

## Original Research

**Cite this article:** Oteng KF, Wallace LJ, Adu MK, Lartey KF, Arthur J, Dwomoh S, Owusu-Antwi R, Tsali DN, Larsen-Reindorf R and Agyapong VIO (2024). Prevalence and Correlates of Likely Anxiety Disorder in Ghana During the COVID-19 Pandemic: Evidence From a Cross-Sectional Online Survey. *Disaster Medicine and Public Health Preparedness*, **18**, e269, 1–10  
<https://doi.org/10.1017/dmp.2024.105>

Received: 08 October 2023

Revised: 18 March 2024

Accepted: 05 April 2024

### Keywords:



anxiety; mental health; COVID-19; pandemic; Ghana

### Corresponding author:

Kenneth Fosu Oteng;

Email: [otengkenneth24@gmail.com](mailto:otengkenneth24@gmail.com)

# Prevalence and Correlates of Likely Anxiety Disorder in Ghana During the COVID-19 Pandemic: Evidence From a Cross-Sectional Online Survey

Kenneth Fosu Oteng<sup>1</sup> , Lauren J. Wallace<sup>2</sup>, Medard Kofi Adu<sup>3</sup>, Kwabena Fosu Lartey<sup>4</sup>, Joshua Arthur<sup>5</sup>, Samuel Dwomoh<sup>1</sup>, Ruth Owusu-Antwi<sup>6</sup>, Diana Nunana Tsali<sup>7</sup>, Rita Larsen-Reindorf<sup>1</sup> and Vincent I.O. Agyapong<sup>3</sup> 

<sup>1</sup>Ashanti Regional Health Directorate, Ghana Health Service, Kumasi, Ghana; <sup>2</sup>Dodowa Health Research Centre, Ghana Health Service, Dodowa, Ghana; <sup>3</sup>University of Alberta Faculty of Medicine & Dentistry, Department of Psychiatry, Edmonton, Alberta, Canada; <sup>4</sup>Chan School of Public Health, Harvard University, Boston, MA, USA; <sup>5</sup>Public Health Unit, Komfo Anokye Teaching Hospital, Kumasi, Ghana; <sup>6</sup>Komfo Anokye Teaching Hospital, Department of Psychiatry, Kumasi, Ghana and <sup>7</sup>Kumasi South Hospital, Kumasi, Ashanti Region, Ghana

## Abstract

**Background:** The COVID-19 pandemic created stressors to daily living, leading to increased mental health problems. It is important to assess the influence of COVID-19 pandemic on mental health, specifically anxiety.

**Objectives:** The goal was to determine the prevalence and sociodemographic, clinical, and other correlates of likely Generalized Anxiety Disorder (GAD) among study subjects in Ghana.

**Design:** This study employed a cross-sectional approach, using an online survey administered primarily through social media platforms. The survey questions included the GAD-7 scale, which was used to assess likely GAD in respondents. Data were analyzed using descriptive statistics, chi-square tests, and logistic regression analysis.

**Participants:** Overall, 756 respondents completed the survey, mainly from Ashanti and Greater Accra, which were the hardest hit by COVID-19.

**Results:** The prevalence of likely GAD in our sample was 7.6%. Gender, loss of job due to COVID-19, and seeking mental health counseling were independently associated with increased likelihood of GAD.

**Conclusions:** The findings suggest that women, those who lost their jobs due to the COVID-19 pandemic, and those who sought mental health counseling were more likely to experience moderate to high anxiety symptoms as a result of the COVID-19 pandemic. Priority must be attached to psychological support measures for members of these groups.

The COVID-19 pandemic has had a substantial impact on the lives and well-being of people globally and has created new stressors and disruptions to daily living for people around the world.<sup>1</sup> This includes concern for one's own health and that of one's close relations, as well as constant exposure to information about the pandemic and its adverse effects.<sup>2</sup> Policy measures implemented by authorities to limit the spread of the disease, including stay-at-home orders, have also resulted in limits on individuals' movements, decreased social contact, and adverse economic effects on individuals and countries at large.<sup>3</sup> Many have suffered feelings of isolation and helplessness due to the enormity of the pandemic as well as control measures adopted.<sup>4</sup>

Evidence suggests that outbreaks of communicable diseases can cause individuals to experience increased mental health problems, including symptoms of psychosis, trauma, suicidal ideation, and panic.<sup>5,6</sup> Key among these problems is anxiety, which is a distressing feeling of nervousness or tension linked to physical changes such as increased blood pressure, sweating, trembling, dizziness, or a rapid heartbeat and defensive behaviors such as avoidance.<sup>7</sup> Studies during the COVID-19 pandemic have showed increased levels of anxiety in the general population and in specific groups such as students and health workers.<sup>8–15</sup> In studies of anxiety in Canada and India conducted during the pandemic, 47% and 28% of respondents, respectively, were moderately to severely anxious.<sup>8,10</sup>

Differences in rates of anxiety between populations may be due to the timing of the inquiry around a particular outbreak—whether early in the outbreak, at the peak, or in the post-outbreak period. Other differences could be attributable to contextual factors, demography, and health system factors. The psychological impact of COVID-19 is higher in places with a higher prevalence of COVID-19 and can worsen with increased media exposure.<sup>9,13,16</sup> Moreover, individuals who

reside in settings with recently imposed quarantine and prolonged restrictive measures, including lockdowns, are more likely to experience anxiety.<sup>17,18</sup> Consistent with the patterns of the prevalence of anxiety and other mental health issues more generally, women have been more affected by anxiety during the pandemic than men.<sup>8,9,13,14,17,19</sup> Studies also find that levels of anxiety during this period have been higher in younger age groups (20–40 years)<sup>20</sup>, potentially due to uncertainty and concerns about employment status, since that age bracket is greatly represented in the active labor force.<sup>9,12,16</sup> In some contexts, anxiety is positively associated with employment.<sup>12,10</sup> For instance, studies indicate that severe anxiety and other mental health effects are more likely in occupations with intense working conditions and risk of exposure to COVID-19, such as nursing and other frontline work.<sup>14,19,21,28</sup> In other contexts, anxiety is also associated with job loss.<sup>22</sup>

