Anxiety Symptoms among Extension Professionals' During the COVID-19 Pandemic with the GAD-2

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ABSTRACT
According to the National Institute of Mental Health, anxiety disorders are a common mental health disorder but often remain undetected and undertreated. During the COVID-19 pandemic, Extension professionals have worked hard to address emerging issues that communities face, possibly impacting the amount of anxiety they experience. This study determined the prevalence of anxiety symptoms among Extension professionals in the United States. Participants from 24 states completed a survey containing the Generalized Anxiety Disorder 2-item (GAD-2) screener. Almost one-quarter of Extension professionals had a GAD-2 score greater than three, an indicator of anxiety with a possibility of generalized anxiety disorder, which is similar to that of the general population. Also, female and male Extension professionals were about equal in the prevalence of anxiety symptoms, which is contrary to the literature. Extension administrators should consider ways to help their employees with this anxiety, especially during and after traumatic events.

KEYWORDS
Anxiety, COVID-19, Extension professionals, generalized anxiety disorder

INTRODUCTION
Mental health disorders are a major concern with 1 in 5 adults (CDC 2018) to 1 in 4 adults (Johns Hopkins n.d.) in the U.S. having a disorder every year. Among mental health disorders, anxiety disorders are the most common with an estimated 19 percent of adults having a disorder per year in the U.S. (NIMH 2021). With the stressors related to the pandemic caused by SARS-CoV-2 and the reaction to it, it is likely that people are

enduring chronic stress and are more likely to develop anxiety disorders (CDC 2018; NIMH 2021).

The SARs-CoV-2 pandemic has caused huge losses in terms of human lives and economies around the world (WHO 2020). On January 30, 2020, the World Health Organization (WHO) declared the SARs-CoV-2 outbreak as a public health hazard of international concern (Holshue et al. 2020). During a pandemic, the primary focus will be on studying the pathogen to find out a way to treat the disease. The secondary effects that the pandemic can have on humans' mental state are often neglected (Ornell et al. 2020). Generally, pandemics and disease outbreaks are known to lead to increased levels of stress and cause mental illnesses (Kim et al. 2019). The observations of a survey conducted by Bhattacharjee and Acharya (2020) in the United States suggest possible increases in mental health illnesses/disorders because of the pandemic. Because Extension professionals[1] are on the frontlines in providing information and educational programs for the agricultural and natural resources industries as well as the general public (Sampson et al. 2020), their work performance and home life could be impacted by the COVID-19 pandemic. This study aims to determine the prevalence of anxiety symptoms and possible GAD among the Extension professionals and understand the underlying factors that may be associated with anxiety.

STRESS, STRESS RESPONSE, AND ITS CONSEQUENCES

A stress response is a normal body reaction that increases the body's stress hormones of cortisol, adrenaline, and noradrenaline to create the flight or fight response. However, when this stress response persists for more than a few minutes or few days, it becomes a chronic stress response that can wreak havoc on the body (Kujanpää et al. 2016; NIMH 2021). Chronic stress response causes stress hormones to be released constantly and for a person to be on edge most of the time, which will eventually lead to hormonal dysfunction with clinically high and low levels of hormones (APA 2013). Physiological symptoms from chronic stress response include muscle tension/injury/pain, impaired memory or concentration, severe fatigue, chest pain, headache, sleep problems, decreased immunity, heart disease, high blood pressure, cancer, skin problems (especially acne), and asthma attacks (APA 2013). The mental health impacts from chronic stress response are just as severe with depression, anhedonia (inability to feel pleasure), feelings of powerlessness, increased suicidal ideation, and anxiety disorders (APA 2013).

It is the possibility of developing anxiety and anxiety disorders which can result in social and occupational impairment (Bhattacharjee and Acharya 2020) that is the interest of this article. Anxiety disorders impact between 18 percent (Johns Hopkins n.d.) and 19.1 percent (NIMH 2021) of adults in the U.S. per year with women more likely to get anxiety disorders than men; 23.4 percent and 14.3 percent, respectively (NIMH 2021). Although anxiety disorders are thought to impact 1 in 5 people in a typical year, this rate has likely increased given the chronic stressors of this past year. Several previous studies have reported anxiety disorders during disease outbreaks (Bournes and Ferguson-Paré 2005; Lancee, Maunder, and Goldbloom 2008). A systematic review of studies in 2020 related to anxiety with the pandemic found a 95% confidence interval for anxiety to be between 27.5 and 36.7 percent of the general public and that for chronic stress to be between 24.3 and 35.4 percent of the general public (Wang, Kala, and Jafar 2020). It was also found that females were more likely to have anxiety and stress symptoms (Hou et al. 2020; Huang and Zhao 2020), as well as people younger than 35 (Salari et al. 2020; Wang et al. 2020). No significant difference in anxiety symptoms has been found between rural and urban populations (Salari et al. 2020; Wang et al. 2020).

Generalized anxiety disorder (GAD) is a common anxiety disease, with an estimated 2.7 percent of the population being impacted and 3.4 percent of females and 1.9 percent of males having this disorder per year in the U.S. (McLean et al. 2011; NIMH 2020).[2] In a global comparative study of GAD, it was found that in a lifetime 3.7 percent of the population had it, 1.8 percent in one year, and countries with higher income had a higher prevalence with 5 percent (Ruscio et al. 2017). We did not find research on GAD or GAD scores during the pandemic; only the previous anxiety literature reviewed above.

