Direct and Indirect Costs Associated With Generalized Anxiety Disorder Among Adults in the United States

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Introduction

Generalized anxiety disorder (GAD) is one of the most prevalent anxiety disorders in the general population[1] and is characterized by excessive and pervasive worry. Earlier research reported an association between diagnosed GAD and considerable health and economic burden,[1] including interference with performing daily activities, lower role functioning and social functioning, and higher rates of comorbid disorders.[2,3]

Despite high prevalence, GAD is under-diagnosed, often leading to under-treatment.[4] Contemporary data are needed to understand the burden of GAD and its downstream economic impact.

This study estimated the costs across adults with diagnosed GAD, those with undiagnosed GAD, and those with no GAD in the US general population.

Methods

Data Source

This cross-sectional, retrospective study analyzed data from the **2022 US National Health and Wellness Survey (NHWS) (n=75,261)**, a nationally representative, online-based, self-report survey.

- Recruitment is designed to represent the general US adult population in terms of age, race/ethnicity, and gender distributions
- Consistent with previous literature, those with cancer were excluded from analysis[5]
- As part of the NHWS survey, respondents reported on 1) demographics, health characteristics, and comorbidities; 2) GAD diagnosis and treatment and completed 3) the Generalized Anxiety Disorder 7-item (GAD-7) screening tool

Study Groups

Adults (aged 18-64 years) were categorized by GAD diagnosis.

Diagnosed GAD (n=4,433) was defined as reporting either (1) GAD diagnosis and perceived anxiety in past 12 months or (2) GAD diagnosis, ever perceived anxiety, and had either GAD negative screen (GAD-7 score <10) with GAD treatment use or had GAD positive screen (GAD-7 score ≥10).

Undiagnosed GAD were those with no GAD diagnosis and a positive screen (GAD-7≥10, n=13,759).

Controls were those with no GAD diagnosis and with a negative screen (n=36,505, GAD-7<10).

Outcome measures included total and stratified direct costs for health care resource utilization (HCRU), including hospitalizations and visits to HCPs and ERs and total and stratified indirect costs for absenteeism and presenteeism. Costs are reported in 2023 USD.

Calculation of costs: Direct costs were derived utilizing mean expenditure data from 2021 United States Medicare Expenditure Panel Survey (MEPS). Mean expenditures were corrected to 2023 dollars utilizing the mean annual medical care consumer price index increase from the 2022-2023 US Bureau of Labor Statistics (BLS). Indirect costs were derived using the median hourly earning in current dollars based on sex and age from the 2023 BLS.

Statistical Analysis: Confounder-adjusted cost outcomes were compared across GAD groups and versus controls using generalized linear models (negative binomial distribution, log link). The models controlled for sociodemographic and health characteristics (eg, age, sex, income, comorbidities). Adjusted means and 95% confidence intervals (CIs) for both total and stratified direct and indirect costs are reported. P-values <0.05, 2-tailed, were considered to be statistically significant.

Results

Table 1: Study Population Demographics and Health Characteristics

Participant Characteristics N =	No GAD 36,505	Undiagnosed GAD 13,759	Diagnosed GAD 4,433
Age (years), Mean ± SD	41.88 ± 13.53	35.51 ± 10.12	38.60 ± 14.57
Female, N (%)	18,136 (49.68)	5,778 (41.99)	3,514 (79.27)
Race, ethnicity, N (%)			
Non-Hispanic White	21,704 (59.45)	7,075 (51.42)	2,769 (62.46)
Non-Hispanic Black	5,001 (13.70)	1,567 (11.39)	471 (10.62)
Hispanic	6,177 (16.92)	4,213 (30.62)	697 (15.72)
Other	3,623 (9.92)	904 (6.57)	496 (11.19)
Married/living with partner, N (%)	23,174 (63.48)	9,905 (71.99)	1,864 (42.05)
College educated, N (%)	20,268 (55.52)	7,353 (53.44)	1,568 (35.37)
Annual household income, N (%)			
$75K or more	20,420 (55.94)	9,295 (67.56)	1,211 (27.32)
$50K to <$75K	5,106 (13.99)	1,193 (8.67)	752 (16.96)
<$50K	9,472 (25.95)	3,002 (21.82)	2,252 (50.80)
Decline to answer	1,507 (4.13)	269 (1.96)	218 (4.92)
Employed, N (%)	27,596 (75.60)	11,223 (81.57)	2,466 (55.63)
Insurance, N (%)			
Private insurance	21,729 (59.52)	5,960 (43.32)	2,331 (52.58)
Public insurance	6,013 (16.47)	2,212 (16.08)	1,592 (35.91)
No insurance	7,630 (20.90)	5,134 (37.31)	397 (8.96)
Insured, unknown type	1,133 (3.10)	453 (3.29)	113 (2.55)
Body mass index category, N (%)			
Not obese	23,519 (64.43)	7,720 (56.11)	2,430 (54.82)
Obese	8,544 (23.41)	2,217 (16.11)	1,758 (39.66)
Decline to answer	4,442 (12.17)	3,822 (27.78)	245 (5.53)
Smoking behavior, N (%)			
Non-smoker	24,889 (68.18)	7,460 (54.22)	2,341 (52.81)
Former smoker	4,856 (13.30)	1,208 (8.78)	1,112 (25.08)
Current smoker	6,760 (18.52)	5,091 (37.00)	980 (22.11)