Findings from current and past disease outbreaks also revealed that marital status is correlated with the likelihood of experiencing anxiety. During the pandemic, individuals who were single, separated, or widowed were more likely to experience anxiety<sup>17,22</sup>; relatedly, people with strong social support were less likely to experience anxiety.<sup>23</sup> Findings from current and past disease outbreaks also implicate concerns about preexisting chronic disease, health of self and family, and current or preexisting psychiatric illness as correlates of anxiety. Individuals with poor health status, including a history of existing or prior medical conditions (both physical and mental), are more likely to experience anxiety.<sup>13,17,24,25</sup> Having a high level of confidence in doctors,<sup>26</sup> observing precautionary measures,<sup>27</sup> being satisfied with the health information received from authorities,<sup>26</sup> low perceived risk of contracting COVID-19,<sup>28</sup> and high perceived likelihood of survival<sup>26</sup> decreased the risk of individuals experiencing anxiety during the COVID-19 pandemic.<sup>13</sup>

Individuals who suffer health anxiety during a pandemic may carry out disruptive behaviors such as rushing to and from overcrowded stores or may be reluctant to seek medical assistance. Conversely, anxiety may also cause individuals to visit doctors and pursue tests repeatedly for reassurance while neglecting to seek mental health assistance, believing their condition to be somatic. Higher-than-normal levels of anxiety can decrease immune system functioning, increasing the risk of infection and of severe disease.<sup>29</sup> Increased anxiety is also associated with suicidal behavior, and several studies have indicated a concern for possible increases in suicide attempts during the pandemic.<sup>30,31</sup> To the best of our knowledge, no previous study has examined the effect of the COVID-19 pandemic on anxiety levels in the general adult population in Ghana. This study aims to determine the prevalence of likely Generalized Anxiety Disorder (GAD) as well as the socio-demographic, clinical, and other COVID-19-related factors influencing likely GAD symptoms among the general population during the COVID-19 pandemic.

## Methods

The methods and information about the study site have been published in a related study.<sup>32</sup> We employed a cross-sectional approach, utilizing a web-based survey that included demographic, social, clinical, and COVID-19-related variables adapted from survey questions used to gather baseline data from Text4hope subscribers in Canada during the COVID pandemic.<sup>33,34</sup> The study assessed symptoms of anxiety using the Generalized Anxiety Disorder 7-item (GAD-7) scale.<sup>35</sup> The survey was hosted

on the Qualtrics XM platform as a web-based survey. A link to the survey was forwarded to respondents primarily through WhatsApp-based platforms, including specific groups for nurses, doctors, and students, as well as for general public groups for residents in Ghana. Data were collected in November 2020 and January 2021, in between the first and second COVID-19 waves.

With an estimated population in Ghana of 30 million people, using the sample size calculator (available online: <https://www.surveymonkey.com/mp/sample-size-calculator/> accessed on May 1, 2021), the sample size needed to estimate the prevalence for likely GAD with a 95% confidence interval and a 3% margin of error was 1068.

Ethics approval was obtained from the Ghana Health Service Ethics Review Committee [*GHS-ERC 027/08/20*]. Informed consent was sought from respondents by providing them comprehensive information about the benefits and risks of the study and asking about their agreement to participate in the study immediately after the survey was started. If they responded “no,” the survey was immediately terminated. We also included a footnote in all sections of the survey informing respondents they could terminate the survey at any time.

## Data Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics for demographic characteristics were reported in numbers and percentages. Cross-tabular bivariate analyses with chi-square or Fisher’s exact tests were used to explore the relationship between the categorical variables and moderate/high anxiety (‘likely GAD’). Variables with a statistically significant relationship ( $p < 0.05$ , two-tailed) and variables that trended toward significance ( $0.05 \leq p \leq 0.10$ , two-tailed) with likely GAD on bivariate analysis were entered into a logistic regression model. Prior to performing the logistic regression analysis, correlational diagnostics were performed to identify any strong intercorrelations (Spearman’s correlation coefficient of  $\pm 0.7$ – $1.0$ ) among predictor variables. If high intercorrelations between two predictor variables were identified, we planned to reach a consensus among members of the study group on which variables to include in the regression model based on their relative relevance to the outcome of interest. Odds ratios from the binary logistic regression analysis were examined to determine the association between each of the variables in the model and likely GAD, controlling for the other variables in the model.

## Results

Respondents were fairly balanced between males and females, with majority residing in the Ashanti Region, having a university or college degree, being married, and being employed in a government agency. The prevalence for likely GAD in our sample was higher in female respondents (10.5%) compared to male respondents (4.7%). The prevalence of likely GAD in our overall sample was 7.6% (Table 1).

## Bivariate Analysis

The association between all variables examining sociodemographic factors, COVID-19 news exposure, and anxiety-related variables and likely GAD is illustrated in Table 2. Gender, employment, and relationship status, fear of contracting COVID-19, having a family member or relative sick with COVID-19, loss of job during the

