been well-established as a predictor of multimorbidity, the interaction of other demographic variables (gender, race/ethnicity, and socioeconomic position) has not been investigated nationally [20]. The study's main objective is to estimate the proportion of adult primary care visits involving patients with ≥2 chronic conditions and identify demographic predictors using NAMCS data. This study contextualizes multimorbidity as a concept in the practice of family physicians to inform clinical decision-making and health policy initiatives to maximize patient care in an increasingly intricate and large population of patients.

MATERIALS AND METHODS

Study Design and Data Source

This study employed a cross-sectional design using publicly available data from the National Ambulatory Medical Care Survey (NAMCS) for the years 2010 through 2015 [21]. The NAMCS is an annual, nationally representative survey of visits to office-based physicians in the United States, conducted by the National Center for Health Statistics (NCHS). It utilizes a multistage probability sampling design incorporating stratification and clustering to generate accurate national estimates of ambulatory medical care.

Study Population and Inclusion / Exclusion Criteria

The analytic sample was restricted to visits made by adult patients (≥18 years) who were seen by family physicians, identified using the physician specialty (SPECR) code for General/Family Practice within NAMCS. Visits to other specialties such as internal medicine, pediatrics, psychiatry, and surgery were excluded. This restriction ensured the analysis specifically reflected the prevalence and correlates of multimorbidity in family practice settings. After applying age restrictions, specialty criteria and insurance type grouping, the final unweighted sample included 29,879 visits, representing estimates of adult visits to family physicians. Survey weights supplied by NCHS were applied to account for the complex survey design and to produce nationally representative estimates.

Primary Outcome

The primary outcome was multimorbidity, defined as the presence of two or more chronic conditions during the visit. Chronic conditions were provided as binary indicators in the NAMCS dataset (e.g., hypertension, diabetes, arthritis, chronic obstructive pulmonary disease, coronary artery disease, depression, obesity). The survey-derived variable TOTCHRON was used to capture the total number of chronic conditions. A binary outcome variable for multimorbidity was created, coded as 1 if TOTCHRON ≥ 2 and 0 otherwise.

Covariates

Demographic variables included patient age, sex, race/ethnicity, and insurance status. Age was analyzed as a continuous variable in years. Sex was classified as male or female. Race/ethnicity followed NAMCS classifications: Non-Hispanic White, Non-Hispanic Black, Hispanic, and Other. Insurance status was categorized as private insurance, Medicare, Medicaid/CHIP, self-pay/other, and unknown.

Missing data

After data processing, missingness was evaluated across all analytic variables. The final dataset demonstrated no missing values for age, sex, race/ethnicity, and multimorbidity status. The only variable with missingness was insurance status, with 2291 visits (7.67%) lacking information.

Because the proportion of missingness was relatively small (<10%) and limited to a single covariate, we did not apply imputation methods. Multiple imputation was considered; however, it is not recommended in the context of complex survey design data such as NAMCS, where imputation may introduce bias and compromise variance estimation. Instead, we conducted a complete case analysis, excluding visits with missing insurance information. This approach ensured valid variance estimation under the survey design and preserved interpretability of regression coefficients, while minimizing potential bias given the modest degree of missingness.

Statistical Analysis

All analyses accounted for the complex sampling design of NAMCS by applying survey weights, strata, and primary sampling units to obtain nationally representative estimates and correct standard errors. Descriptive statistics were generated to estimate the prevalence of multimorbidity among adult family physician visits. Bivariate associations between multimorbidity and categorical covariates (sex, race/ethnicity, and insurance status) were assessed using survey-adjusted chi-square tests, while differences in continuous variables (age) were evaluated using survey-adjusted F-tests.

To identify independent predictors of multimorbidity, we fit a multivariable survey-weighted logistic regression model with multimorbidity (≥2 chronic conditions) as the dependent variable and patient age in years (continuous), sex, race/ethnicity, and insurance status as independent variables. Adjusted odds ratios (aOR) with 95% confidence intervals (CI) were reported.