Table 2: Study Population Comorbidities

Participant Characteristics N =	No GAD 36,505	Undiagnosed GAD 13,759	Diagnosed GAD 4,433
Depression, N (%)			
No depression	27,682 (75.83)	1,539 (11.19)	591 (13.33)
Diagnosed depression	3,982 (10.91)	1,963 (14.27)	3,559 (80.28)
Undiagnosed depression[a]	4,841 (13.26)	10,257 (74.55)	283 (6.38)
Diagnosed with cardiovascular/cerebrovascular condition, N (%)	6,679 (18.30)	1,743 (12.67)	1,469 (33.14)
Diagnosed with pain condition, N (%)	7,107 (19.47)	2,139 (15.55)	2,499 (56.37)
Diagnosed with bone/joint condition, N (%)	5,038 (13.80)	2,521 (18.32)	1,282 (28.92)
Diagnosed with high cholesterol, N (%)	4,726 (12.95)	832 (6.05)	1,072 (24.18)
Diagnosed with pulmonary condition, N (%)	2,422 (6.63)	1,063 (7.73)	974 (21.97)
Diagnosed with other mental health condition, N (%)	2,061 (5.65)	1,342 (9.75)	2,739 (61.79)
Diagnosed with sleep disorder, N (%)	3,335 (9.14)	1,156 (8.40)	1,844 (41.60)
Diagnosed with diabetes, N (%)	2,401 (6.58)	678 (4.93)	507 (11.44)

[a]Undiagnosed depression is defined as having a positive screen (Patient Health Questionnaire-9 for depression score ≥10) and reported no depression diagnosis.
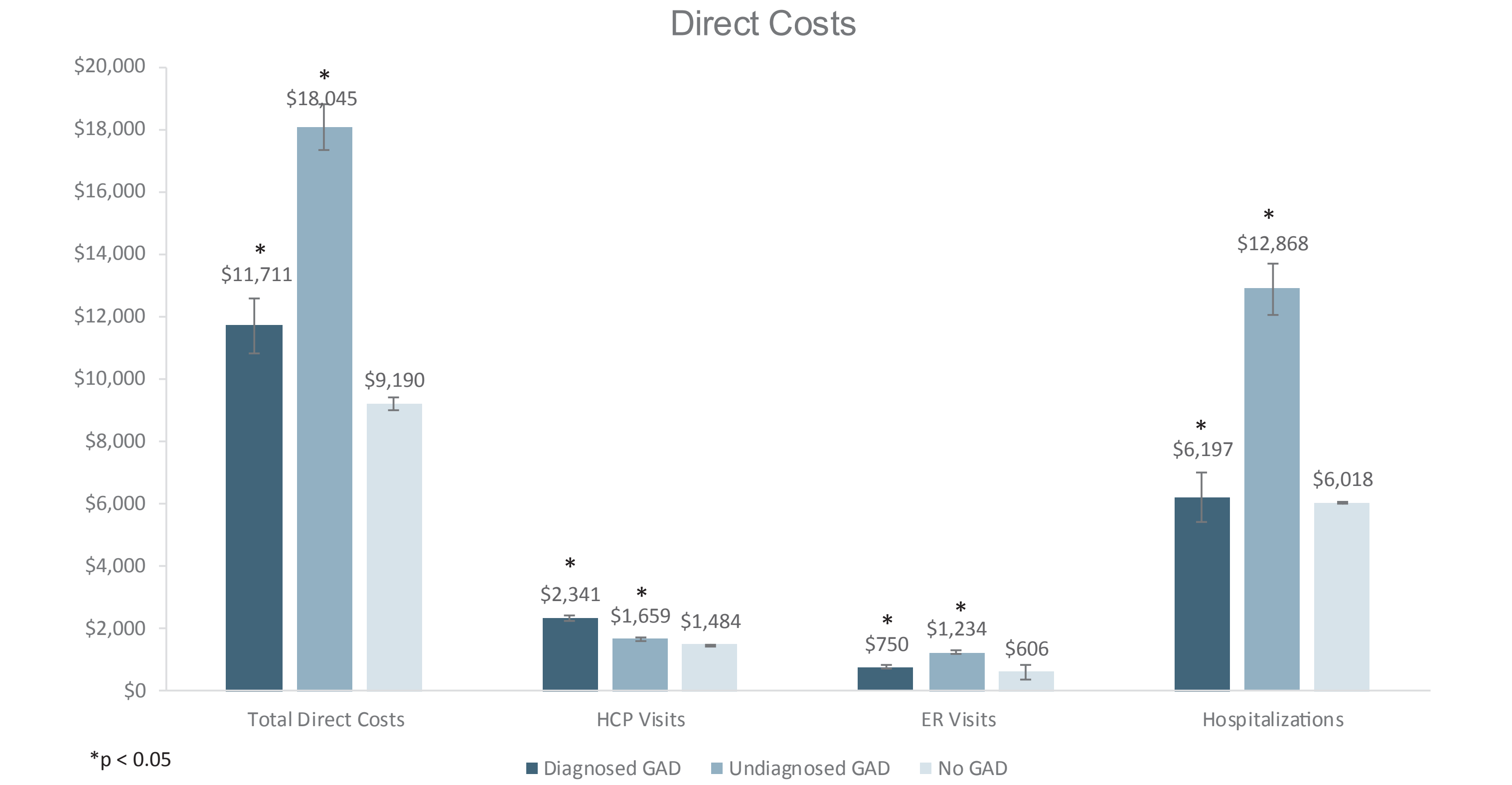