**Table 1.** Gender distribution of demographic and COVID-19-related characteristics of respondents

Variable	Male N (%)	Female N (%)	Overall N (%)
<b>Age (years)</b>			
25 and under	25 (7.6%)	68 (19.3%)	93 (13.6%)
26-40	<b>225 (68.0%)</b>	<b>200 (56.7%)</b>	425 (62.1%)
41-60	72 (21.8%)	73 (20.7%)	145 (21.2%)
61 and older	9 (2.7%)	12 (3.4%)	21 (3.1%)
<b>Region</b>			
Ashanti	199 (64.4%)	216 (63.9%)	415 (64.5%)
Greater Accra	68 (22.0%)	87 (25.7%)	155 (24.0%)
Others	42 (13.6%)	35 (10.4%)	77 (11.9%)
<b>Education</b>			
Up to junior high school	10 (3.2%)	26 (7.7%)	36 (5.6%)
Senior high school	21 (6.8%)	34 (10.1%)	55 (8.5%)
University/college/post-graduate	278 (90.0%)	277 (82.2%)	555 (85.9%)
<b>Relationship status</b>			
Single	117 (37.9%)	125 (37.0%)	242 (37.4%)
In a relationship but not married	34 (11.0%)	49 (14.5%)	83 (12.8%)
Married	152 (49.2%)	143 (42.3%)	295 (45.6%)
Divorced, separated, or widowed	6 (1.9%)	21 (6.2%)	27 (4.2%)
<b>Employment</b>			
Employed at gov't agency	192 (62.3%)	176 (52.1%)	368 (57.0%)
Private agency	50 (16.2%)	53 (15.7%)	103 (15.9%)
Self-employed	35 (11.4%)	31 (9.2%)	66 (10.2%)
Unemployed	13 (4.2%)	41 (12.1%)	54 (8.4%)
Retired	6 (1.9%)	6 (1.8%)	12 (1.9%)
Student	12 (3.9%)	31 (9.2%)	43 (6.7%)
<b>Currently work in health care</b>			
Yes	173 (56.0%)	168 (49.7%)	341 (52.7%)
No	136 (44.0%)	170 (50.3%)	306 (47.3%)
<b>Health-care profession</b>			
Physicians and physician assistants	58 (34.3%)	42 (25.8%)	100 (30.1%)
Nurses and midwives	47 (27.8%)	86 (52.8%)	133 (40.1%)
Other health-care professional	64 (37.9%)	35 (21.5%)	99 (29.8%)
<b>Did you ever work in a designated holding/isolation center or treatment center as a health worker?</b>			
Yes	77 (45.6%)	62 (37.6%)	139 (41.6%)
No	92 (54.4%)	103 (62.4%)	195 (58.4%)
<b>Self-isolated or self-quarantined due to symptoms, recent travel, or contact with someone who may have COVID-19?</b>			
Yes	62 (21.2%)	67 (21.5%)	129 (21.4%)

(Continued)

**Table 1.** (Continued)

Variable	Male N (%)	Female N (%)	Overall N (%)
No	230 (78.8%)	245 (78.5%)	475 (78.6%)
<b>Have any of your close friends or family members been sick from COVID-19?</b>			
Yes	85 (29.1%)	84 (27.0%)	169 (28.0%)
No	207 (70.9%)	227 (73.0%)	434 (72.0%)
<b>During the COVID-19 pandemic, have you been fearful about contracting COVID-19?</b>			
Yes	196 (67.4%)	229 (73.2%)	425 (70.4%)
No	95 (32.6%)	84 (26.8%)	179 (29.6%)
<b>During the COVID-19 pandemic, how frequently have you read newspaper stories, internet articles, or social media posts related to the pandemic?</b>			
Daily	188 (64.4%)	178 (57.1%)	366 (60.6%)
About every other day	62 (21.2%)	72 (23.1%)	134 (22.2%)
About once a week	24 (8.2%)	32 (10.3%)	56 (9.3%)
Less than once a week	14 (4.8%)	25 (8.0%)	39 (6.5%)
I did not read news related to the pandemic	4 (1.4%)	5 (1.6%)	9 (1.5%)
<b>During the COVID-19 pandemic, how frequently did you hear radio stories of sick and dead people caused by COVID-19?</b>			
Daily	209 (71.6%)	197 (62.9%)	406 (67.1%)
About every other day	48 (16.4%)	58 (18.5%)	106 (17.5%)
About once a week	24 (8.2%)	30 (9.6%)	54 (8.9%)
Less than once a week	6 (2.1%)	16 (5.1%)	22 (3.6%)
I did not watch or hear radio stories of sick and dead people caused by COVID-19	5 (1.7%)	12 (3.8%)	17 (2.8%)
<b>During the COVID-19 pandemic, how frequently did you watch television images of sick and dead people caused by COVID-19?</b>			
Daily	146 (50.0%)	148 (47.3%)	294 (48.6%)
About every other day	66 (22.6%)	66 (21.1%)	132 (21.8%)
About once a week	40 (13.7%)	35 (11.2%)	75 (12.4%)
Less than once a week	17 (5.8%)	31 (9.9%)	48 (7.9%)
I did not watch images on any media of sick and dead people caused by COVID-19	23 (7.9%)	33 (10.5%)	56 (9.3%)
<b>Did you lose your job due to the COVID-19 pandemic?</b>			
Yes	13 (4.5%)	16 (5.2%)	29 (4.8%)
No	251 (86.0%)	243 (78.4%)	494 (82.1%)
I did not have a job before the COVID-19 pandemic	28 (9.6%)	51 (16.5%)	79 (13.1%)

(Continued)

Table 1. (Continued)

Variable	Male N (%)	Female N (%)	Overall N (%)
<b>Have you had sufficient support from family and friends since the COVID-19 pandemic was declared?</b>			
Yes, I have had absolute support	109 (37.3%)	147 (47.3%)	256 (42.5%)
Yes, I have had some support	73 (25.0%)	84 (27.0%)	157 (26.0%)
Yes, but only limited support	24 (8.2%)	23 (7.4%)	47 (7.8%)
No	86 (29.5%)	57 (18.3%)	143 (23.7%)
<b>Have you had sufficient support from spiritual organizations and/or traditional healers/ mentors since the COVID-19 pandemic was declared?</b>			
Yes, I have had absolute support	45 (15.5%)	71 (22.8%)	116 (19.3%)
Yes, I have had some support	55 (18.9%)	77 (24.8%)	132 (21.9%)
Yes, but only limited support	27 (9.3%)	26 (8.4%)	53 (8.8%)
No	164 (56.4%)	137 (44.1%)	301 (50.0%)
<b>Have you had sufficient support from the Government of Ghana since the COVID-19 pandemic was declared?</b>			
Yes, I have had absolute support	49 (16.8%)	59 (19.0%)	108 (17.9%)
Yes, I have had some support	103 (35.3%)	103 (33.1%)	206 (34.2%)
Yes, but only limited support	65 (22.3%)	61 (19.6%)	126 (20.9%)
No	75 (25.7%)	88 (28.3%)	163 (27.0%)
<b>Have you had sufficient support from your employer since the COVID-19 pandemic was declared?</b>			
Yes, I have had absolute support	58 (19.9%)	47 (15.2%)	105 (17.5%)
Yes, I have had some support	81 (27.8%)	83 (26.8%)	164 (27.3%)
Yes, but only limited support	53 (18.2%)	43 (13.9%)	96 (16.0%)
No	73 (25.1%)	72 (23.2%)	145 (24.1%)
I am not currently employed	26 (8.9%)	65 (25.0%)	91 (15.1%)
<b>Have you sought mental health counseling since the COVID-19 pandemic was declared?</b>			
Yes	21 (7.2%)	12 (3.9%)	33 (5.5%)
No	271 (92.8%)	296 (96.1%)	567 (94.5%)
<b>Have you received mental health counseling since the COVID-19 pandemic was declared?</b>			
Yes	41 (14.1%)	28 (9.0%)	69 (11.5%)
No	250 (85.9%)	282 (91.0%)	532 (88.5%)
<b>Would you like to receive mental health counseling for psychological distress related to the COVID-19 pandemic?</b>			
Yes	38 (13.0%)	47 (15.0%)	85 (14.0%)

