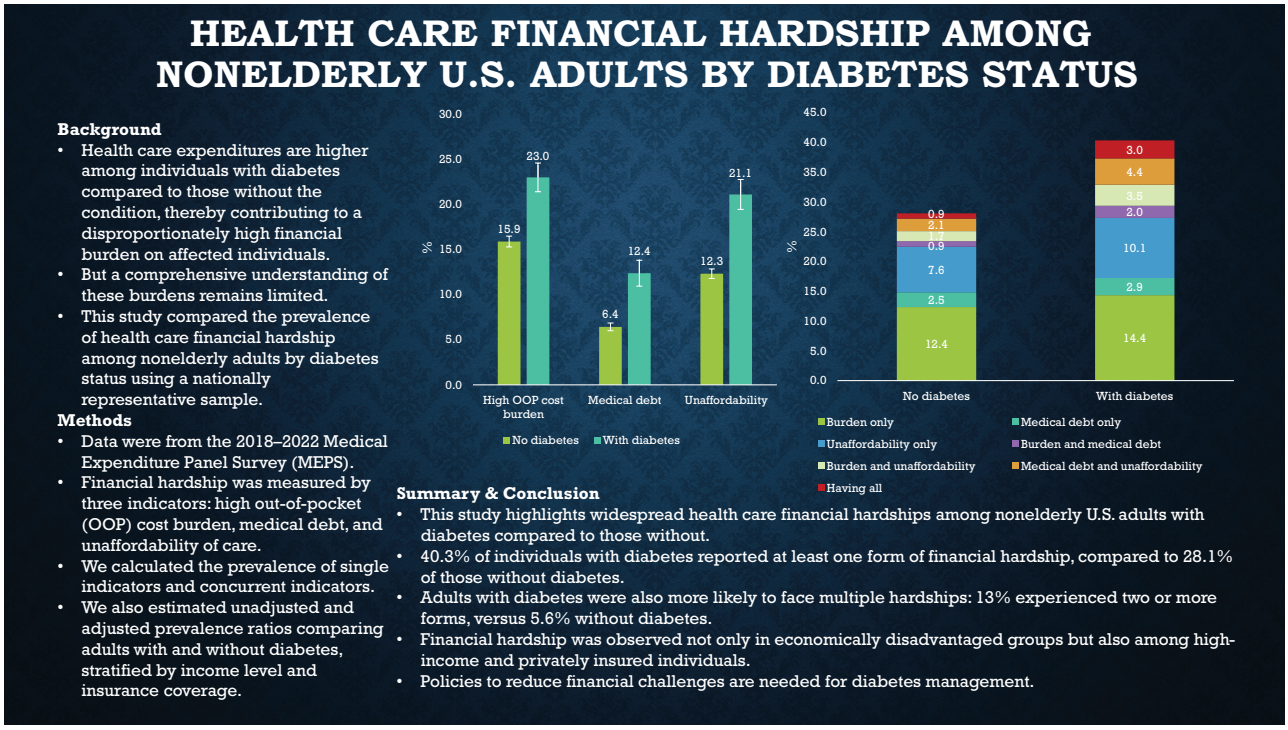
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Health Care Financial Hardship Among Nonelderly U.S. Adults by Diabetes Status

Xilin Zhou, Yu Wang, Rui Li, Deborah B. Rolka, and Ping Zhang

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ARTICLE HIGHLIGHTS

- **Why did we undertake this study?**
  There is a limited comprehensive understanding of health care–related financial hardship among individuals with diabetes, based on current nationally representative data.

- **What is the specific question we wanted to answer?**
  What is the prevalence of health care financial hardship, measured by high out-of-pocket cost, medical debt, and unaffordability of care, among individuals with diabetes compared with those without?

- **What did we find?**
  Nonelderly adults with diabetes experienced higher financial hardship (40% vs. 28%) than those without diabetes, with 13% reporting multiple forms of hardship, a pattern observed across income and insurance groups.

- **What are the implications of our findings?**
  Policies that address financial vulnerabilities are needed to support diabetes management.

ORIGINAL ARTICLE

Health Care Financial Hardship Among Nonelderly U.S. Adults by Diabetes Status

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OBJECTIVE | Individuals with diabetes face substantial health-related financial burdens, but a comprehensive understanding of these burdens remains limited. This study compared the prevalence of health care financial hardship among nonelderly adults by diabetes status.