GAD symptoms can severely impact a person's life with physical and psychiatric symptoms. In the global study of GAD across 26 countries it was found that due to these symptoms 50.6 percent of people experience severe role impairment across all aspects of their lives, and this was especially true in high income countries (Ruscio et al. 2017). These role constraints can impact people's quality of life, job and educational performance, relationships with others, and performance in everyday tasks (Barrera and Norton 2009; Celano et al. 2016; Waghorn et al. 2005). It has been shown that children who live with parents with anxiety and GAD are likely to develop anxiety issues (Silva et al. 2018; Spence, Zubrick, and Lawrence 2018). GAD can cause all the

physiological systems listed above for chronic stress response. It can also lead to people having more sick days and visiting the doctor more often, with one study finding they visit health care professionals 112 percent more than their non-GAD counterparts (Kujanpää et al. 2014; Kujanpää et al. 2016). These visits could possibly increase with the fear that they could be experiencing COVID-19 symptoms.

PANDEMIC IMPACTS ON EXTENSION PROFESSIONALS

This study will specifically be looking at symptoms of generalized anxiety disorder, a disorder of chronic excessive worrying, through the GAD-2 screener tool in Extension professionals. Due to the spread of the SARs-CoV-2 virus and its economic impact, the mental health of individuals in their work and home life may be affected (Bao et al. 2020; Chen et al. 2020; Ryu and Chun 2020). This includes Extension professionals and the clients they serve. There have been several studies about the impact of stress and anxiety on farmers and agricultural workers (Greig, Nuthall, and Old 2020; Rudolphi, Berg, and Parsaik 2020) that are a target population for educational programs of many Extension professionals. However, there is very little research on anxiety impacts on Extension professionals themselves. It is important to assess Extension professionals' level of stress symptoms and anxiety during normal operations but is especially important during this pandemic due to the importance of their jobs. According to North Carolina State University (North Carolina State University n.d.), Extension agents serve as the bridge between research and citizens across the country by monitoring and responding to needs in the community with educational programs and resources. Among the many things that Extension professionals do, they help the agriculture, fishing, and forestry industries and its workers to have sustainable and productive yields; youth to develop skills to be good leaders and citizens; educate clients on financial management, mental health, healthy eating habits and providing opportunities to increase food security; assist with water, soil, and air testing; and teach homeowners about best practices for a safe and healthy landscape (Constable et al. 2017; Extension Richland County n.d.; North Carolina State University n.d.). These are important roles during normal operations but are essential during a crisis to help keep many people in the community healthy.

Extension has a long history of responding during a crisis (Gusto, Silvert, and Diaz 2021). One of Extension's first documented examples of this was during World War I when they conducted programs to meet the increased demand for agricultural products (National Institute of Food and

Agriculture n.d.). Extension agents have continued to help deliver and coordinate essential services during humanitarian crises and natural disasters (Hiesl and Rodriguez 2019; McLeod et al. 2010). An essential role for Extension professionals is to identify issues and areas of concern in the community and develop plans to deal with them (Gibb 2015). This has remained true during the SARs-CoV-2 pandemic, but Extension professionals have had to change the way they provide these resources and information. Extension professionals are now providing information for the community on the SARs-CoV-2 virus, the COVID-19 disease, ways to operate in this new environment, how to still obtain healthy food, as well as other concerns of farmers and the general public (Gusto et al. 2021). Some Extension professionals might experience severe stress from the pandemic and its economic impacts, not knowing where to get valid information (since for many this is outside of their expertise), and dealing with clientele who are stressed and anxious.

Given this background, the study aims to determine the prevalence of anxiety symptoms and possible GAD among the Extension professionals and understand the underlying factors that may be associated with anxiety, as indicated by the GAD-2 screening instrument. The following analysis includes demographic factors discussed in the literature above (i.e., gender, age, and residential location), additional demographic factors which might increase or decrease the risk of anxiety symptoms, work-related factors, pandemic-related perceptions about work and home life, and protective practices employed at the individual and community levels.

METHODS
The evaluation team at the Southeastern Coastal Center for Agricultural Health and Safety (SCCAHS) organized a collaborative group of evaluators and outreach leaders from the 11 National Institute for Occupational Safety and Health-funded (CDC-NIOSH-funded) agricultural safety and health centers. These centers conduct research on health and safety in agriculture, fishing, and forestry and conduct outreach programs for clientele through partnerships with Extension and other organizations. The collaborative group developed an online questionnaire to assess the impacts of the pandemic on Extension professionals (Israel et al. 2020; Sampson et al. 2020). The survey questions, which included a mix of open-ended and closed-ended questions, were drawn from several sources, including surveys about natural disasters (Telg et al. 2008) and COVID-19 (Center for Public Issues Education 2020). The survey

addressed several topics, including current concerns related to agricultural safety and health, awareness and perceptions of COVID-19, and impacts of the pandemic on respondents' daily lives.

The survey was reviewed and determined to be exempt research by the University of Florida Institutional Review Board. It was subsequently administered by the Central States Center for Agricultural Safety and Health (CS-CASH), the Great Plains Center for Agricultural Health (GPCAH), the Southeast Center for Agricultural Health and Injury Prevention (SCAHIP), the Southeastern Coastal Center for Agricultural Health and Safety (SCCAHS), the Pacific Northwest Agricultural Safety and Health Center (PNASH), and the Northeast Center for Occupational Health and Safety (NECOHS) to Extension professionals. Data were collected in 24 states from mid-May through late-August 2020, except for NECOHS which collected data from late October through December (Table 1).[3] Because of the collaborative nature of the project, the survey procedures varied among the centers and, consequently, the response rates did as well.

Of the responses obtained, the bulk was from the SCCAHS catchment area and smaller numbers from areas served by the other centers.[4] Several factors contributed to the variation in the number of responses between the centers, including whether an Extension administrator actively supported the survey, whether sports rivalries were invoked to encourage participation, and whether the recommended number of reminders were sent to potential participants. Finally, because auxiliary data were not available to conduct analysis of nonresponse bias, we incorporated key variables, including respondent role, programmatic focus, and location, in the analysis.