Figure 1: Direct Healthcare-Related Costs Among Participants With GAD

- Adjusted total direct healthcare-related costs were 1.27 and 1.96 times higher among diagnosed ($11,711) and undiagnosed ($18,045) GAD participants compared to no GAD participants ($9,190) (both, *p*<0.01)
- Adjusted total direct healthcare-related costs were greatest among undiagnosed GAD participants compared to other groups (diagnosed GAD vs no GAD vs undiagnosed GAD: $11,711 vs $9,190 vs $18,045)
- Cost of hospitalizations was greatest among undiagnosed GAD participants compared to other groups (diagnosed GAD vs no GAD vs undiagnosed GAD: $6,197 vs $6,018 vs $12,868)
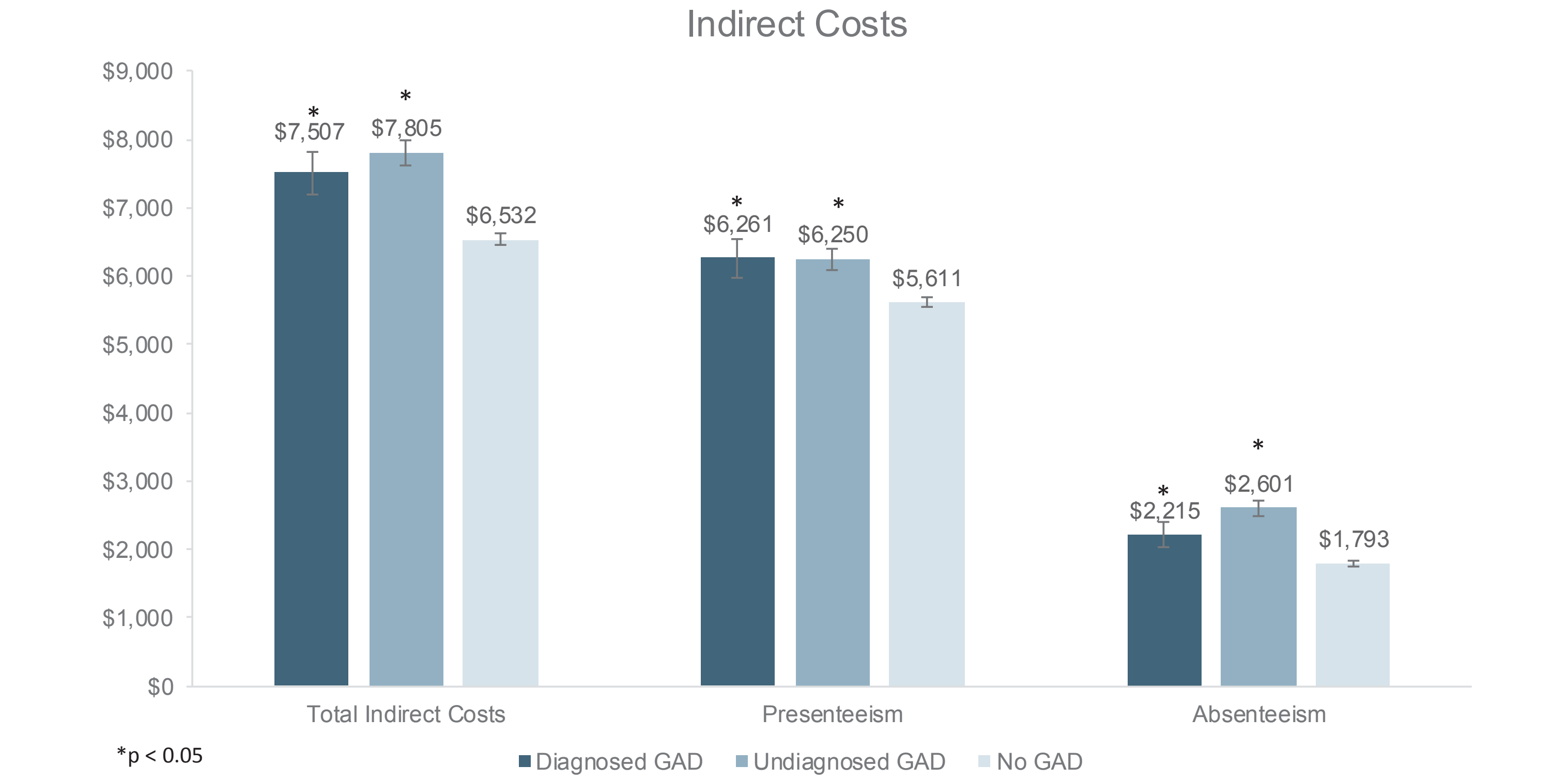