RESEARCH DESIGN AND METHODS | We conducted a cross-sectional analysis using data from the 2018–2022 Medical Expenditure Panel Survey, including 67,782 adults aged 18–64 years. Diabetes status was self-reported. Financial hardship was measured by three indicators: high out-of-pocket cost burden, medical debt, and unaffordability of care. We calculated the prevalence of single indicators and concurrent indicators. We also compared the prevalence of financial hardships between individuals with and without diabetes across income levels and insurance coverages.

RESULTS | The study sample included 6,091 individuals with diabetes and 61,691 individuals without diabetes. Nonelderly adults with diabetes experienced significantly higher rates of financial hardship than those without. Specifically, 40.3% (95% CI 38.4–42.3) of individuals with diabetes reported at least one form of financial hardship, compared with 28.1% (95% CI 27.3–28.9) of those without diabetes ($P < 0.01$). Among individuals with diabetes, 13.0% (95% CI 11.6–14.5) reported multiple concurrent financial hardships, whereas 5.6% (95% CI 5.3–5.9) of those without diabetes reported the same ($P < 0.01$). Notably, financial hardship was observed not only in economically disadvantaged groups but also among higher-income and privately insured individuals.

CONCLUSIONS | This study highlights widespread health care financial hardships among nonelderly U.S. adults with diabetes compared with those without, affecting all income and insurance groups. Policies to reduce financial challenges are needed for diabetes management.

Diabetes is a chronic health condition affecting over 38 million people in the U.S. (1), posing substantial health challenges and economic burdens for those affected. The disease requires continuous management through medication use, regular monitoring of blood glucose levels, and lifestyle modifications, all of which incur recurring costs. Consequently, health care expenditures are higher among individuals with diabetes compared with those without the condition. In 2022, the estimated total annual health care expenditure for individuals with diabetes was $19,736, about 2.6 times that of those without diabetes of comparable age and sex (2).

The additional costs associated with diabetes contribute to a disproportionately high financial burden. For instance, in 2017, with an average annual out-of-pocket (OOP) expenditure exceeding $4,000, nearly one in five nonelderly adults with diabetes were part of a family allocating more than 10% of their income to health care costs (3). Approximately half of adults with diabetes reported experiencing financial stress (4).

This high financial burden can hinder treatment initiation and continuity, limiting individuals' ability to manage unexpected medical expenses. In the context of financial strain, individuals with diabetes may delay or forgo necessary medical care and prescribed medications. Notably, one in six nonelderly adults with diabetes in the U.S. report cost-related difficulty maintaining their medication regimen, which increases with OOP costs (5,6). Such difficulty is often associated with elevated HbA_{1c} levels, increased complications, and declines in physical functioning (7).

Despite the importance of this topic, gaps remain in understanding health care–related financial hardship among

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individuals with diabetes. Most studies have examined individual measures, either self-perceived financial hardship or OOP costs separately, rather than considering both types or their co-occurrence (3,7–10). Moreover, direct comparisons of financial hardship between individuals with and without diabetes is lacking (7), particularly using recent data that reflect current patterns. One study explored multiple measures of financial hardship but focused on the general population and did not compare outcomes by diabetes status (11). These limitations hinder a comprehensive understanding of the full extent and severity of financial strain experienced by individuals with diabetes in accessing health care.

To address these gaps, we used nationally representative data to examine health care financial hardship, comparing indicators of financial strain by diabetes status. We also stratified the analysis by income level and health care insurance type.

Research Design and Methods

Data Source and Study Sample

This cross-sectional study used data from the Medical Expenditure Panel Survey (MEPS), a nationally representative survey of the U.S. noninstitutionalized civilian population. MEPS collects rich information on individuals' demographic and socioeconomic status, health conditions, health insurance coverage, and health care expenditures. To improve the precision of estimates, we pooled 5 years of data (2018–2022). The study sample comprised 67,782 adults aged 18–64 years in families without members aged 65 years or older (12). We excluded individuals from families with elderly members (less than 1% of the study sample) because these members are often Medicare beneficiaries (11). The MEPS data set does not include data on Medicare premiums, which are necessary for calculating the financial burden measures for the analysis (13). Diabetes status was self-reported by individuals who answered affirmatively to the question "Have you ever been told by a doctor or other health professional that you had diabetes?"

We used three measures for financial hardship: high OOP cost burden, medical debt, and unaffordability of care. High OOP cost burden was defined as total family OOP health care spending, including medical care expenses and health insurance premiums, that exceeded 10% of the family's annual income (8,11). This measure was computed at the family level and assigned to each family member, as families often decide how to allocate resources collectively (3,8). Medical debt was assessed using self-reported indicators of whether the family was unable to pay medical bills or had medical bills being paid off over time. Unaffordability of care was also self-reported, based on whether an individual needed care but was unable to afford it. In addition to single indicators, we examined concurrent indicators to reflect the multidimensional nature of financial hardship (10).