Multicollinearity was assessed using the variance inflation factor (VIF). The VIF values ranged from 1.01 to 1.94 with a mean VIF of 1.23, indicating no evidence of multicollinearity. All analyses were performed using Stata version 18 (StataCorp, College Station, TX).

Ethical Considerations

The NAMCS dataset is publicly available and de-identified; therefore, this study was exempt from institutional review board approval and did not require informed consent.

RESULTS

Table 1 below summarizes the demographic and socioeconomic characteristics of adult visits to family physicians, stratified by multimorbidity status. Overall, the analytic sample represented an estimated 897,485,008 weighted visits (29,879 unweighted visits). Among these, 485,029,355 visits (54%) were for patients without multimorbidity, while 412,455,652 visits (46%) were for patients with multimorbidity (≥2 chronic conditions).

TABLE 1: Patient characteristics by multimorbidity status among adult family physician visits, NAMCS 2010–2015 (weighted N = 897,485,008; unweighted n = 29,879).

Characteristic	No multimorbidity (N = 485,029,355)	Multimorbidity (≥2) (N=412,455,652)	F-test/T-test	p-value
Patient age in years (mean ± SD)	45.93 ± 17.38	61.79 ± 14.77	t= -36.65	<0.001***
Sex(%)	-	-	***F= 16.45***	***<0.001******
Male	194,091,250 (51%)	183,212,644 (49%)	-	-
Female	290,938,104 (56%)	229,243,008 (44%)	-	-
Insurance type(%)	-	-	*F= 27.68*	*<0.001****
Private	45,764,463 (60%)	30,067,932 (40%)	-	-
Medicare	5,486,772 (83%)	1,156,366 (17%)	-	-
Medicaid/CHIP	30,383,955(75%)	10,143,624(25%)	-	-
Self-pay/Other	12,597,793(64%)	7,077,309(36%)	-	-
Unknown	358,347,044 (51%)	339,463,131 (49%)	-	-
Race/Ethnicity(%)	-	-	***F= 1.41***	***0.241***
Non-Hispanic White	351,465,616 (54%)	300,838,572 (46%)	-	-
Non-Hispanic Black	49,127,007 (51%)	47,490,366 (49%)	-	-
Hispanic	60,442,912 (56%)	46,975,378 (44%)	-	-
Non-Hispanic Other	23,993,817 (58%)	17,151,335 (42%)	-	-

*This table presents the demographic and clinical characteristics of adult visits to family physicians stratified by multimorbidity status (defined as ≥2 chronic conditions) using data from the National Ambulatory Medical Care Survey (NAMCS) 2010–2015. Estimates are survey-weighted to produce nationally representative figures (weighted N = 897,485,008), while unweighted counts (n = 29,879 visits) represent the raw sample size. The weighted estimates (N, %) should be interpreted as reflecting the national population of visits, whereas the unweighted numbers are the actual observed visits included in the analytic dataset. Continuous variables (age) are reported as means with standard deviations (mean ± SD), and comparisons between groups were made using survey-adjusted t-tests. Categorical variables (sex, insurance type, and race/ethnicity) are reported as weighted frequencies and percentages, and differences across multimorbidity status were assessed using survey-adjusted F-tests. Statistical significance: *** p < 0.001. – Intentionally left blank.*

From the table above it's evident that patients with multimorbidity were significantly older on average compared to those without multimorbidity (61.8± 14.8 years vs. 45.9± 17.4 years, $p < 0.001$), highlighting the strong association between advancing age and the accumulation of multiple chronic conditions. The sex distribution also revealed meaningful differences: although females represented the majority of overall visits in both groups, multimorbidity appeared relatively more common among males (183,212,644 [49%]) compared with females (229,243,008 [44%]). This pattern suggests that while women utilize more health services overall, men may be more likely to present with multiple chronic illnesses once engaged in care.