This study used the GAD-2 screening instrument to measure the prevalence of anxiety symptoms among the Extension professionals. The GAD-2 is a two-question version of the GAD-7 that was created in 2007 to have a quick screener for GAD and anxiety symptoms for the general public (Kroenke et al. 2007). Over the past decade, GAD-2 has been widely applied to screen for symptoms of GAD in primary care settings (Kujanpää et al. 2014; García-Campayo et al. 2012) and in the general population (Christensen et al. 2011; Wild et al. 2014) with reasonably good psychometric properties in different populations. The study by Staples et al. (2019) comparing the GAD-2 to the GAD-7 for detecting GAD found with 95% confidence interval that 0.72 to 0.76 patients with a score of 3 or above were going to have a positive score for GAD with the GAD-7. Luo et al. (2019) found that with a score above 3, the GAD-2 had

Table 1: Survey Distribution, Usable Responses, and Response Rate by Center

Center	States and territories with respondents	List source & Number of contacts	Email list	Usable responses	Response rate
CS-CASH	KS, MO, NE	Extension (NE only), 2 contacts; CS-CASH, 3 contacts [a]	597	76	12.7%
GPCAH	MN, OH, WI	Extension, 1 contact	1,678	122	7.3%
	IL, KY, MT, WV	– [b]	–	13	–
NECOHS	CT, DE, MA, ME, NH, PA, WV	1 – 3 contacts [b]	–	77	–
SCAHIP	KY	Extension, 5 contacts	871	212	24.3%
SCCAHS	FL, GA, SC, VI	Extension, 4 contacts	1,501	831	55.4%
PNASH	AK, ID, WA	Extension, 3 contacts	1,075	139	12.9%
Total			5,722[c]	1,470	24.3%[d]

[a]A link was also shared through a Facebook post.
[b]Distribution methods varied among the states and included listservs, newsletters, direct email; therefore, the number invited in some states is unknown.
[c]Totals are based on known counts from the centers.
[d]Response rates are the number of usable response (which include partial and complete responses) divided by the number in the list used for each state's survey. Criteria for a partial response included answering at least one question on COVID-19 in addition to questions on respondent role and programmatic focus (see AAPOR 2016).

acceptable levels of detecting GAD, and a meta-analysis found these results as well (Plummer et al. 2016). The Cronbach's alpha score was also determined to be appropriate with 0.806 (Luo et al. 2019) and 0.77 (Staples et al. 2019).

A score of 3 points is the preferred cutoff for identifying possible cases of GAD and in which further diagnostic evaluation for generalized anxiety disorder is warranted (Kroenke et al. 2007). Using a cutoff of 3, the GAD-2 has a sensitivity of 86 percent and specificity of 83 percent for diagnosing generalized anxiety disorder (Kroenke et al. 2007). Sensitivity was also determined with a 95% confidence interval level of 0.61-0.89

(Luo et al. 2019) and 0.55-0.89 in a systematic review (Plummer et al. 2016). The specificity was determined with a 95% confidence interval to be 0.71-0.91 (Luo et al. 2019) and 0.60-0.92 in a systematic review (Plummer et al. 2016), which are acceptable levels. For this reason, GAD-2 scores greater than 3 were considered as probable cases of GAD for data analysis purposes. Thus, the dependent variable of this study is "GAD-2 score" which has two binary outcomes whereby a score greater than 3 is coded as 1 and a score equal to or less than 3 is coded as 0.

The predictor variables included a set of demographic attributes (age, sex, education, household income, marital status, whether a primary caregiver for an elderly family member, having children under 5, and county type), work-related variables (role in Extension, program focus area, effect of COVID-19 on hours worked, and current work location), perceptions of COVID-19 impacts on work and family life (preparedness to address the professional challenges during COVID-19, extent of support, extent of difficulty to balance personal and professional needs, extent of difficulty to balance working remotely and family needs, extent to which the clientele exhibited stress or emotional symptoms, worry over contracting COVID-19, effect of COVID-19 on the employment status of another household member, and overall level of stress), and protective practices (whether social distancing is used by most people, whether face coverings are used by most people, and respondents' use of protective practices). The list of variables and their measurement are shown in Table A1 in the Appendix.

Three items from the survey were used to create the stress index to assess the stress felt by the Extension professionals during the pandemic for receiving medical care and medicines and providing enough food for the household. Measurement properties of the index were acceptable, with Cronbach's alpha for the index calculated at .816 and a principal axis factor model accounting for 61.3 percent of the common variance.

Similarly, three items were used to create the respondent's personal protective practices index to assess how frequently the Extension professionals were following various protective practices to fight COVID-19. These items were: How frequently are you following any of these methods to fight COVID-19? Avoiding touching your eyes, nose and mouth; Cleaning or disinfecting frequently touched objects and surfaces; and Washing your hands with soap and water for at least 20 seconds. Measurement properties of the index were acceptable, with Cronbach's alpha for the index calculated at .725 and a principal axis factor model accounting for 48.6 percent of the common variance.