To account for differences in sample characteristics by diabetes status, we included the following covariates: age, sex, race and ethnicity (Hispanic, non-Hispanic [NH] White, NH Black, and NH other), educational attainment (less than high school, high school diploma, or college or higher), income level, health insurance (any private, public only, or uninsured), marital status, and self-reported poor or fair physical and mental health. Income level was categorized as low (<200%), middle (200–399%), or high (≥400%) in relation to the federal poverty level, adjusted for family size.

Statistical Analyses

We compared sample characteristics by diabetes status with χ^2 tests. Then we calculated unadjusted rates of health care financial hardship, as well as the distribution of concurrent hardship indicators. We estimated both unadjusted and adjusted prevalence ratios (PRs and aPRs) comparing individuals with and without diabetes by income level and insurance coverage. The aPRs were estimated using logistic regression models, controlling for all covariates except for either income or insurance.

TABLE 1 Sample characteristics by diabetes status, 2018–2022 MEPS

Characteristic	With diabetes	No diabetes	*P* value*
n	6,091	61,691	
Age (%)			<0.01
18–44 years	23.5	62.3	
45–64 years	76.5	37.7	
Sex (%)			0.30
Female	46.4	50.5	
Male	53.6	49.5	
Race and ethnicity (%)			<0.01
Hispanic	20.8	18.8	
NH White	51.8	59.4	
NH Black	16.3	12.3	
Others	11.0	9.5	
Education (%)			<0.01
Less than high school	15.0	10.9	
High school diploma	48.2	42.3	
College or higher	36.9	46.7	
Income level (%)			<0.01
Low	35.6	24.1	
Middle	28.9	28.6	
High	35.5	47.3	
Health insurance (%)			<0.01
Any private	63.2	75.8	
Public only	30.5	14.9	
Uninsured	6.3	9.3	
Married (%)	53.5	50.6	0.34
Perceived poor physical health (%)	49.0	15.6	<0.01
Perceived poor mental health (%)	27.2	14.6	<0.01

*P values for χ^2 tests comparing individuals with and without diabetes.

Observations with missing covariate values (around 1%) were excluded from the analyses (14). All analyses accounted for the complex survey design of MEPS to ensure nationally representative estimates of the U.S. noninstitutionalized, nonelderly adult population. We reported point estimates alongside their 95% CIs.

Results

Individuals with diabetes exhibited significant differences compared with those without diabetes across demographic, socioeconomic, and health-related characteristics (Table 1). Compared with individuals without diabetes, those with diabetes were older (76.5% vs. 37.7% for ages 45–64 years), were more likely to be identified as Hispanic (20.8% vs. 18.8%) or NH Black (16.3% vs. 12.3%), had a lower level of education (36.9% vs. 46.7% for college education), and were more likely in the low-income category (35.6% vs. 24.1%). They were also more likely to report poor physical (49% vs. 15.6%) and mental (27.2% vs. 14.6%) health and to rely on public insurance coverage (30.5% vs. 14.9%).

Figure 1 presents the prevalence of health care financial hardship indicators—high OOP cost burden, medical debt, and unaffordability of care—by diabetes status, with 95% CIs. Nonelderly adults with diabetes consistently showed higher rates across all indicators. Specifically, 23.0% (95% CI 21.4–24.5) of individuals with diabetes reported a high OOP cost burden, compared with 15.9% (95% CI 15.3–16.5) of those without diabetes ($P < 0.01$). Medical debt affected 12.4% (95% CI 10.9–13.8) of individuals with diabetes versus 6.4% (95% CI 6.0–6.8) of those without ($P < 0.01$), while 21.1% (95% CI 19.4–22.7) of individuals with diabetes reported being unable to afford needed care, compared with 12.3% (95% CI 11.8–12.8) of those without diabetes ($P < 0.01$). When examining service types, the largest difference was observed for prescription medication. Individuals with diabetes were three times more likely to report being unable to afford their medications than those without diabetes.