Insurance status demonstrated significant differences in multimorbidity prevalence across groups ($p < 0.001$). Among patients with Medicare, only 1,156,366 visits (17%) involved multimorbidity, representing the lowest proportion across categories. In comparison 7,077,309 visits (36%) among those with Self-pay/Other coverage and 10,143,624 visits (25%) among Medicaid/CHIP recipients reflected higher burdens of multimorbidity.

Private insurance accounted for the largest absolute number of multimorbidity visits, totaling 30,067,932 (40%) of all privately insured encounters. However, when examining proportions within each insurance category, the Unknown insurance group exhibited the highest prevalence, with 339,463,131 visits (49%) involving multimorbidity.

Race and ethnicity, in contrast, did not demonstrate statistically significant differences in multimorbidity prevalence ($p = 0.241$). Across categories, the proportions were broadly similar, with Non-Hispanic White patients at 300,838,572 (46%), Non-Hispanic Black patients at 47,490,366(49%), and Hispanic patients at 46,975,378 (44%) presenting with multimorbidity. This suggests that within this nationally representative sample of adult visits to family physicians, the burden of multiple chronic conditions was largely consistent across racial and ethnic subgroups after accounting for survey design. Figure 1 below illustrates the proportion of multimorbidity visits by insurance type. This visualization helps contextualize the relative burden across insurance groups.

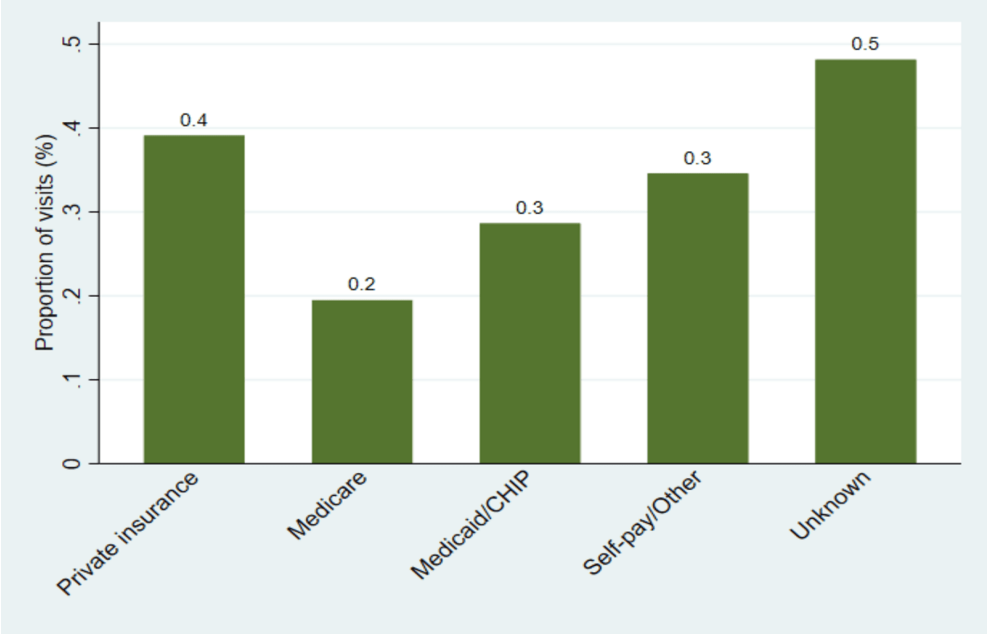

FIGURE 1: Proportion of Multimorbidity Visits by Insurance Type, NAMCS 2010–2015.

Bars represent the weighted proportion of family physician visits with ≥2 chronic conditions (multimorbidity) stratified by insurance type. Labels above each bar denote the proportion in decimal form (e.g., 0.4 = 40%). Survey weights were applied to generate nationally representative estimates.

The figure above shows that multimorbidity was most common among visits with Unknown insurance status (0.5), followed by those with Private insurance (0.4), and Self-pay/Other coverage (0.3). Medicaid/CHIP visits also accounted for 0.3 of multimorbidity visits, while Medicare patients had the lowest proportion (0.2).