Data analysis was conducted using SPSS version 27. The data were analyzed for the pattern of missingness (i.e., item nonresponse, Schafer and Graham 2002) and, therefore, multiple imputation was conducted to address the missing values. The pooled estimates for variable distributions, parameters, p-values, and odds ratios derived from the ten multiple imputation data sets were used for the analysis when provided by SPSS; otherwise, the median value across the ten imputations was used to guide model fit and significance interpretations (Eekhout, van de Wiel, and Heymans 2017). The first phase involved tabular analysis and bivariate models using binary logistic regression to examine the association of predictors with the GAD-2 score, followed by a multivariate model using binary logistic regression to assess and identify the influence of predictor variables with the GAD-2 score.[5]

RESULTS

The demographic profile of the respondents is shown in Table 2. County agents comprised the largest group of Extension professionals in the study, followed by state specialists. The distribution of Extension roles varied across the different participating Agriculture, Fishing and Forestry (AFF) health and safety centers (data not shown). The primary focus for programming was fairly evenly divided between AFF and other topical areas. Nearly two-thirds of Extension professionals lived in metropolitan counties, while the remainder were evenly split between nonmetro micropolitan and noncore counties (the counties were classified using definitions from the USDA's Economic Research Service [USDA-ERS 2013]). The distributions for age, income, and having a child under 5 in the household suggest a relatively mature workforce. Not surprisingly, educational attainment is very high with half of the professionals possessing a Master's degree and another quarter with a PhD degree. Finally, nearly three-quarters were married, and a small percentage of respondents reported being a caregiver for an elderly family member or having a young child in the household. Turning to the assessment of anxiety symptoms, we calculated the GAD-2 score and found that 23.3 percent of respondents scored greater than 3, which indicates the presence of symptoms and a potential for GAD.

Associations Between GAD-2 Scores and Predictors
The next several tables display participants' responses for different variables and their relation to having a GAD-2 score over 3. The bivariate association between selected demographic attributes and the GAD-2

Table 2: Demographic Attributes of Respondents (n=1,433)

Attribute	Responses	Percent
Role in Extension	County Agents	47.6
	Multicounty Agents, Regional Specialized Agents & Regional Specialists	7.6
	State Specialists	20.3
	Administrators	6.1
	Support Staff	8.6
	Other	9.8
Program focus area	Agriculture, Fishing or Forestry	52.2
	Other programmatic areas	47.8
Residential Location	Metropolitan	63.5
	Nonmetro Micropolitan	17.8
	Nonmetro noncore (rural)	18.7
Age Category	18-34 years	17.9
	35-44 years	26.0
	45-64 years	49.0
	65-74 years	7.1
Highest level of education	Bachelor	22.2
	Master	50.7
	PhD	27.1
Income Level	<$25,000	2.2
	$25,000-$49,999	12.2
	$50,000-$74,999	20.0
	$75,000-$149,999	51.7
	$150,000-$249,999	13.2
	>$250,000	0.7
Marital status	Married	73.9
	Widowed	1.5
	Divorced	8.5
	Separated	0.9
	Never married	15.1
Children under 5	Yes	13.5
	No	86.5
Caregiver of an elderly family member	Yes	13.1
	No	86.9

score is shown in Table 3. Contrary to expectation and the literature, there was virtually no difference between the percentage of male and female respondents who had a GAD-2 score over 3. On the other hand, the age category to which respondents belonged showed a strong negative association, whereby the youngest Extension professionals had the highest percentage with a GAD-2 score over 3 and each subsequent age

Table 3: Association of GAD Score with Demographics and COVID Response Impacts (n=1,433)

Factor	GAD >3	p-Value	Odds ratio	95% C.I. Lower	95% C.I. Upper
Sex					
Male	22.9%	.488	1.093	.851	1.403
Female	24.5%				
Age					
18-34	36.8%	<.001	.637	.552	.737
35-44	27.5%				
45-64	18.0%				
65-74	16.7%				
75+	0.0%				
Education					
Bachelor's degree	29.7%	.016	.796	.661	.958
Master's degree	22.0%				
PhD	21.4%				
Income					
Less than $25,000	36.1%	<.001	.766	.673	.872
$25,000-$49,999	31.2%				
$50,000-$74,999	28.7%				
$75,000-$149,999	20.6%				
$150,000-$249,999	19.7%				
$250,000 or more	0.0%				
Marital status					
Married	21.9%	.003	--[a]		
Widowed	19.6%		.777	.220	2.711
Divorced	22.0%		.977	.507	1.883
Separated	29.6%		1.375	.371	5.096
Never married	33.4%		1.796	1.292	2.496
Children under 5					
No	22.4%	.005	1.628	1.161	2.282
Yes	31.9%				
Caregiver of an elderly family member					
Yes	27.0%	.265	1.227	.856	1.760
No	23.2%				
Residential location					
Metropolitan county (ref)	24.5%	.340	--[a]		
Nonmetro micropolitan county	20.1%		.777	.541	1.117
Nonmetro noncore county	24.4%		.996	.712	1.393

[a] An overall odds ratio is not available for categorical variables. For these variables, odds ratios are in comparison to the reference category.

group was lower than the next. The odds ratio (estimated with logistic regression) indicates about a 36 percent decrease in percent with a GAD-2 score over 3 for each step in the age category. Similar patterns were found for education and income, where the highest percent of Extension professionals with a GAD-2 score over 3 was for those with a Bachelor's degree and a household income under $25,000, respectively. Regarding marital status, a larger percentage of those who were never married had a GAD-2 score over 3 compared to those who were married but all other categories would not be considered different, based on logistic regression (data not shown). In contrast, a larger percentage of Extension professionals who had a child under 5 in the household had a GAD-2 score over 3 compared to those that didn't have a child under 5. Being a caregiver for an elderly family member and place of residence were not associated with a higher GAD-2 score. These results for place of residence were as anticipated, but not for being a caregiver, where we expected to observe differences in their anxiety symptom levels.