Figure 2 shows the distribution of individuals by the combination of hardship indicators experienced—one, two,

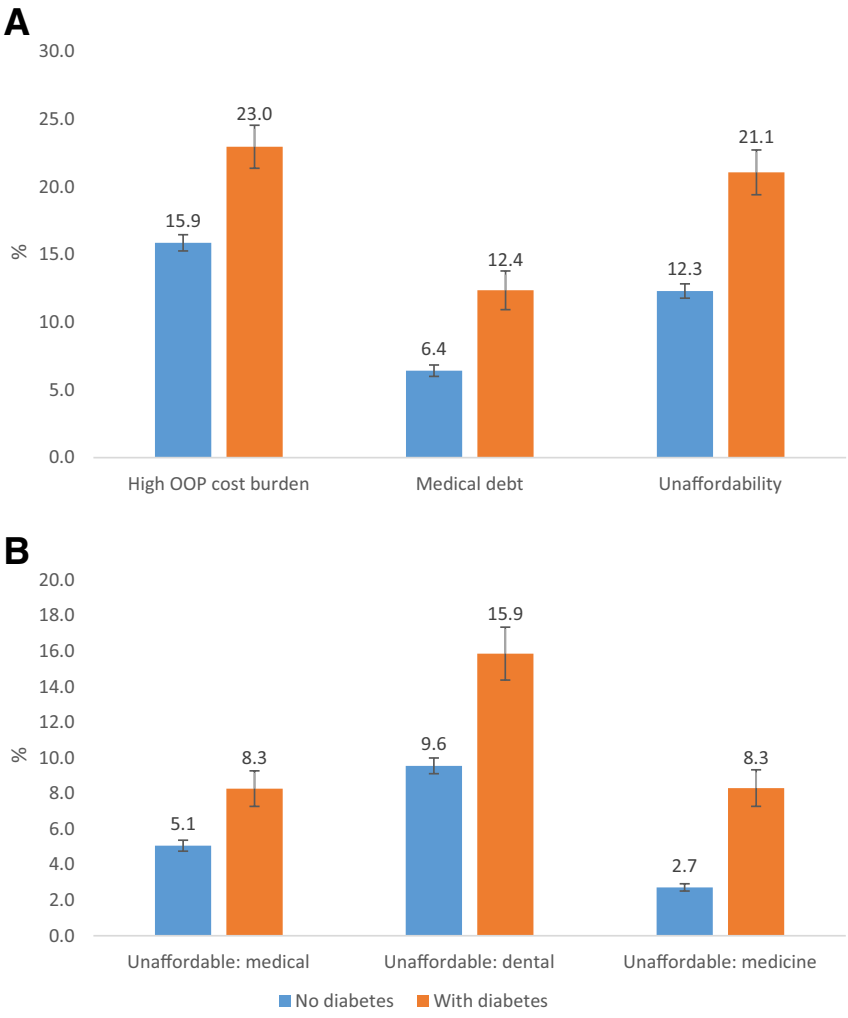


FIGURE 1 Health care financial hardship by diabetes status, 2018–2022 MEPS. *A*: Health care financial hardship. *B*: Unaffordability by service type. Error bars represent 95% CIs.