To further assess independent predictors of multimorbidity among adult family physician visits, we conducted a multivariable survey-weighted logistic regression model. Table 2 presents the adjusted odds ratios (aOR) with 95% confidence intervals (CI) for age, sex, insurance status, and race/ethnicity.

TABLE 2: Multivariable Survey-Weighted Logistic Regression of Multimorbidity Among Adult Family Physician Visits, NAMCS 2010–2015.

Predictor	Odds Ratio (95% CI)	P-value
Age (years)	1.06 (1.06 – 1.07)	<0.001***
Sex (Male vs Female)	0.81 (0.74 – 0.89)	<0.001***
Insurance type	-	-
Medicare	0.26 (0.13 – 0.55)	<0.001***
Medicaid/CHIP	0.42 (0.32 – 0.57)	<0.001***
Self-pay/Other	0.71 (0.51 – 0.98)	0.039
Unknown	0.69 (0.58 – 0.82)	<0.001****
Race/Ethnicity	-	-
Non-Hispanic Black	1.47 (1.21 – 1.77)	<0.001***
Hispanic	1.01 (0.77 – 1.32)	0.950
Non-Hispanic Other	0.80 (0.62 – 1.04)	0.098

*Odds ratios (OR) represent the adjusted likelihood of multimorbidity (≥2 chronic conditions) after accounting for survey design features (weights, strata, and clusters). An OR greater than 1 indicates higher odds of multimorbidity relative to the reference category, while an OR less than 1 indicates lower odds. Statistical significance: *** p < 0.001. – Intentionally left blank.*

The findings in Table 2 above revealed that patient age was strongly associated with multimorbidity, with each additional year increasing the odds by 6% (aOR = 1.06, 95% CI: 1.06–1.07, p < 0.001). Male patients were less likely than females to have multimorbidity (aOR = 0.81, 95% CI: 0.74–0.89, p < 0.001). Compared with privately insured patients (reference group), those covered by Medicare (aOR = 0.26, 95% CI: 0.13–0.55, p < 0.001), Medicaid/CHIP (aOR = 0.42, 95% CI: 0.32–0.57, p < 0.001), Self-pay/Other (aOR = 0.71, 95% CI: 0.51–0.98, p = 0.039), and Unknown insurance (aOR = 0.69, 95% CI: 0.58–0.82, p < 0.001) all showed significantly lower odds of multimorbidity. Regarding race and ethnicity, Non-Hispanic Black patients had significantly higher odds of multimorbidity compared to Non-Hispanic White patients (aOR = 1.47, 95% CI: 1.21–1.77, p < 0.001). Hispanic patients (aOR = 1.01, p = 0.950) and Non-Hispanic Other (aOR = 0.80, p = 0.098) did not differ significantly from the reference group.

DISCUSSION

This nationally representative analysis of adult visits to family physicians using NAMCS data from 2010–2015 provides important insights into the demographic and clinical patterns of multimorbidity in U.S. primary care. Nearly half 412,455,652(46%) of all visits involved patients with multimorbidity, underscoring the high burden of multiple chronic conditions in family medicine. These findings align with prior literature emphasizing that multimorbidity has become a defining feature of contemporary healthcare and is especially prominent in primary care settings [1, 2].

Consistent with earlier studies, advancing age emerged as the strongest predictor of multimorbidity, with each additional year of age increasing the odds by approximately 6%(aOR = 1.06, 95% CI: 1.06–1.07, p < 0.001). This age gradient reflects the cumulative nature of chronic disease and mirrors prior evidence that aging populations are disproportionately affected by multiple comorbidities [3, 9]. The sex differences observed in our analysis also add nuance to existing work: while women accounted for more visits overall, men demonstrated relatively higher odds of presenting with multimorbidity once engaged in care. This pattern supports the notion that health service utilization and disease accumulation may differ by gender, echoing findings from earlier population-based studies [7].