On analysis of employment/work-related variables, Extension professionals whose program focus area is "other than Agriculture, Fisheries and Forestry (AFF)" were more likely to have a GAD-2 score greater than 3 when compared to those with a focus on AFF (Table 4). Also, when it comes to how COVID-19 has affected their work hours, respondents who have been laid off or furloughed had a greater chance of having GAD-2 score greater than 3 when compared to others. Those who were working regular hours had the lowest percentage with a GAD-2 score over 3. The Extension role and current workplace were not found to have an association with a GAD-2 score over 3.

Next, we examined perceptions of how COVID-19 has affected the respondents. Extension professionals who reported to be "not at all" prepared to address the professional challenges and those not getting enough support during the COVID-19 pandemic were found to have higher chances of having a GAD-2 score greater than 3 (Table 5).

When it comes to balancing personal and professional needs during the COVID-19 pandemic, respondents who found it difficult to a "great extent" were likely to have a higher GAD-2 score (Table 5). A similar pattern was revealed when responses related to balancing working remotely and family needs during the COVID-19 pandemic were analyzed, with those finding it difficult to a "great extent" having greater chances of having a GAD-2 score greater than 3.

Table 4: Association of GAD-2 Score with Employment/Work-related Variables (n=1,433)

Factor	GAD >3	p-Value	Odds Ratio	95% C.I.	
				Lower	Upper
Extension role					
County Agent	22.7%	.108	--[a]		
State Specialist	21.5%		.935	.667	1.311
Multicounty Agents, Regional Specialized Agents & Regional Specialists	27.4%		1.285	.803	2.056
Administrator	17.0%		.694	.373	1.290
Other role	30.6%		1.500	.995	2.262
Support Staff	28.0%		1.325	.840	2.089
Program focus area					
Other than AFF	27.9%	.001	.641	.499	.825
Agriculture, Fisheries, Forestry (AFF)	19.9%				
Employment status					
I am working regular hours (ref)	20.4%	<.001	--[a]		
I am working more hours	29.9%		1.659	1.254	2.196
I am working fewer hours	27.2%		1.450	.829	2.539
I have been laid off or furloughed	48.1%		3.352	.936	12.012
Current workplace					
Mainly from my regular office	19.9%	.232	1.154	.912	1.460
Mainly from my home	24.9%				

[a] An overall odds ratio is not available for categorical variables. For these variables, odds ratios are in comparison to the reference category.

On analyzing the Extension professional's personal and their client's stress or emotional symptoms during the COVID-19 pandemic, respondents who were extremely worried about contracting COVID-19 and whose clientele exhibited stress or emotional symptoms to a great extent had a higher chance of having a GAD-2 score greater than 3. The stress index also showed a positive, linear association with a GAD-2 score over three. On the other hand, the percentage of respondents with a GAD-2 score over 3 was lower for those having another member of the household whose employment was unaffected by COVID-19 than for those with an affected family member.

Table 5: Association of GAD Score with COVID-19 Impacts (n=1,433)

Factor	GAD >3	p-Value	Odds Ratio	95% C.I.	
				Lower	Upper
Extent to which respondents were prepared to address the professional challenges during the COVID-19 pandemic					
Not at all	40.4%	<.001	.668	.575	.777
Slight extent	27.7%				
Moderate extent	21.1%				
Great extent	16.2%				
Extent to which the respondents are getting the support they need during the COVID-19 pandemic					
Not at all	30.1%	<.001	.586	.503	.684
Slight extent	41.7%				
Moderate extent	23.0%				
Great extent	16.1%				
Extent to which is it difficult for the respondents to balance personal and professional needs during the COVID-19 pandemic					
Not at all	10.2%	<.001	2.040	1.743	2.388
Slight extent	14.3%				
Moderate extent	24.5%				
Great extent	43.8%				
Extent to which it is difficult to balance working remotely and family needs during the COVID-19 pandemic					
Not at all	13.6%	<.001	1.609	1.416	1.828
Slight extent	19.5%				
Moderate extent	26.3%				
Great extent	40.0%				
Extent to which the clientele that the respondents assist exhibited stress or emotional symptoms during the COVID-19 pandemic					
Not at all	16.1%	<.001	1.581	1.326	1.886
Slight extent	17.0%				
Moderate extent	25.1%				
Great extent	37.9%				
How worried are you about contracting COVID-19?					
Not at all worried	11.5%	<.001	1.766	1.547	2.017
A little worried	16.8%				
Somewhat worried	24.0%				
Very worried	40.0%				
Extremely worried	54.5%				

Factor	GAD >3	p-Value	Odds Ratio	95% C.I. Lower	95% C.I. Upper
Employment status of another household member has been negatively affected by COVID-19					
No (ref)	21.3%	<.001	--[a]		
Is working more hours	30.0%		1.568	.997	2.465
Is working less hours	26.6%		1.334	.869	2.046
Laid off or furloughed	32.0%		1.730	1.153	2.594
Stress Index from getting medical care, medicines, and food					
.00	13.2%	<.001	2.222	1.914	2.579
.33	15.8%				
.67	21.3%				
1.00	19.0%				
1.33	29.6%				
1.67	42.9%				
2.00	45.9%				
2.33	62.8%				
2.67	59.7%				
3.00	44.0%				
3.33	57.3%				
3.67	100.0%				
4.00	62.2%				

[a] An overall odds ratio is not available for categorical variables. For these variables, odds ratios are in comparison to the reference category.

Finally, the protective practices followed by Extension professionals and people in their community were examined in Table 6. When it comes to protective practices, those living and working in communities where people were not practicing social distancing were found to have greater chances of having a GAD score greater than 3, whereas the use of face masks was found to have no association with a higher score. The respondent's personal protective practices index also was weakly associated with a GAD-2 score over 3, where a greater percentage of those who used no protective practices or used most of them had a higher percentage with a GAD-2 score greater than 3 compared to those who had lower, non-zero values on the protective practices index.