(Continued)

Table 1. (Continued)

Variable	Male N (%)	Female N (%)	Overall N (%)
Maybe	102 (34.9%)	83 (26.5%)	185 (30.6%)
No	149 (51.0%)	180 (57.5%)	329 (54.4%)
I am currently receiving mental health counseling for psychological distress related to the COVID-19 pandemic	3 (1.0%)	3 (1.0%)	6 (1.0%)
<b>Likely GAD</b>			
Yes	11 (4.7%)	26 (10.5%)	37 (7.6%)
No	227 (95.4%)	221 (89.5%)	448 (92.4%)

pandemic, level of support received from employer, and seeking mental health support were significantly associated with likely GAD ( $p \leq 0.05$ ). For example, respondents who were female, unemployed, or single had a higher prevalence of likely GAD compared to respondents with other characteristics. Similarly, respondents who expressed that they had been fearful of contracting COVID-19 as well as those who reported they had lost their jobs during the pandemic had higher prevalence of likely GAD compared to respondents with other characteristics. Other variables such as frequency of exposure to COVID-19-related news were not significantly associated with likely GAD.

### Logistic Regression

The full model containing all twelve predictors was significant,  $X^2(21, N = 475) = 93.2, p < 0.001$  indicating the model was able to distinguish between individuals who reported moderate/high anxiety symptoms versus those who reported low anxiety symptoms. The model explained between 17.8% (Cox and Snell  $R^2$ ) and 44.2% (Nagelkerke  $R^2$ ) of the variance. Additionally, 94.5% of all cases were correctly classified. As shown in Table 3, respondents who were female were 2.8 times more likely to have likely GAD compared to male respondents. Similarly, respondents who did not lose their job due to COVID-19 were 0.6 times less likely to present with likely GAD compared to those who lost their jobs due to COVID-19. This implies that respondents who lost their job during the COVID pandemic were 1.67 (1/0.6) times more likely to present with likely GAD symptoms compared to respondents who did not lose their job. Similarly, respondents who did not seek counseling during the pandemic were 0.13 times less likely to present with likely GAD compared to respondents who sought counseling. This also implies that respondents who sought counseling were 7.7 (1/0.13) times more likely to present with likely GAD symptoms compared to respondents who did not seek counseling.

Employment status, relationship, religion, working in health care, having a family member or friend who is sick from COVID, fear of contracting COVID-19 infection, and level of employer support were not independently significantly associated with likely GAD, controlling for all other factors in the model.

### Discussion

The prevalence of likely GAD in this study (7.6%) was lower than that reported in Canada (47%), where a similar survey that utilized the same scale and cutoff scores was carried out, as well as in India (28%).<sup>8,10</sup> The disparity between our findings and those of the Indian study, which used the DASS tool rather than the GAD-7,



**Table 2.** Chi-square/Fisher's exact\* tests of association between the demographic antecedents and likely GAD

Variables	Likely GAD number (%)	Chi-square/Fisher's exact test*	P-value
<b>Gender</b>			
Male	11 (4.6%)	5.996	<b>.014</b>
Female	26 (10.5%)		
<b>Age (Years)</b>			
≤25	7 (11.7%)		
26-40	27 (8.9%)	*	<b>.139</b>
41-60	3 (2.8%)		
>60	1 (6.3%)		
<b>Region</b>			
Ashanti	20 (6.2%)	*	
Greater Accra	14 (12.5%)		.097
Others	4 (7.85)		
<b>Education</b>			
Up to junior high school	2 (6.3%)		
Senior high school	1 (2.75)	*	<b>.444</b>
University/college/post-graduate	35 (8.4%)		
<b>Employment</b>			
Employed gov't agency	15 (5.4%)		
Private agency	11 (14.1%)		
Self-employed	0 (0.0%)	*	<b>&lt;.001</b>
Unemployed	10 (23.8%)		
Retired	0 (0.0%)		
Student	2 (7.4%)		
<b>Do you currently work in health care?</b>			
Yes	14 (5.7%)	3.035	<b>.082</b>
No	24 (9.9%)		
<b>Health-care profession</b>			
Physicians and physician assistants	3 (4.1%)		
Nurses and midwives	6 (6.2%)	*	<b>.761</b>
Other health-care professional	5 (6.7%)		
<b>Relationship status</b>			
Single	22 (11.6%)		
In a relationship but not married	6 (10.2%)	*	<b>.033</b>
Married	9 (4.1%)		
Divorced, separated, or widowed	1 (4.5%)		
<b>Housing status</b>			
Own home or mortgage	9 (8.0%)		
Renting accommodation	16 (6.4%)	*	<b>.188</b>
Live with family or friends	13 (12.1%)		
If housing not listed, please specify	0 (0.0%)		

(Continued)

