

Work Productivity and Activity Impairment Associated with Generalized Anxiety Disorder among Adults in the United States

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Background	Objective	Study Design	Inclusion criteria	Variables	Covariates	Data Analysis
<p>Generalized anxiety disorder (GAD) is one of the most prevalent anxiety disorders in the general population.¹</p> <p>GAD, characterized by excessive and pervasive worry, interferes with performing daily activities and lowers role functioning.^{2,3}</p> <p>Yet, the impact of GAD on performance of work and non-work activities is not well-understood.</p>	<p>This study aimed to quantify the impact on work productivity and daily activities attributed to GAD, overall, and by symptom severity.</p>	<p>Study Design</p> <ul style="list-style-type: none"> This cross-sectional retrospective analysis 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 adult population in terms of age, race/ethnicity, and gender distributions in the US. During the survey, NHWS respondents 1) completed the 7-Item GAD Questionnaire (GAD-7), 2) reported on GAD diagnosis and treatment, 3) completed the Work Productivity and Activity Impairment Questionnaire (WPAI), and 4) reported on demographics, health characteristics, and comorbidities. 	<p>Inclusion criteria</p> <ul style="list-style-type: none"> Aged 18-64 years. Resident of the US. Completed 2022 US NHWS. <p>Exclusion criteria</p> <ul style="list-style-type: none"> Screened positive for bipolar disorder on Mood Disorder Questionnaire (MDQ).⁴ Self-reported a diagnosis of bipolar disorder and/or schizophrenia. Self-reported a diagnosis of any type of cancer. Screened positive for GAD (GAD-7 score ≥10) and self-reported no diagnosis.⁵ 	<p>Variables</p> <ul style="list-style-type: none"> Exposure (GAD by symptom severity vs. control) Adults (aged 18-64 years) diagnosed with GAD were categorized by symptom severity using scores on the GAD-7 screening tool: no (n=872, 0-4); mild (n=1,381, 5-9); moderate (n=1,100, 10-14); and severe (n=1,080, ≥15) GAD symptoms.⁴ Controls were defined as reporting no diagnosis of GAD and having a negative screen (n=36,505, GAD-7<10). Impairment to work and non-work activities The Work Productivity and Activity Impairment Questionnaire (WPAI) provides scores on 4 metrics (absenteeism, presenteeism, overall work productivity impairment, and activity impairment), which can range from 0-100%, with higher scores reflecting greater impairment.⁶ 	<p>Covariates</p> <ul style="list-style-type: none"> 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.^{7,8} Undiagnosed depression was defined as having a positive screen for depression (the Patient Health Questionnaire-9≥10) and reported no depression diagnosis.⁹ Comorbidities include self-reported diagnosis of depression, cardiovascular/cerebrovascular conditions, pain, high cholesterol, pulmonary conditions, sleep disorder, diabetes, and other mental health conditions. 	<p>Data Analysis</p> <ul style="list-style-type: none"> WPAI scores of patients diagnosed with GAD were compared by symptom severity with controls using generalized linear models (GLMs; negative binomial distribution, log link). Covariates were adjusted in the GLMs. Adjusted means and 95% confidence intervals (CIs) were reported. P-values <0.05, 2-tailed were considered to be statistically significant.