Which Factors Were Most Influential on GAD Scores?
Given the large number of variables associated with a GAD-2 score over 3, the analysis focused on identifying a set of factors having a net effect after controlling for other predictors. The results of binary logistic regression analysis of the data showed that the full logistic regression model containing all the 15 predictors was statistically significant, $x^2 =$

348.126, df =22, p<.001, indicating that the set of independent variables significantly predicted the outcome variable, General Anxiety Disorder (GAD-2) score greater than 3. In addition, the Hosmer and Lemeshow test p-value was .512, which was greater than the .05 threshold value, and supports the view that the model fits the data reasonably well. The results of Cox & Snell, and Nagelkerke R squared estimates indicated that the

Table 6: Association of GAD Score with Protective Practices Followed (n=1,433)

Factor	GAD >3	p-Value	Odds Ratio	95% C.I.	
				Lower	Upper
Is social distancing being used by most people in your community?					
Yes	21.6%	.003	.631	.467	.852
No	30.4%				
Is wearing face coverings being used by most people in your community?					
Yes	23.5%	.873	.978	.747	1.282
No	24.0%				
Respondent's personal protective practices index					
.00	50.0%	.037	1.266	1.014	1.581
.33	0.0%				
.67	17.3%				
1.00	17.0%				
1.33	22.1%				
1.67	21.1%				
2.00	22.2%				
2.33	24.6%				
2.67	23.2%				
3.00	28.4%				

whole model explained between 22 percent and 32 percent of the variance that can be predicted from the independent variables. Finally, the model classified correctly 93.9 percent of the respondents who have a GAD-2 score less than or equal to 3 and 39.2 percent of those who have a GAD-2 score greater than 3, for an overall classification success rate of 80.9 percent.

The results presented in Table 7 show the logistic regression coefficients, Wald test, and odds ratios for each of the predictor variables. Extension professionals in the younger age groups have greater likelihood of having a GAD-2 score greater than 3 compared to higher age groups, controlling for other variables in the model. As shown by the odds ratio of

.589, each increase in age category was predicted to decrease the likelihood of having a score over 3 by approximately 70 percent of the previous age group. Contrary to the literature reviewed earlier, women did not significantly differ from men on the likelihood of having an elevated GAD-2 score. Nor did education level or income remain significant from the bivariate associations (although these were retained for model fitting purposes). Finally, residential location continued to be a nonfactor.

Table 7: Logistic Regression Model of GAD-2 Score on Demographics, Roles and Area in Extension, and COVID-19 Impacts (n=1,433)

	Estimate	Wald	df	p-Value	Exp(B)	95% C.I. Lower	95% C.I. Upper
Age category	-0.530	44.562	1	**<.001**	0.589	0.490	0.707
Sex (Male is the reference)	0.081	0.440	1	.599	1.084	0.802	1.467
Highest level of education	-0.170	0.836	1	.274	0.843	0.621	1.145
Total annual household income from all sources, before taxes	-0.079	0.189	1	.408	0.924	0.766	1.115
Residential Location (Metropolitan is the reference)		3.097	2	.213			
Nonmetro micropolitan	-0.361	2.604	1	.091	0.697	0.458	1.059
Nonmetro noncore	-0.068	0.005	1	.746	0.934	0.619	1.409
Role in Extension (County agent is the reference)		8.080	5	.152			
State specialist	0.211	1.061	1	.382	1.235	0.769	1.983
Regional specialist	0.441	3.790	1	.133	1.555	0.874	2.766
Administrator	-0.031	0.003	1	.934	0.970	0.468	2.009
Other	0.326	2.049	1	.198	1.386	0.843	2.278
Support staff	0.650	7.545	1	**.028**	1.916	1.074	3.420
Program focus area: AgFF vs other	-0.420	10.692	1	**.008**	0.652	0.482	0.896
How has the COVID-19 pandemic affected your employment status? (Working same hours is the reference)		7.471	3	.058			
I am working more hours	0.319	3.226	1	.073	1.375	0.971	1.948
I am working less hours	0.192	0.861	1	.571	1.212	0.624	2.354
I have been laid off/furloughed	1.112	5.466	1	.098	3.039	0.810	11.403

	Estimate	Wald	df	p-Value	Exp(B)	95% C.I. Lower	Upper
During the COVID-19 pandemic…							
To what extent were you prepared to address the professional challenges?	-0.211	6.098	1	**.023**	0.810	0.675	0.972
To what extent is it difficult for you to balance personal and professional needs?	0.412	15.622	1	**<.001**	1.509	1.204	1.891
To what extent is it difficult to balance working remotely and family needs?	0.138	0.280	1	.166	1.148	0.944	1.396
To what extent are you getting the support you need?	-0.266	8.074	1	**.005**	0.766	0.635	0.924
To what extent has clientele that you assist exhibited stress or emotional symptoms?	0.203	6.489	1	.052	1.225	0.998	1.505
How worried are you about contracting COVID	0.484	36.685	1	**<.001**	1.622	1.378	1.911
Stress Index	0.522	38.367	1	**<.001**	1.686	1.418	2.004
Constant	-0.562	0.672	1	.483	0.570		

Although the various roles of Extension professionals generally did not differ much on the likelihood of having a GAD-2 score greater than 3, those in support staff roles were nearly twice as likely as county agents (the reference category) to have a score over 3. Extension professionals with Agriculture, Fisheries and Forestry (AFF) as their program focus area were predicted to have a 53 percent lower likelihood of having a higher GAD score when compared to those with focus areas other than AFF. Understandably, respondents who had been laid off or furloughed were three times as likely to have a GAD score over 3 as those working the same number of hours as before the pandemic (though it should be noted that this group was small in number and the p-value suggests this was not significant). Although the estimate approached significance, those working more hours than before the pandemic trended toward having a GAD score over 3 compared to the reference group.