**Table 2.** (Continued)

Variables	Likely GAD number (%)	Chi-square/Fisher's exact test*	P-value
<b>Did you ever work in a designated holding/ isolation center or treatment center as a health worker?</b>			
Yes	9 (8.2%)	2.300	<b>.129</b>
No	5 (3.7%)		
<b>Self-isolated or self-quarantined due to symptoms, recent travel, or contact with someone who may have COVID-19?</b>			
Yes	9 (9.1%)	.294	<b>.588</b>
No	29 (7.5%)		
<b>Have any of your close friends or family members been sick from COVID-19?</b>			
Yes	15 (11.2%)	3.868	<b>.049</b>
No	21 (6.0%)		
<b>During the COVID-19 pandemic, have you been fearful about contracting COVID-19?</b>			
Yes	37 (11.0%)		
No	1 (0.7%)	*	<b>.001</b>
<b>During the COVID-19 pandemic, how frequently have you read newspaper stories, internet articles, or social media posts related to the pandemic?</b>			
Daily	20 (6.6%)		
About every other day	12 (11.3%)	*	
About once a week	2 (4.4%)		
Less than once a week	4 (14.8%)		<b>.230</b>
I did not read news related to the pandemic	0 (0.0%)		
<b>During the COVID-19 pandemic, how frequently did you hear radio stories of sick and dead people caused by COVID-19?</b>			
Daily			
About every other day	26 (7.9%)		
About once a week	6 (6.7%)		
Less than once a week	3 (7.7%)	*	<b>.264</b>
I did not watch or hear radio stories of sick and dead people caused by COVID-19	0 (0.0%) 3 (21.4%)		
<b>During the COVID-19 pandemic, how frequently did you watch television images of sick and dead people caused by COVID-19?</b>			
Daily			

(Continued)

Table 2. (Continued)

Variables	Likely GAD number (%)	Chi-square/ Fisher's exact test*	P-value
About every other day	15 (6.2%)		
About once a week	8 (7.4%)	*	<b>.444</b>
Less than once a week	5 (8.8%)		
I did not watch images on any media of sick and dead people caused by COVID-19	4 (10.8%) 6 (14.0%)		
<b>Did you lose your job due to the COVID-19 pandemic?</b>			
Yes	6 (24.0%)		
No	23 (5.8%)		
I did not have a job before the COVID-19 pandemic	9 (13.8%)	14.645	<b>.001</b>
<b>Have you had sufficient support from family and friends since the COVID-19 pandemic was declared?</b>			
Yes, I have had absolute support	19 (8.8%)		
Yes, I have had some support	6 (4.9%)		
Yes, but only limited support	3 (9.1%)	*	<b>.576</b>
No	10 (8.8%)		
<b>Have you had sufficient support from spiritual organizations and/or traditional healers/ mentors since the COVID-19 pandemic was declared?</b>			
Yes, I have had absolute support	11 (11.8%)		
Yes, I have had some support	7 (6.0%)		
Yes, but only limited support	5 (15.2%)	5.950	<b>.114</b>
No	15 (6.2%)		
<b>Have you had sufficient support from the Government of Ghana since the COVID-19 pandemic was declared?</b>			
Yes, I have had absolute support	7 (7.4%)		
Yes, I have had some support	8 (4.9%)		
Yes, but only limited support	7 (6.9%)	5.755	<b>.124</b>
No	16 (12.4%)		
<b>Have you had sufficient support from your employer since the COVID-19 pandemic was declared?</b>			
Yes, I have had absolute support	6 (7.2%)		
Yes, I have had some support	5 (3.8%)		
Yes, but only limited support	4 (5.3%)		
No	12 (9.8%)	*	<b>.041</b>
I am not currently employed	11 (15.3%)		
<b>Have you sought mental health counseling since the COVID-19 pandemic was declared?</b>			

(Continued)

Table 2. (Continued)

Variables	Likely GAD number (%)	Chi-square/ Fisher's exact test*	P-value
Yes	6 (22.2%)	8.607	<b>.003</b>
No	31 (6.8%)		
<b>Have you received mental health counseling since the COVID-19 pandemic was declared?</b>			
Yes	5 (9.1%)	.135	<b>.713</b>
No	33 (7.7%)		
<b>Would you like to receive mental health counseling for psychological distress related to the COVID-19 pandemic?</b>			
Yes	9 (13.8%)		
Maybe	13 (9.2%)		
No	16 (5.8%)	*	<b>.133</b>
I am currently receiving mental health counseling for psychological distress related to the COVID-19 pandemic	0 (0.0%)		
<b>Did you receive a mental health diagnosis from a health professional before the COVID-19 pandemic was declared?</b>			
Yes	0 (0.0%)		
No	38 (8.0%)	*	<b>.352</b>
<b>Were you on medication for a mental health concern before the COVID-19 pandemic was declared?</b>			
Yes	2 (100%)		
No	10 (100%)	*	*
<b>Are you drinking more alcohol than you were used to before the COVID-19 pandemic was declared?</b>			
Yes, and it is affecting my work, school, family, or social life	0 (0.0%)		
Yes, but it is not affecting my work, school, family, or social life	0 (0.0%)		
No	14 (6.3%)	*	<b>.506</b>
No, I did not drink alcohol even before the COVID-19 pandemic was declared	24 (9.4%)		
<b>Are you using cannabis (weed) more than you used to before the COVID-19 pandemic was declared?</b>			
Yes, and it is affecting my work, school, family, or social life	0 (0.0%)		
Yes, but it is not affecting my work, school, family, or social life	1 (25.0%)		

(Continued)

Table 2. (Continued)

Variables	Likely GAD number (%)	Chi-square/Fisher's exact test*	P-value
No	13 (7.3%)	*	<b>.613</b>
No, I did not use cannabis even before the COVID-19 pandemic was declared	24 (7.9%)		
<b>Are you using drugs (excluding medication prescribed by a doctor) more than you used to before the before the COVID-19 pandemic was declared?</b>			
Yes, and it is affecting my work, school, family, or social life	0 (0.0%)		
Yes, but it is not affecting my work, school, family, or social life	1 (10.0%)		
No	15 (7.3%)	*	<b>.963</b>
No, I did not use drugs even before the COVID-19 pandemic was declared	22 (8.2%)		

may be attributed to differences in the anxiety assessment instrument used. The disparity between our findings and those reported in Canada, which used the same scale and cutoff scores to assess anxiety, could be due to differences in cultural factors and contextual factors, such as the higher rate of COVID-19 mortality and morbidity in Canada compared to Ghana, as well as differences in health systems' responses to the pandemic.<sup>36</sup>

The prevalence for likely GAD in our sample was 10.5% in women compared with 4.7% in men. Women were 2.8 times more likely to have moderate to high anxiety symptoms as compared with men. Both biological and social factors are expected to play a role in females being more anxious about COVID-19 than males. Women are reported to be more sensitive to stress hormones and threats and less likely to use adaptive coping strategies than men.<sup>37</sup> It has also been reported that women tend to assume more caregiving responsibilities and tend to be employed in lower paying jobs with less job security. Our findings are in line with those of other studies conducted during the COVID-19 pandemic in Iran,<sup>9</sup> China,<sup>38,39</sup> and Turkey.<sup>13</sup>

Losing one's job due to COVID-19 pandemic measures was associated with likely GAD.