Results	Strengths and limitations																																																																																																																																				
<p>Demographics, Health Characteristics, and Comorbidities</p> <ul style="list-style-type: none"> The total study sample had an average age of 41.5 years, and 52.9% were female. Overall, compared with controls, those with diagnosed GAD were: <ul style="list-style-type: none"> Slightly younger and more likely to be female; (Table 1) Less likely to be married/living with partner, educated, and employed; (Table 1) Had lower income; (Table 1) <p>Table 1. Demographics and health characteristics of diagnosed GAD and control</p> <table border="1"> <thead> <tr> <th></th> <th>Diagnosed GAD</th> <th>Control</th> </tr> </thead> <tbody> <tr><td>N</td><td>4,433</td><td>36,505</td></tr> <tr><td>Age (years), Mean ± SD</td><td>38.60 ± 14.57</td><td>41.88 ± 13.53</td></tr> <tr><td>Female, N (%)</td><td>3,514 (79.27%)</td><td>18,136 (49.68%)</td></tr> <tr><td>Race/ethnicity, N (%)</td><td></td><td></td></tr> <tr><td>Non-Hispanic white</td><td>2,769 (62.46%)</td><td>21,704 (59.45%)</td></tr> <tr><td>Non-Hispanic black</td><td>471 (10.62%)</td><td>5,001 (13.70%)</td></tr> <tr><td>Hispanic</td><td>697 (15.72%)</td><td>6,177 (16.92%)</td></tr> <tr><td>Other</td><td>496 (11.19%)</td><td>3,623 (9.92%)</td></tr> <tr><td>Married/living with partner, N (%)</td><td>1,864 (42.05%)</td><td>23,174 (63.48%)</td></tr> <tr><td>College educated, N (%)</td><td>1,568 (35.37%)</td><td>20,268 (55.52%)</td></tr> <tr><td>Annual household income, N (%)</td><td></td><td></td></tr> <tr><td>\$75K or more</td><td>1,211 (27.32%)</td><td>20,420 (55.94%)</td></tr> <tr><td>\$50K to <\$75K</td><td>752 (16.96%)</td><td>5,106 (13.99%)</td></tr> <tr><td><\$50K</td><td>2,252 (50.80%)</td><td>9,472 (25.95%)</td></tr> <tr><td>Decline to answer</td><td>218 (4.92%)</td><td>1,507 (4.13%)</td></tr> <tr><td>Employed, N (%)</td><td>2,466 (55.63%)</td><td>27,596 (75.60%)</td></tr> <tr><td>Insurance, N (%)</td><td></td><td></td></tr> <tr><td>Private insurance</td><td>2,331 (52.58%)</td><td>21,729 (59.52%)</td></tr> <tr><td>Public insurance</td><td>1,592 (35.91%)</td><td>6,013 (16.47%)</td></tr> <tr><td>No insurance</td><td>397 (8.96%)</td><td>7,630 (20.90%)</td></tr> <tr><td>Insured, unknown type</td><td>113 (2.55%)</td><td>1,133 (3.10%)</td></tr> <tr><td>Body mass index category, N (%)</td><td></td><td></td></tr> <tr><td>Not obese</td><td>2,430 (54.82%)</td><td>23,519 (64.43%)</td></tr> <tr><td>Obese</td><td>1,758 (39.66%)</td><td>8,544 (23.41%)</td></tr> <tr><td>Decline to answer</td><td>245 (5.53%)</td><td>4,442 (12.17%)</td></tr> <tr><td>Smoking behavior, N (%)</td><td></td><td></td></tr> <tr><td>Non-smoker</td><td>2,341 (52.81%)</td><td>24,889 (68.18%)</td></tr> <tr><td>Former smoker</td><td>1,112 (25.08%)</td><td>4,856 (13.30%)</td></tr> <tr><td>Current smoker</td><td>980 (22.11%)</td><td>6,760 (18.52%)</td></tr> </tbody> </table> <p>Table 2. Comorbidities of GAD, and control</p> <table border="1"> <thead> <tr> <th></th> <th>Diagnosed GAD</th> <th>Control</th> </tr> </thead> <tbody> <tr><td>N</td><td>4,433</td><td>36,505</td></tr> <tr><td>Depression, N (%)</td><td></td><td></td></tr> <tr><td>No depression</td><td>591 (13.33%)</td><td>27,682 (75.83%)</td></tr> <tr><td>Diagnosed depression</td><td>3,559 (80.28%)</td><td>3,982 (10.91%)</td></tr> <tr><td>Undiagnosed depression</td><td>283 (6.38%)</td><td>4,841 (13.26%)</td></tr> <tr><td>Diagnosed with cardiovascular/cerebrovascular condition, N (%)</td><td>1,469 (33.14%)</td><td>6,679 (18.30%)</td></tr> <tr><td>Diagnosed