From the results of the regression model, one can observe that those Extension professionals who felt they were better prepared to address the professional challenges and who were getting the needed

support during the COVID-19 pandemic were less likely to have a GAD-2 score greater than 3, controlling for other variables in the model. The results also indicate that there is a significant relationship between the extent of difficulty for balancing professional and personal needs and having a GAD-2 score greater than 3. For each incremental increase in difficulty for balancing professional and personal needs, there was a 51 percent increase in the likelihood of having a GAD-2 score over 3. Likewise, increases in observing stress among clients with whom Extension professionals worked also was associated with an increased likelihood of having an elevated GAD score. In addition, it is no surprise that as worry about contracting COVID-19 increased, the likelihood of having a GAD score over 3 increased 62 percent for each incremental increase in worry.

Finally, the stress index was found to be significantly predicting the GAD-2 scores of the Extension professionals with an estimated odds ratio of 1.69, indicating those who have a higher level of stress related to getting medical care, medicines, and food and arranging childcare during the pandemic are 69 percent more likely to have a GAD-2 score greater than 3 compared to those with a 1-unit lower level of stress, controlling for other variables in the model.

DISCUSSION AND CONCLUSIONS

Anxiety can be a major impairment in people's lives, thereby impacting their work, interactions with friends and family, mental health, and even physical health. That is why it is important to study the SARs-CoV-2 pandemic and public health protocols related to its impacts on Extension workforce anxiety symptoms. The data showed that nearly one-quarter of Extension professionals had anxiety symptoms (with some subgroups higher), and this was within the range reported for anxiety in the general population (NIMH 2021) as well as during the beginning of the pandemic (Wang, Kala, and Jafar 2020). These findings suggest that there is a need in Extension to provide increased mental health support for their workforce and to better assess what Extension faculty needs are, especially during stressful situations.

In addition, younger Extension professionals, single people, people with children under five years old, and professionals who had impacts on work (more work or laid off) in their home were found to be more likely to have greater anxiety symptoms, which agrees with published findings (NIMH 2021; Salari et al. 2020; Wang et al. 2020; Wood, Daniels, and Ogbonnaya 2020; Zhang, Punnett, and Nannini 2017). The logistic model

also showed that Extension professionals who perceived being less supported and less prepared to deal with the pandemic, and those who were having trouble balancing work and home life in quarantine, were more likely to have anxiety symptoms, even after controlling for worrying about contracting COVID-19, which has been shown in the literature as well (Peele and Wolf 2020; Vallin, Nestander, and Wells 2019; Wood et al. 2020; Zhang et al. 2017). Anxiety symptoms among Extension professionals did not differ between living in rural, micropolitan, and metropolitan areas, which is consistent with other studies (Salari et al. 2020; Wang et al. 2020).

The most surprising finding was that males and females reported anxiety symptoms at equal rates among Extension professionals, which differs from the broader literature and recent research during the beginning of the pandemic (NIMH 2021; Hou et al. 2020; Huang and Zhao 2020). It is unclear whether Extension professionals who are males were experiencing more anxiety and thus had equal levels with females or that women working in Extension were at lower risk for anxiety symptoms compared to women in the general population, possibly because of the former's higher education and economic stability. Further research is needed to understand the reasons for this finding and to explore whether the equal rates of anxiety symptoms hold during non-crisis times.

Contrary to our expectation, the data did not show an association between individual-level protective practices used and the GAD-2 scores. This could be due to the considerable uncertainty and debate over the effectiveness of these measures and whether these participants believed these were helpful measures (which was not measured in this study). It could also be related to how Extension professionals felt about severity of the risk of the disease. Several studies suggest that both downplayed and exaggerated perceptions of risk can potentially undermine the adoption of protective health behaviors during a pandemic or disease outbreak (Brewer et al. 2004; Dryhurst et al. 2020; Leppin and Aro 2009).

The data revealed that Extension professionals working in areas other than Agriculture, Fisheries and Forestry were more likely to have anxiety symptoms. This result might be due to the increased interaction these Extension professionals have with the public, either out of concern over contracting the disease or interacting with more clientele who have anxiety themselves. We did not find that Extension professionals' role was associated with anxiety except for support staff, and the latter appears to be twice as likely to have a score greater than 3 on the GAD-2. This supports the view that Extension's leadership needs to develop ways to

enhance support for its workforce, especially for those in the lower echelons of the workforce.

We offer a few suggestions for creating improved support systems for Extension professionals. These could include organizing support groups, group counseling, and places to socialize; providing resources and/or training to help transition to new ways of working; listing specifically what is expected for each job role; and offering family support as well as resources to help clientele deal with new systems and stress. It also is essential for the Extension System to provide mental and emotional support for both individuals and groups in its workforce so as to develop coping skills to deal with stress and decrease anxiety symptoms. This could come in the form of group support (including individual support groups for men and women in Extension), individual support, and access to mental health providers, and it should be offered at least a few times throughout the year. Extension also might provide new programs or expand existing ones to help teach coping skills to professionals and clientele, which could create a less stressful environment, so that they will feel more equipped to manage stress. In addition, these supportive initiatives should continue past the current crisis to ensure that these resources are there for everyday needs and for future crises.

It is also important that Extension provide more support for their workforce as it relates to families. This could include mental and emotional support for significant others as well as support and resources to help children. There may need to be different expectations of work if Extension professionals are working from home with family around, such as different workloads or times of work. There also should be resources such as websites, interactive groups, or child care services to help parents with younger children get their work done. These are just some of the suggestions that Extension could offer to help support their staff now and in the future.