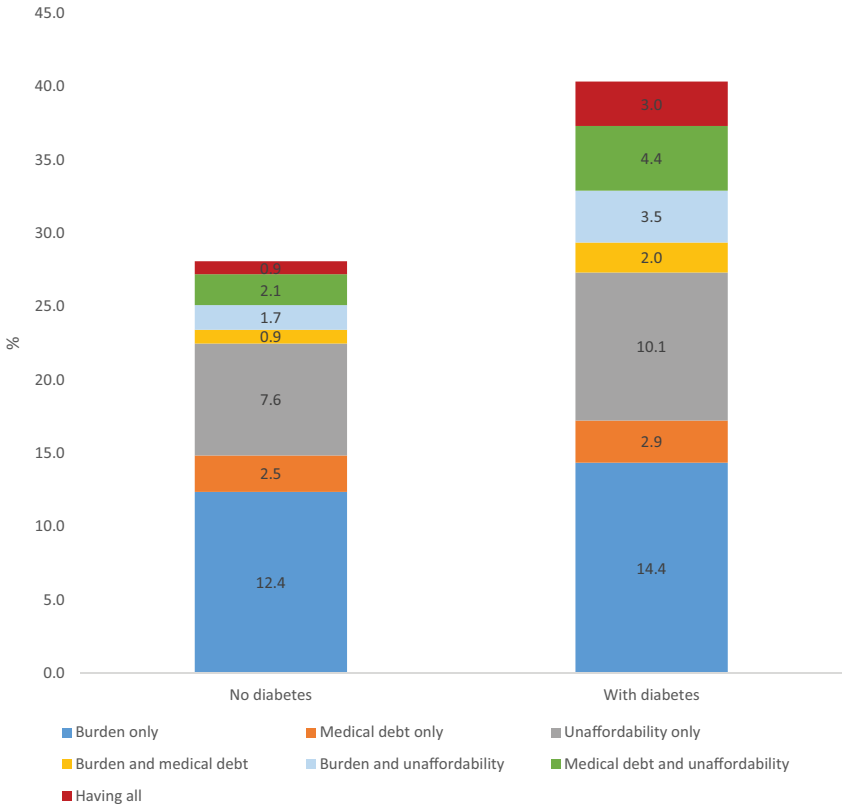


FIGURE 2 Combination of concurrent indicators of health care financial hardship: high OOP cost burden (referred to as "burden"), medical debt, and unaffordability, 2018–2022 MEPS.

or all three—by diabetes status. Overall, 40.3% (95% CI 38.4–42.3) of individuals with diabetes experienced at least one form of health care financial hardship, compared with 28.1% (95% CI 27.3–28.9) of those without diabetes ($P < 0.01$). Adults with diabetes were also more likely to face multiple hardships: 13.0% (95% CI 11.6–14.5) experienced two or more forms versus 5.6% (95% CI 5.3–5.9) of those without diabetes ($P < 0.01$). The most common combinations among individuals with diabetes were unaffordability with either high OOP cost burden (3.5%) or medical debt (4.4%).

Table 2 presents PRs and aPRs for health care financial hardship by income level and insurance coverage when comparing those with diabetes to those without diabetes. Unadjusted results show a consistent pattern of higher financial hardship among individuals with diabetes, with PRs ranging from 1.2 to 2.0 across income levels and from 1.4 to 2.5 across insurance types. After adjustment, the pattern was similar but less pronounced. For example, for high OOP cost burden, aPRs were significant among both low-income (aPR = 1.2; 95% CI 1.09–1.28) and high-income (aPR = 1.2; 95% CI 1.01–1.44) groups, while not statistically significant for the middle-income group. In addition, aPRs for medical debt and unaffordability were significant among privately insured individuals but not among those with public-only coverage or the uninsured.

Conclusions

In this nationally representative study of U.S. nonelderly adults, we found that individuals with diabetes experienced significantly higher rates of health care financial hardship—high OOP cost burden, medical debt, and unaffordability—than those without diabetes. Adults with diabetes were not only more likely to experience health care financial hardship but also more likely to face multiple forms of hardships simultaneously compared with those without diabetes. These excess financial burdens existed even among higher-income and privately insured individuals.

Our findings align with prior studies that have documented elevated health care costs and OOP spending among individuals with diabetes. For example, Wang et al. (3) and Park et al. (9) identified persistently high OOP costs among adults with diabetes in the past two decades, and Caraballo et al. (7) reported that over 40% of nonelderly adults with diabetes struggle to pay medical bills. Compared with those without diabetes, individuals with diabetes also had higher odds of high financial distress, food insecurity, cost-related difficulty maintaining self-management, and foregone or delayed medical care (7). Previous studies have also shown that these financial hardships were associated with cost-related medication underuse and worse glycemic control (15,16). Unlike much of the prior research that often focused on

TABLE 2 PRs and aPRs of health care financial hardship comparing those with diabetes to those without diabetes, 2018–2022 MEPS

	Unadjusted	Adjusted
By income		
High OOP cost burden		
Low	1.3 (1.14–1.39)	1.2 (1.09–1.28)
Middle	1.3 (1.16–1.49)	1.1 (0.99–1.27)
High	1.4 (1.20–1.69)	1.2 (1.01–1.44)
Medical debt		
Low	1.6 (1.41–1.91)	1.3 (1.10–1.51)
Middle	1.8 (1.46–2.12)	1.4 (1.16–1.69)
High	2.0 (1.60–2.55)	1.6 (1.25–1.97)
Unaffordability		
Low	1.4 (1.29–1.57)	1.1 (1.00–1.25)
Middle	1.5 (1.30–1.70)	1.2 (1.01–1.34)
High	1.8 (1.51–2.17)	1.4 (1.17–1.64)
Any problem		
Low	1.2 (1.15–1.30)	1.1 (1.02–1.15)
Middle	1.3 (1.18–1.38)	1.1 (1.01–1.19)
High	1.5 (1.35–1.74)	1.3 (1.12–1.44)
By insurance		
High OOP cost burden		
Any private	1.5 (1.34–1.59)	1.1 (1.05–1.24)
Public only	1.5 (1.32–1.81)	1.2 (1.01–1.41)
Uninsured	2.5 (1.97–3.23)	1.9 (1.48–2.40)
Medical debt		
Any private	2.1 (1.80–2.35)	1.5 (1.32–1.71)
Public only	1.6 (1.31–1.94)	1.2 (0.98–1.46)
Uninsured	1.8 (1.24–2.53)	1.3 (0.92–1.79)
Unaffordability		
Any private	1.7 (1.56–1.95)	1.3 (1.13–1.42)
Public only	1.5 (1.31–1.66)	1.1 (0.96–1.26)
Uninsured	1.4 (1.14–1.74)	1.1 (0.87–1.34)
Any problem		
Any private	1.5 (1.37–1.56)	1.2 (1.09–1.23)
Public only	1.4 (1.25–1.48)	1.1 (0.97–1.18)
Uninsured	1.4 (1.17–1.61)	1.1 (0.92–1.31)