Figure 2: Indirect Costs Among Participants With Diagnosed, Undiagnosed, and No GAD

- Adjusted total indirect costs were 1.15 and 1.20 times higher for diagnosed ($7,507) and undiagnosed ($7,805) GAD participants respectively, compared to no GAD participants ($6,532) (both, *p*<0.01)
- Adjusted total indirect costs between diagnosed and undiagnosed GAD participants were similar to one another, yet both were greater than no GAD participants (diagnosed GAD vs no GAD vs undiagnosed GAD: $7,507 vs $6,532 vs $7,805)
- Similar trends can be observed in both presenteeism and absenteeism

Limitations

- Our study is cross-sectional and thus cannot provide evidence of the potential impact for the associations of GAD diagnosis and economic burden
- All data collected in the survey were self-reported, including GAD diagnosis and HCRU, and survey responses may potentially be affected by recall error or other response biases. While GAD-7 is a validated screening tool for GAD, it is not a diagnostic tool

Strengths

- This study adds to the limited existing knowledge of direct and indirect costs associated with GAD diagnosis
- This study presents evidence on both undiagnosed GAD and diagnosed GAD and their economic impact on patients, providing a more comprehensive depiction of the economic burden faced by the GAD population
- An extensive list of covariates selected based on findings of other published research was adjusted in our models to reduce potential confounding effects
- To define our study cohorts, we used the GAD-7 scale, which has demonstrated good validity and reliability in the general population,[6,7] to screen for GAD
- The large representative sample allows for greater generalizability of the findings

Conclusions

Overall, individuals living with GAD, whether diagnosed or undiagnosed, incurred greater direct and indirect costs compared to the general US population

- Undiagnosed GAD participants were more likely to have greater total direct and indirect annual costs compared to diagnosed and no GAD participants
- Higher total direct costs for undiagnosed GAD participants were primarily driven by higher hospitalization costs
- Total indirect costs associated with presenteeism and absenteeism were greater among the undiagnosed GAD and diagnosed GAD participants than no GAD participants

GAD diagnosis was associated with higher healthcare-related direct and indirect economic burden. As the prevalence of GAD increases, these findings highlight the need for more effective GAD diagnosis and treatment to potentially mitigate the economic burden of disease among the US adult GAD population, individuals, and society

References:
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Abbreviations:
BLS, Bureau of Labor Statistics; CI, confidence interval; ER, emergency room; GAD, generalized anxiety disorder; HCP, healthcare provider; HCRU, healthcare resource utilization; MEPS, Medicare Expenditure Panel Survey; NHWS, National Health and Wellness Survey; SD, standard deviation; WPAI, work productivity and activity impairment; USD, United States Dollar.

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