The prevalence of anxiety symptoms might indicate that more people are likely to develop generalized anxiety disorder if they are unable to find ways to decrease or cope with the stress and anxiety they are experiencing (APA 2013; Kujanpää et al. 2016; NIMH 2021). This could have an impact on their ability to function as a person and as a professional, which would impact their ability to share knowledge with the public effectively. Since Extension professionals are one of the frontline information sources for many people (Sampson et al. 2020), their ability to interact and communicate appropriately is essential for them and the populations they serve. That is why it is imperative for Extension to

expand support for its workforce and find ways to help professionals deal with stress and anxiety. This should be a continuing process of training and support for Extension professionals so that in the future, fewer professionals will have anxiety symptoms, and that they will feel more prepared and supported when the next emergency occurs.

ENDNOTES

[1] Extension professionals includes county agents, those with multi-county or regional roles, state specialists, administrators (such as district directors and department chairs with Extension responsibilities) and others. County agents also are called county educators in some states.

[2] A diagnosis of GAD is made for a person meeting these criteria: a) excessive anxiety and worry (apprehensive expectation) occurring more days than not for at least 6 months about a number of events or activities (such as work or school performance); b) the person finds it difficult to control the worry; and c) the anxiety and worry are associated with three or more of the following six symptoms (with at least some symptoms present for more days than not for the past 6 months): 1) restlessness or feeling keyed up or on edge; 2) being easily fatigued; 3) difficulty concentrating or mind going blank; 4) irritability; 5) muscle tension; and 6) sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep) (APA, 2013). In addition, the person must not have these symptoms related to another disorder or related to substance abuse.

[3] We examined the effect of the date when respondents completed the questionnaire in subsequent analyses and this was not a factor in determining the likelihood of anxiety symptoms among those responding between May and December 2020.

[4] While the 11 NIOSH-funded centers provide coverage for the entire U.S., the catchment area of the six centers involved in the data collection included 36 states plus Puerto Rico and the Virgin Islands (notably the southwestern USA was not covered). Additional analysis using logistic regression indicated that the catchment area of each NIOSH-funded center was not a factor in respondents' reporting of anxiety symptoms (data not shown). This suggests that the source of the contact list and methods used to distribute the survey did not introduce bias among those responding.

[5] Although the data constitute a convenience sample, we use p-values and odds ratios in the tabular analysis as a guide for the relative importance of an association and for model fitting for logistic regression. Odds ratios are reported in the latter and are commonly used as a measure of effect size (Ferguson 2009).

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APPENDIX
Table A1: Variables and Their Measurements

Variable	Measurement

GAD-2 scale:
 	
Over the last 2 weeks, how often have you experienced the following problems?
  Feeling nervous, anxious or on edge
  Not able to stop or control worrying
	Sum of 2 items scored:
	0=Never; 1=Sometimes; 2=About half the time; 3=Most of the time; 4=Always; recoded 0=3 or less; 1=Greater than 3

Age category (in years)	2=18-34; 3=35-44; 4=45-64; 5=65-74; 6=75 or older
Sex	2=Female; 1=Male
Highest level of education	4=Bachelor's Degree; 5=Master's Degree; 6=PhD
Total annual household income from all sources, before taxes	1=Less than $25,000; 2= $25,000-$49,999; 3=$50,000-$74,999; 4=$75,000-$149,999; 5=$150,000-$249,999; 6=$250,000 or more
Marital status	16=Married; 17=Widowed; 18=Divorced; 19=Separated; 20=Never married
Children under 5	0=No; 1=Yes
Caregiver of an elderly family member	0=No; 1=Yes
Residential Location	1=Metropolitan; 2=Nonmetro micropolitan; 3=Nonmetro noncore
Role in Extension	1=County agent; 8=State specialist; 9=Regional specialist[*]; 10=Administrator; 12=Other; 13=Support staff
Program focus area	0=Other; 1=Agriculture, fishing, or forestry
Current workplace	4=Mainly from my regular office; 5=Mainly from my home
How has the COVID-19 pandemic affected your employment status?	1=Working Same hours; 2= Working more hours; 3=Working less hours; 4=Laid off/furloughed
Employment status of another household member has been negatively affected by COVID-19	No=1; 2=Someone is working more hours; 3=Someone is working less hours; 4= Someone laid off or furloughed

Variable	Measurement
During the COVID-19 pandemic, … To what extent were you prepared to address the professional challenges? To what extent is it difficult for you to balance personal and professional needs? To what extent is it difficult to balance working remotely and family needs? To what extent are you getting the support you need? To what extent has clientele that you assist exhibited stress or emotional symptoms?	For each item: 0=Not at all; 1=Slight extent; 2=Moderate extent; 3=Great extent
How worried are you about contracting COVID	1=Not at all worried; 2=A little worried; 3=Somewhat worried; 4=Very worried; 5=Extremely worried
Stress Index Sum of 3 items about the amount of stress felt from: Receiving medical care Receiving medications Providing enough food for self/family	0=Not at all; 1=Slightly; 2=Moderately; 3=Very; 4=Extremely
Is social distancing being used by most people in your community	0=No; 1=Yes
Is wearing face coverings being used by most people in your community?	0=No; 1=Yes
Protective practices by respondent Index (Sum of 3 items): Avoiding touching your eyes, nose, and mouth Cleaning or disinfecting frequently touched objects and surfaces Washing your hands with soap and water for at least 20 seconds	0=Never; 1=sometimes; 2=Most of the time; 3=Every time I should

[*]Includes Multicounty Agents, Regional Specialized Agents & Regional Specialists