Insurance type was another key predictor. Although private insurance accounted for the largest absolute number of multimorbidity visits, patients with Medicaid/CHIP, Self-pay/Other, and Unknown insurance types exhibited disproportionately high burdens relative to their group size. Importantly, the regression results demonstrated that, compared to privately insured patients, all other insurance categories were associated with significantly lower odds of multimorbidity. This somewhat contradictory pattern may reflect differences in healthcare access, diagnostic practices, or patterns of care-seeking behavior across insurance groups. For instance, patients with public or no coverage may face barriers to consistent management of chronic conditions, potentially leading to under-recognition in clinical documentation [13, 16].

In contrast, race and ethnicity showed more mixed associations. While Non-Hispanic Black patients demonstrated significantly higher adjusted odds of multimorbidity compared with Non-Hispanic White patients, Hispanic and Non-Hispanic Other groups did not differ significantly. This suggests that while racial disparities persist in some dimensions of multimorbidity, the relationship may be more complex than previously thought and warrants deeper exploration of socioeconomic, structural, and environmental determinants [20].

Comorbidities increase healthcare utilization and costs. Heart failure and cardiovascular disease had the highest average annual medical expenditures per capita $33,451, 95% CI: $29,034 - $37,868 [1]. Patients with multimorbidity require frequent visits,

hospitalizations and monitoring. A Canadian study by Rapoport et al reported that older adults with multimorbidity utilize two and five times more physician appointments than those without chronic conditions [11]. Another study by Schneider et al reported that older adult patients with 3 or more chronic conditions utilized 25 times more hospital bed days during 14.6 times more hospital admissions than those without chronic conditions [11]. Those increases in physician appointments and hospital admissions would greatly impact the cost on families. The out-of-pocket costs are reported to be 2.1 times higher than for older adults with multiple chronic conditions than for those without multiple chronic conditions [11]. Multimorbidity is important in primary care settings, as it represents a high burden for primary healthcare, with a median of 8 times more patient visits than the healthier group [9].

Strengths, Limitations, and Recommendations

This study benefits from the use of NAMCS, a nationally representative survey of outpatient care, and the application of survey-weighted analyses, which enhances the generalizability of findings beyond individual practices. By moving beyond prevalence estimates to assess demographic predictors, the analysis provides a more delicate understanding of which populations are disproportionately affected by multimorbidity in family practice settings.

However, some limitations must be noted. The cross-sectional design of NAMCS prevents causal or longitudinal interpretations of multimorbidity. Reliance on physician-reported diagnoses may understate or misclassify chronic disease burden, particularly when visits focus on acute issues. Insurance type, while informative, serves only as a proxy for socioeconomic status, and other key social determinants such as education, income, or neighborhood factors were not captured. In addition, smaller subgroup sample sizes, such as for Medicaid or Self-pay visits, may have reduced the precision of certain estimates.

These findings point to several important directions. Future studies should use longitudinal designs to track how multimorbidity evolves and its impact on healthcare utilization. Incorporating richer measures of social determinants of health would improve understanding of demographic disparities. Given the high prevalence of multimorbidity, there is a need for clinicians, particularly family medicine physicians, to adopt an integrative, patient-centered approach in the management of patients with multimorbidity [5, 10, 12]. There is an urgent need to address existing health disparities through the expansion of access to both preventive care and chronic disease management for all patients, regardless of their insurance status [11, 13, 20]. Preventive programs tailored to the elderly age group may help to reduce the burden of multimorbidity among older adults, who are the most vulnerable to this condition.

Interventions need to be culturally sensitive across all populations to ensure their effectiveness in reducing inequities [7, 9, 20]. Worthy of note is the absence of clinical guidelines that are focused on the management of multimorbidity. Instead, what is commonly available are single-disease clinical guidelines. There is a need for evidence-based clinical guidelines that make care of patients with multimorbidity more efficient while integrating effective approaches to addressing critical issues like polypharmacy, preventive care, and shared decision making [4, 6,12].

CONCLUSION

Multimorbidity is common in family physician visits and is strongly linked with older age and male sex. Insurance differences suggest that socioeconomic factors play an important role, while race and ethnicity showed no consistent association. These findings highlight the need for tailored care and policies to better support patients with multiple chronic conditions.

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