This finding is consistent with the work of others, who suggest that those who lose their jobs are likely to be more anxious due to their inability to cater for themselves and their families.<sup>40,41</sup> A nationally representative survey of partial lockdown districts in Ghana in June 2020 reported that some job losses were a direct result of COVID-19-related work suspensions.<sup>42</sup> In contrast, this study found no significant difference in likely GAD prevalence between those who were unemployed and those who were employed in a government agency; this contrasts with a Canadian study, which reported higher anxiety levels in respondents who were unemployed compared to those employed in a government agency.<sup>34</sup> Our study did not show that health care workers were more likely to experience GAD. Working in the health sector did not show any relationship with GAD. Our findings are in contrast with other studies that reported higher stress, anxiety, and other

mental health symptoms among health workers during the pandemic.<sup>8,9</sup> The higher level of anxiety among health-care workers elsewhere may be linked to the higher rate of COVID-19 morbidity and mortality. Another reason for relatively lower levels of anxiety among health-care workers in Ghana may be the institution of motivation packages for health-care workers during the first wave of the pandemic, which may have boosted their mental health.

Respondents who received mental health counseling were more than 7 times likely to be anxious compared with those who did not receive mental health counseling. This is consistent with longitudinal studies conducted in China by Tang et al.<sup>37</sup> and Wang et al.<sup>38</sup> Individuals who seek counseling tend to be already mentally unwell.<sup>37,38</sup>

Relationship status did not independently predict likelihood for respondents to experience moderate to high anxiety in this study. This is consistent with findings from a Canadian study during the pandemic<sup>34</sup> but contrasts with findings from studies conducted during the COVID-19 pandemic among nonworking women in Pakistan<sup>35,43</sup> and among women and men in Bangladesh,<sup>36</sup> which indicated that respondents who were single had higher levels of anxiety, possibly due to the fear of not having companionship or support from partners if they got infected with the virus.

Having a family member or friend with COVID-19 and being fearful of contracting the COVID-19 infection did not independently predict moderate to high anxiety in respondents after controlling for other factors such as employment and region in the regression model. These findings are in contrast with those reported by Moghanibashi-Mansourieh et al.<sup>9</sup> and Mrklas et al.,<sup>8</sup> who studied anxiety in Iran and Canada, respectively, during the pandemic. Our study did not specifically ask about contact with the infected person, which might account for the differences in anxiety levels reported with the other studies.

### Strengths and Limitations of the Study

A major strength of the study is the use of GAD-7, a validated self-reported scale with high reliability for the assessment of likely GAD in the general population.<sup>44</sup> However, this study has some limitations. First, the study achieved a sample size of 756 instead of the anticipated sample size of 1068. As a result, the margin of error for our prevalence estimates for likely GAD increased from 3% to 4%. Second, since data collection occurred primarily with an online questionnaire, there is the possibility of selection bias since individuals without internet access, smart devices, and computers may not have been able to access the survey. Distribution of survey links on WhatsApp groups means a large section of Ghanaians who were not members of these select social media groups or affiliated with members of the group were excluded from the survey.

Third, the cross-sectional nature of the study does not allow for a direct causal relationship to be established between the variables in the regression model and likely GAD and also makes it difficult to draw conclusions regarding long-term effects of COVID-19 on likely GAD. Fourth, the demographics of our respondents are not representative of the demographics of the entire Ghanaian population; therefore, our findings on the prevalence of anxiety may not be nationally representative. For example, Ghana's most recent census reports that about 50.7% of Ghanaians are women, whereas 51.6% of our sample are women. Also, about 42.1% of Ghanaians are married, whereas 45.6% of our sample are married.<sup>49</sup>

Also, all the variables were evaluated using self-reports and hence may suffer recall biases. Due to the large number of variables in our regression model, our study outcome may be prone to type 1 error, necessitating statistical correction.

**Table 3.** Logistic regression predicting likelihood for respondents to present with likely GAD

Predictor	B	S.E	Wald	df	Sig	EXP(B)	95% CI for EXP (B)	
							Lower	Upper
<b>Gender</b>								
Female	1.036	.488	4.512	1	.034	2.818	1.083	7.332
<b>Employment status</b>								
Employed gov't agency	1.201		5.052	5	.410			
With private agency	−19.161	.669	3.220	1	.073	3.324	.895	12.343
Self-employed	.840	4529.095	.000	1	.997	.000	.000	.
Unemployed	−18.297	.962	.763	1	.382	2.317	.351	15.282
Retired	−.587	11483.873	.000	1	.999	.000	.000	.000
Student		1.118	.276	1	.600	.556	.062	4.971
<b>Relationship status</b>								
Single			2.078	3	.556			
In a relationship but not married	−.027	.663	.002	1	.967	.973	.265	3.571
Married	−.765	.540	2.005	1	.157	.466	.162	1.341
Divorced, separated, or widowed	−19.476	7306.773	.000	1	.998	.000	.000	.
<b>Region</b>								
Ashanti			.503	2	.777			
Greater Accra	.105	.524	.040	1	.841	1.111	.398	3.102
Others	.523	.738	.502	1	.479	1.686	.397	7.161
<b>Work in health care</b>								
No	−.201	.622	.105	1	.746	.818	.242	2.767
<b>Friend/family sick from COVID?</b>								
No	−.490	.492	.993	1	.319	.613	.234	1.606
<b>Fearful about getting COVID-19?</b>								
No	−19.283	2848.249	.000	1	.995	.000	.000	.
<b>Loss job due to COVID-19?</b>								
Yes			5.532	2	.063			
No	−2.798	1.242	5.078	1	.024	.061	.005	.695
No job before COVID	−1.915	1.309	2.141	1	.143	.147	.011	1.916
<b>Sufficient employer support</b>								
Yes, absolute support			9.358	4	.053			
Yes, some support	−1.312	.775	2.862	1	.091	.269	.059	1.231
Yes, limited support	−.464	.836	.308	1	.579	.629	.122	3.240
No support	.928	.673	1.903	1	.168	2.530	.677	9.456
Not employed	.457	1.181	.150	1	.699	1.579	.156	15.977
<b>Sought mental health counseling?</b>								
No	−2.016	.668	9.098	1	.003	.133	.036	.494
<b>Constant</b>	1.941	1.498	1.680	1	.195	6.966		