with pain condition, N (%)</td><td>2,499 (56.37%)</td><td>7,107 (19.47%)</td></tr> <tr><td>Diagnosed with bone/joint condition, N (%)</td><td>1,282 (28.92%)</td><td>5,038 (13.80%)</td></tr> <tr><td>Diagnosed with high cholesterol, N (%)</td><td>1,072 (24.18%)</td><td>4,726 (12.95%)</td></tr> <tr><td>Diagnosed with pulmonary condition, N (%)</td><td>974 (21.97%)</td><td>2,422 (6.63%)</td></tr> <tr><td>Diagnosed with other mental health condition, N (%)</td><td>2,739 (61.79%)</td><td>2,061 (5.65%)</td></tr> <tr><td>Diagnosed with sleep disorder, N (%)</td><td>1,844 (41.60%)</td><td>3,335 (9.14%)</td></tr> <tr><td>Diagnosed with diabetes, N (%)</td><td>507 (11.44%)</td><td>2,401 (6.58%)</td></tr> </tbody> </table> <p>GAD with WPAI</p> <p>Data on WPAI scores by GAD symptom severity are shown in Figure 1.</p> <p>Absenteeism:</p> <ul style="list-style-type: none"> Compared with controls (8.0%, 95% CI: 7.6%-8.4%), absenteeism was statistically significantly higher among the severe GAD group (11.4%, 95% CI: 8.4%-15.5%) (p=0.03). Absenteeism increased as severity worsened among adults diagnosed with GAD (none: 6.0%, 95% CI: 4.5%-8.0%, mild: 7.9%, 95% CI: 6.2%-10.1%, moderate: 9.6%, 95% CI: 7.3%-12.8%, severe: 11.4%, 95% CI: 8.4%-15.5%). <p>Presenteeism:</p> <ul style="list-style-type: none"> Compared with controls (19.3%, 95% CI: 18.8%-19.7%), presenteeism was significantly higher among the mild, moderate, and severe GAD groups (22.6%-26.3%). Presenteeism increased as severity worsened among adults diagnosed with GAD (none: 15.0%, 95% CI: 13.0%, 17.4%, mild: 22.6%, 95% CI: 20.1%-25.6%, moderate: 24.1%, 95% CI: 20.8%-27.8%, severe: 26.3%, 95% CI: 22.5%-30.7%). Presenteeism was significantly lower among adults with diagnosed GAD who had no GAD symptoms (15.0%, 95% CI: 13.0%-17.4%) than controls (19.3%, 95% CI: 18.8%-19.7%) (p<0.01). <p>Overall work productivity:</p> <ul style="list-style-type: none"> Compared with controls (22.5%, 95% CI: 22.0%-22.9%), overall work productivity impairment was statistically significantly higher among the mild, moderate, and severe GAD groups (26.1%-30.0%). Overall work productivity impairment increased as severity worsened among adults diagnosed with GAD (none: 17.7%, 95% CI: 15.4%-20.3%, mild: 26.1%, 95% CI: 23.3%-29.3%, moderate: 27.8%, 95% CI: 24.3%-31.9%, severe: 30.0%, 95% CI: 25.9%-34.7%). Overall work productivity impairment was significantly lower among adults with diagnosed GAD who had no GAD symptoms (17.7%, 95% CI: 15.4%-20.3%) than controls (22.5%, 95% CI: 22.0%-22.9%) (p<0.01). 		Diagnosed GAD	Control	N	4,433	36,505	Age (years), Mean ± SD	38.60 ± 14.57	41.88 ± 13.53	Female, N (%)	3,514 (79.27%)	18,136 (49.68%)	Race/ethnicity, N (%)			Non-Hispanic white	2,769 (62.46%)	21,704 (59.45%)	Non-Hispanic black	471 (10.62%)	5,001 (13.70%)	Hispanic	697 (15.72%)	6,177 (16.92%)	Other	496 (11.19%)	3,623 (9.92%)	Married/living with partner, N (%)	1,864 (42.05%)	23,174 (63.48%)	College educated, N (%)	1,568 (35.37%)	20,268 (55.52%)	Annual household income, N (%)			\$75K or more	1,211 (27.32%)	20,420 (55.94%)	\$50K to <\$75K	752 (16.96%)	5,106 (13.99%)	<\$50K	2,252 (50.80%)	9,472 (25.95%)	Decline to answer	218 (4.92%)	1,507 (4.13%)	Employed, N (%)	2,466 (55.63%)	27,596 (75.60%)	Insurance, N (%)			Private insurance	2,331 (52.58%)	21,729 (59.52%)	Public insurance	1,592 (35.91%)	6,013 (16.47%)	No insurance	397 (8.96%)	7,630 (20.90%)	Insured, unknown type	113 (2.55%)	1,133 (3.10%)	Body mass index category, N (%)			Not obese	2,430 (54.82%)	23,519 (64.43%)	Obese	1,758 (39.66%)	8,544 (23.41%)	Decline to answer	245 (5.53%)	4,442 (12.17%)	Smoking