Health Care Resource Use 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]
- Despite high prevalence, GAD is under-diagnosed, often leading to under-treatment.[2]
- This may, in turn, have a downstream economic impact that has not been well-characterized.

Objective

This study aimed to compare health care resource use (HCRU) among adults who are undiagnosed with GAD and experiencing GAD symptoms (undiagnosed GAD), and adults without GAD, with adults diagnosed with GAD.

Methods

Study Design

- This is a cross-sectional retrospective study.

Data Source

- This study included data from the 2022 National Health and Wellness Survey (NHWS; N=75,261).
- The NHWS is an annual internet-based survey; all data are self-reported. Recruitment is designed to represent the general US adult population in terms of age, race/ethnicity, and gender distributions.
- During the survey, NHWS respondents 1) completed the 7-Item GAD Questionnaire (GAD-7), 2) reported on GAD diagnosis and treatment, 3) reported on HCRU, demographics, health characteristics, and comorbidities.

Inclusion Criteria

- Aged 18-64 years.
- Resident of the US.
- Completed 2022 US NHWS.

Exclusion Criteria

- Participants with other mental health conditions or cancer.
- Screened positive for bipolar disorder on Mood Disorder Questionnaire (MDQ).[3]
- Self-reported a diagnosis of bipolar disorder and/or schizophrenia.
- Self-reported a diagnosis of any type of cancer.

Variables

- Exposure (no-GAD, undiagnosed GAD vs diagnosed GAD)
- Undiagnosed GAD was defined as having a positive GAD screen [GAD-7≥10] and reporting no GAD diagnosis (n=13,759).[4]
- No-GAD was defined as having a negative screen [GAD-7<10] and reporting no GAD diagnosis (n=36,505).[4]
- Diagnosed GAD was defined as reporting a GAD diagnosis (n=4,433).

HCRU Outcomes

- HCRU outcomes included number of health care provider (HCP) visits, emergency room (ER) visits, and hospitalizations within the past 6 months.

Covariates

- Demographics include age, gender, race/ethnicity, marital status, education, household income, employment status, and health insurance.
- Health characteristics include obesity, smoking status, and depression status.[5,6]
- Undiagnosed depression was defined as having a positive screen for depression (the Patient Health Questionnaire-9≥10) and reported no depression diagnosis.[7]
- Comorbidities include self-reported cardiovascular/cerebrovascular conditions, pain, high cholesterol, pulmonary conditions, sleep disorder, diabetes, and other mental health conditions.

Data Analysis

- Undiagnosed GAD and no-GAD groups were compared with the diagnosed GAD group on HCRU outcomes using generalized linear models (GLMs; negative binomial distribution, log link).
- Covariates were adjusted in the GLMs.
- Point estimates and 95% confidence intervals (CIs) for average number of visits and incidence density ratios (IDRs) are reported. P-values <0.05, 2-tailed, were considered to be statistically significant.

Results

Demographics, Health Characteristics, and Comorbidities

- Among the 54,697 participants, 8.1% were diagnosed GAD and 25.2% were **identified as having** undiagnosed GAD.
- The total study sample had an average age of 40.01 years, and 50.2% were female.
- Overall, compared with the diagnosed GAD and no-GAD groups, those with undiagnosed GAD were:
  - Younger and more likely to be male and Hispanic; **(Table 1)**
  - More likely to be married/living with partner, more likely to be employed, and had higher household income; **(Table 1)**
  - Less likely to have private/public insurance; **(Table 1)**
  - More likely to have undiagnosed depression. **(Table 2)**
- In addition, those with undiagnosed GAD were less likely to be diagnosed with other comorbidities than the diagnosed GAD group. **(Table 2)**

Table 1. *Demographics and health characteristics of no-GAD, undiagnosed GAD, and diagnosed GAD*

	No GAD	Undiagnosed GAD	Diagnosed GAD
N	36,505	13,759	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%)

Abbreviations: GAD: generalized anxiety disorder; SD: standard deviation.

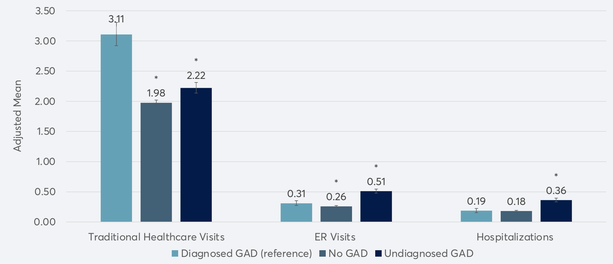
Table 2. *Comorbidities of no-GAD, undiagnosed GAD, and diagnosed GAD*

	No GAD	Undiagnosed GAD	Diagnosed GAD
N	36,505	13,759	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	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%)

GAD with HCRU

- Data on **HCRU by group** are shown in **Figure 1.**
- Diagnosed GAD group had an adjusted average of 3.1 HCP visits, 0.31 ER visits, and 0.19 hospitalizations within the past 6 months.
- Undiagnosed GAD group had an adjusted average of 2.2 HCP visits, 0.51 ER visits, and 0.36 hospitalizations within the past 6 months.
  - Compared with the diagnosed GAD group, the undiagnosed GAD group had significantly lower rates of HCP visits (IDR: 0.71, 95% CI: 0.66-0.77, p<0.01).
  - However, those with undiagnosed GAD were 1.64 times more likely to have an ER visit (95% CI: 1.42-1.90) and 1.95 times more likely to have a hospitalization (95% CI: 1.59-2.40) than the diagnosed GAD group, suggesting significantly greater HCRU among the undiagnosed group (both p<0.01).
- No-GAD group had an adjusted average of 2.0 HCP visits, 0.26 ER visits, and 0.18 hospitalizations within the past 6 months.
  - Compared with the diagnosed GAD group, the no-GAD group had significantly lower rates of HCP visits (IDR: 0.64, 95% CI: 0.59-0.68, p<0.01).
  - Compared with the diagnosed GAD group, the no-GAD group had significantly lower rates of ER visits (IDR: 0.84, 95% CI: 0.73-0.96, p=0.01) and similar hospitalization rates (IDR: 0.97, 95% CI: 0.80-1.19).

Figure 1. *Number of HCP visits, ER visits, and hospitalizations within the past 6 months: undiagnosed GAD, no-GAD vs diagnosed GAD*



Note. Groups that were statistically significant at p<0.05, 2-tailed, compared with diagnosed GAD are marked with asterisks.
Abbreviations: GAD: generalized anxiety disorder; HCP: healthcare provider; ER: emergency room.

Strengths and limitations

Limitations

- Our study is cross-sectional and thus cannot provide evidence of causality for the associations of GAD diagnosis status with HCRU.
- All data collected in the survey, including GAD diagnosis and HCRU, were self-reported, and survey responses may potentially be affected by recall error or other response biases.

Strengths

- This study presents evidence on both undiagnosed GAD and diagnosed GAD and their impact on HCRU, 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.
- The large representative sample allows for greater generalizability of the findings.
- To define our study cohorts, we used the GAD-7 scale, which has demonstrated good validity and reliability in the general population,4,8 to screen for GAD.

Conclusions

Diagnosed GAD **had higher rates of HCP and ER visits** and similar rates hospitalization rates compared with the no-GAD group.

The undiagnosed GAD group had significantly **greater rates of ER visits and hospitalizations** than the diagnosed GAD and no-GAD groups.

These findings lend further support to efforts to screen for, diagnose, and effectively treat GAD to potentially reduce preventable and costly HCRU.

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