However, routine use of statistical correction methods such as the Bonferroni correction has been criticized as deleterious to sound statistical judgment and reducing the chance of a type I error at the expense of a type II error.<sup>48</sup> Finally, the absence of nationally representative pre-pandemic data means that we are not able to confidently attribute the high prevalence of anxiety in our study to the pandemic.

### Policy Implications

This study provides useful information on the prevalence and predictors of likely GAD among a section of the Ghanaian population during the COVID-19 pandemic. Likely GAD has a high potential negative health burden. Without prompt intervention, anxiety symptoms may evolve into long-term depression. We



recommend collecting information about GAD in the general population through existing periodic national surveys (such as the Ghana Demographic and Health Survey) to inform local understanding of the determinants of GAD in Ghana generally and for relevant mitigation approaches. The government of Ghana could adopt internet-based cognitive behavior therapy (CBT), which is very cost effective, easily scalable, and geographic-location independent, in treating psychiatric symptoms to reduce mental health issues, including anxiety, among the general population in Ghana.<sup>33,45,46,47</sup> Internet-based CBT has been used in other settings to manage stress, anxiety, and depression and could serve as a useful tool in Ghana and other low- and middle-income settings during public health emergencies.<sup>33,45,46</sup>

## Conclusions

Our findings suggest that the pandemic may have greater effect on women, those who lost their jobs due to the COVID-19 pandemic, and those who sought mental health counseling. Priority must therefore be attached to psychological support measures for members of these groups.

## References

1. Chew NW, Lee GK, Tan BY, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain Behav Immun*. 2020; **88**:559–565.
2. Forte G, Favieri F, Tambelli R, et al. COVID-19 pandemic in the Italian population: validation of a post-traumatic stress disorder questionnaire and prevalence of PTSD symptomatology. *Int J Environ Res Public Health*. 2020; **17**(11):4151.
3. Marčinko D, Jakovljević M, Jakšić N, et al. The importance of psychodynamic approach during COVID-19 pandemic. *Psychiatr Danub*. 2020; **32**(1):15–21.
4. McIntyre RS, Lee Y. Projected increases in suicide in Canada as a consequence of COVID-19. *Psychiatr Res*. 2020; **290**:113104.
5. Tucci V, Moukaddam N, Meadows J, et al. The forgotten plague: psychiatric manifestations of Ebola, Zika, and emerging infectious diseases. *J Glob Infect Dis*. 2017; **9**(4):151.
6. Wu KK, Chan SK, Ma TM. Posttraumatic stress, anxiety, and depression in survivors of severe acute respiratory syndrome (SARS). *J Traumat Stress*. 2005; **18**(1):39–42. doi:10.1002/jts.20004
7. Major B, Cozzarelli C, Horowitz MJ, et al. *Encyclopedia of Psychology: 8 Volume Set*. Oxford University Press; 2000.
8. Mrklas K, Shalaby R, Hrabok M, et al. Prevalence of perceived stress, anxiety, depression, and obsessive-compulsive symptoms in health care workers and other workers in Alberta during the COVID-19 pandemic: cross-sectional survey. *JMIR Ment Health*. 2020; **7**(9):e22408.
9. Moghanibashi-Mansourieh A. Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian J Psychiatr*. 2020; **5**:102076.
10. Verma S, Mishra A. Depression, anxiety, and stress and socio-demographic correlates among general Indian public during COVID-19. *Int J Soc Psychiatr*. 2020; **66**(8):756–762.
11. Islam MA, Barna SD, Raihan H, et al. Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: a web-based cross-sectional survey. *PLoS One*. 2020; **15**(8):e0238162.
12. Goodwin R, Wiwattanapantuwong J, Tuicomepee A, et al. Anxiety and public response to covid-19: early data from Thailand. *J Psychiatr Res*. 2020; **129**:118–121.
13. Özdin S, Bayrak Özdin S. Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: the importance of gender. *Int J Soc Psychiatr*. 2020; **66**(5):504–511.
14. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open*. 2020; **3**(3):e203976. doi:10.1001/jamanetworkopen.2020.3976
15. Cao W, Fang Z, Hou G, et al. The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatr Res*. 2020; **287**:112934. doi:10.1016/j.psychres.2020.112934
16. Nwachukwu I, Nkire N, Shalaby R, et al. COVID-19 pandemic: age-related differences in measures of stress, anxiety and depression in Canada. *Int J Environ Res Public Health*. 2020; **17**(17):6366. doi:10.3390/ijerph17176366
17. Tee ML, Tee CA, Anlacan JP, et al. Psychological impact of COVID-19 pandemic in the Philippines. *J Affect Disord*. 2020; **277**:379–391.
18. Tran B, Nguyen MT, Auquier P, et al. Psychological impacts of COVID-19 on Vietnamese health workers over the prolonged restricted COVID-19 responses: a cross-sectional study. *BMJ Open*. 2023; **13**(8):e069239.
19. Zhang SX, Wang Y, Rauch A, et al. Unprecedented disruption of lives and work: health, distress and life satisfaction of working adults in China one month into the COVID-19 outbreak. *Psychiatr Res*. 2020; **288**:112958. doi:10.1016/j.psychres.2020.112958
20. Mazza C, Ricci E, Biondi S, et al. A nationwide survey of psychological distress among Italian people during the COVID-19 pandemic: immediate psychological responses and associated factors. *Int J Environ Res Public Health*. 2020; **17**(9):3165. doi:10.3390/ijerph17093165,32370116
21. Lee EY, Ng MY, Khong PL. COVID-19 pneumonia: what has CT taught us? *Lancet Infect Dis*. 2020; **20**(4):384–385.
22. Yang F, Lin W, Frost E, et al. Association between contact with a general practitioner and depressive symptoms during the COVID-19 pandemic and lockdown: a large community-based study in Hangzhou, China. *BMJ Open*. 2021; **11**(8):e052383.
23. Hua P, Huang C, Bugeja L, et al. A systematic review on the protective factors that reduce suicidality following childhood exposure to external cause parental death, including suicide. *J Affect Disord Rep*. 2020; **2**:100032.
24. Boateng GO, Phipps LM, Smith LE, et al. Household energy insecurity and COVID-19 have independent and synergistic health effects on vulnerable populations. *Front Public Health*. 2021; **8**:609608.
25. Hao F, Tan W, Jiang LI, et al. Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry. *Brain Behav Immun*. 2020; **87**:100–106.
26. Wang C, Pan R, Wan X, et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain Behav Immun*. 2020; **87**:40–48.
27. Wang C, Tee M, Roy AE, et al. The impact of COVID-19 pandemic on physical and mental health of Asians: a study of seven middle-income countries in Asia. *PLoS One*. 2021; **16**(2):e0246824.
28. Bruine de Bruin W. Age differences in COVID-19 risk perceptions and mental health: evidence from a national US survey conducted in March 2020. *Journals Gerontol B Psychol Sci Soc Sci*. 2021; **76**(2):e24–e29.
29. World Health Organization. *Mental Health and Psychosocial Considerations During the COVID-19 Outbreak*. WHO, 2020.
30. Gunnell D, Appleby L, Arensman E, et al. Suicide risk and prevention during the COVID-19 pandemic. *Lancet Psychiatr*. 2020; **7**(6):468–471.
31. Sinyor M, Spittal MJ, Niederkrotenthaler T. Changes in suicide and resilience-related Google searches during the early stages of the COVID-19 pandemic. *Can J Psychiatry*. 2020; **65**(10):741–743.
32. Adu, MK, Wallace LJ, Lartey KF, et al. Prevalence and correlates of likely major depressive disorder among the adult population in Ghana during the COVID-19 pandemic. *Int J Environ Res Public Health*. 2021; **18**:7106. doi:10.3390/ijerph18137106
33. Agyapong VIO, Hrabok M, Vuong W, et al. Closing the psychological treatment gap during the COVID-19 pandemic with a supportive text messaging program: protocol for implementation and evaluation. *JMIR Res Protoc*. 2020; **9**(6):e19292. doi:10.2196/19292
34. Hrabok M, Gusnowski A, Vuong W, et al. Mental health outreach via supportive text messages during the COVID-19 pandemic: prevalence and correlates of anxiety symptoms. *Can J Psychiatry*. 2020; **66**(1), 59–61. doi:10.1177/0706743720969384
35. Spitzer RL, Kroenke K, Williams JB, et al. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. 2006; **166**(10):1092–1097.