The aPRs were estimated using logistic regression models, controlling for age, sex, race and ethnicity, education, marital status, self-reported physical and mental health, and either income level or insurance type. 95% CIs are shown in parentheses.

single indicators, we examined multiple aspects of health care financial hardship and their co-occurrence, providing a more comprehensive picture of the cumulative financial strain (10). We also directly compared individuals with and without diabetes and stratified results by income and insurance type, offering a more nuanced understanding of which group face the greatest risk.

Our findings highlight the complexity of health care finances. The finding that 13% of adults with diabetes experienced multiple forms of health care financial hardship underscores a compounding effect (16). Rather than existing in isolation, health care financial difficulties appear to exacerbate one another. This compounding effect suggests that when a person faces one type of hardship, such as a high OOP cost burden, they may also face an increased risk of encountering others, such as medical debt or unaffordability. It emphasizes that there might be a need for a more integrated and supportive health care financing approach, particularly one that accounts for the multidimensional and cumulative nature of financial burden among individuals with chronic conditions like diabetes (7).

Moreover, our findings reveal that financial hardship is not limited to low-income populations. Even higher-income individuals with diabetes experienced higher rates of financial hardship than those without diabetes. This may be due to the ongoing costs of medication, supplies, and specialized care, which can impose financial pressure regardless of overall income level. Higher-income individuals may also face unique pressures from other financial obligations, such as mortgages and less eligibility for public assistance, that can limit their flexibility in absorbing unexpected or sustained OOP medical costs. Previous studies confirmed that financial hardship from medical bills affected individuals with diabetes across all income levels, and a substantial proportion of medical bankruptcies involve middle-class families (7,17).

Although health insurance coverage is critical for accessing care, our results indicate that insurance alone may be insufficient to shield individuals with chronic conditions like diabetes from health care–associated financial hardship. Particularly, financial hardship exists even among those with private insurance. Consistent with our findings, a recent study reported that the disparity in financial hardships between individuals with and without diabetes were larger among privately insured adults than among those with public insurance coverage (18). Additional research has similarly shown that having insurance coverage does not necessarily protect against financial hardship from the economic burden of health care. In fact, privately insured individuals have been found to be more likely to report medical debt or to forgo needed medication because of costs compared with those covered by public insurance programs (19,20). Together, these findings underscore concerns about underinsurance, especially among individuals with chronic health conditions. Current benefit designs with many private insurance plans, such as high cost sharing, high deductible, narrow provider networks, rising premiums, and unstable coverage, may lead to health care–related hardship despite coverage (21–23).

This study has several limitations. First, diabetes status was self-reported, which may introduce reporting bias. Second, the cross-sectional design limits causal interpretation. Third, our findings are representative of nonelderly adults and may not generalize to older populations covered by Medicare.

This study highlights the substantial health care–related financial burden faced by nonelderly adults with diabetes in the U.S., which is evident across income levels and insurance types. Policies that address these financial vulnerabilities are needed to support diabetes management.

DUALITY OF INTEREST

No potential conflicts of interest relevant to this article were reported.

AUTHOR CONTRIBUTIONS

X.Z. initiated the research idea, analyzed data, and wrote the manuscript. Y.W., R.L., D.B.R., and P.Z. contributed to discussion and reviewed and edited the manuscript. All authors approved the final version of the manuscript. X.Z. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

PRIOR PRESENTATION

Parts of this study were presented at the 85th Scientific Sessions of the American Diabetes Association, Chicago, IL, 20–23 June 2025.

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