behavior, N (%)			Non-smoker	2,341 (52.81%)	24,889 (68.18%)	Former smoker	1,112 (25.08%)	4,856 (13.30%)	Current smoker	980 (22.11%)	6,760 (18.52%)		Diagnosed GAD	Control	N	4,433	36,505	Depression, N (%)			No depression	591 (13.33%)	27,682 (75.83%)	Diagnosed depression	3,559 (80.28%)	3,982 (10.91%)	Undiagnosed depression	283 (6.38%)	4,841 (13.26%)	Diagnosed with cardiovascular/cerebrovascular condition, N (%)	1,469 (33.14%)	6,679 (18.30%)	Diagnosed with pain condition, N (%)	2,499 (56.37%)	7,107 (19.47%)	Diagnosed with bone/joint condition, N (%)	1,282 (28.92%)	5,038 (13.80%)	Diagnosed with high cholesterol, N (%)	1,072 (24.18%)	4,726 (12.95%)	Diagnosed with pulmonary condition, N (%)	974 (21.97%)	2,422 (6.63%)	Diagnosed with other mental health condition, N (%)	2,739 (61.79%)	2,061 (5.65%)	Diagnosed with sleep disorder, N (%)	1,844 (41.60%)	3,335 (9.14%)	Diagnosed with diabetes, N (%)	507 (11.44%)	2,401 (6.58%)	<p>Limitations</p> <p>Our study is cross-sectional and thus cannot provide evidence of causality for the associations between GAD symptom severity and the impact on work productivity and daily activities.</p> <p>All data collected in the survey were self-reported, and survey responses may potentially be affected by recall error or other response biases.</p> <p>Strengths</p> <ul style="list-style-type: none"> This study adds to the limited existing knowledge of the association of GAD symptom severity with performance of work and non-work activities in a real-world setting. 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,^{4,10} to screen for GAD.
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Conclusions	References
<p>Overall, GAD was associated with greater work productivity loss and daily activity impairment.</p> <p>Adults who were diagnosed with GAD and had moderate or severe GAD symptoms had greater impairment in work productivity and daily activities than controls.</p> <p>Greater GAD symptom severity is associated with greater work productivity loss and daily activity impairment.</p> <p>Adults who were diagnosed with GAD and had no GAD symptoms had less impairment in work productivity and daily activities than controls.</p> <p>Our findings thus support efforts to effectively treat GAD symptoms to potentially mitigate the negative impact on work and non-work activities among the GAD population.</p>	<ol style="list-style-type: none"> Revicki DA, Travers K, Wyrwich KW, et al. Humanistic and economic burden of generalized anxiety disorder in North America and Europe. <i>J Affect Disord.</i> 2012;140(2):103-112. Wittchen HU, Zhao S, Kessler RC, Eaton WW. DSM-III-R generalized anxiety disorder in the National Comorbidity Survey. <i>Arch Gen Psychiatry.</i> 1994;51(5):355-364. Massion AQ, Warshaw MG, Keller MB. Quality of life and psychiatric morbidity in panic disorder and generalized anxiety disorder. <i>Am J Psychiatry.</i> 1993;150(4):600-607. Hirschfeld RM, Holzer C, Calabrese JR, et al. Validity of the Mood Disorder Questionnaire: a general population study. <i>Am J Psychiatry.</i> 2003;160(1):178-180. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. <i>Arch Intern Med.</i> 2006;166(10):1092-1097. Reilly MC, Arthur S, Zbrozek, Ellen M, Dukes. The validity and reproducibility of a work productivity and activity impairment instrument. <i>Pharmacoeconomics.</i> 1993;4(5):353-365. Kroenke K, Spitzer RL, Williams JB (2001) The PHQ-9: validity of a brief depression severity measure. <i>J Gen Intern Med</i> 16:606-613 Löwe B, Decker O, Müller S, et al. Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. <i>Med Care.</i> 2008;46(3):266-274.