36. **Mortality Analyses.** Coronavirus resource center John Hopkins University of medicine. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). ArcGIS. 2020. Accessed May 11, 2020. <https://coronavirus.jhu.edu/data/mortality>
37. **Tang F, Liang J, Zhang H,** et al. COVID-19 related depression and anxiety among quarantined respondents. *Psychol Health.* 2021;**36**(2):164–178.
38. **Wang C, Pan R, Wan X,** et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain Behav Immun.* 2020;**87**:40–48.
39. **Liu CY, Yang YZ, Zhang XM,** et al. The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: a cross-sectional survey. *Epidemiol Infect.* 2020;**148**(e98):1–17. pmid:32430088.
40. **Morris SE, Moment A, Thomas JD.** Caring for bereaved family members during the COVID-19 pandemic: before and after the death of a patient. *J Pain Symptom Manag.* 2020;**60**(2):e70–e74.
41. **Islam MS, Ferdous MZ, Potenza MN.** Panic and generalized anxiety during the COVID-19 pandemic among Bangladeshi people: an online pilot survey early in the outbreak. *J Affect Disord.* 2020;**276**:30–37.
42. Brief on Households and Jobs Tracker: Wave 1. GoG and GSS. 2020. Updated June 2020. Accessed March 2022. <https://statsghana.gov.gh/gsspublications.php?category=MjE5MDQ4Nzg5MS4yNDk1/webstats/p289p3ssr9>
43. **Abbas J, Aqeel M, Abbas J,** et al. The moderating role of social support for marital adjustment, depression, anxiety, and stress: evidence from Pakistani working and nonworking women. *J Affect Disord.* 2019;**244**:231–238.
44. **Garabiles MR, Lao CK, Yip P,** et al. Psychometric validation of PHQ–9 and GAD–7 in Filipino migrant domestic workers in Macao (SAR), China. *J Pers Assess.* 2020;**102**(6):833–844.
45. **Armstrong RA.** When to use the Bonferroni correction. *Ophthalmic Physiol Opt.* 2014;**34**(5):502–508. doi:10.1111/opo.12131.
46. **Zhang MW, Ho R.** Moodle: the cost effective solution for internet cognitive behavioral therapy (I-CBT) interventions. *Technol Health Care.* 2017;**25**(1):163–165.
47. **Ho CS, Chee CYI, Ho RCM.** Use of cognitive behavior therapy (CBT) to treat psychiatric symptoms during COVID-19: mental health strategies to combat the psychological impact of COVID-19: beyond Paranoia and Panic. *Ann Acad Med Singapore.* 2020;**49**(3):155160.
48. **Ghaemi SN.** *A Clinician's Guide to Statistics in Mental Health.* Cambridge University Press; 2023.
49. **Ghana GSS.** Population and Housing Census. *Population and Housing Census General Report.* 2021. Accra, Ghana: GSS, 1–81. Accessed February 2024. <https://census2021.statsghana.gov.gh>