

Suicide and School-based Agricultural Education in the Southern Region – A Multistate Exploratory Study

Chaney Mosley¹

Eric Rubenstein²

Carla Jagger³

Christopher Clemons⁴

OP McCubbins⁵

Robert J. Davis⁶

Ying Jin⁷

Rebekah Epps⁸

Kristin Stair⁹

Dale Layfield¹⁰

Jon Ramsey¹¹

Andy Seibel¹²

Chris Haynes¹³

Donald Johnson¹⁴

Edly Santiago¹⁵

Abstract

This study explored suicide exposure, awareness of warning signs and farm stressors, and related professional development (PD) experiences of school-based agricultural education (SBAE) teachers (N = 793) in the southern region of the United States. Most professional exposure to suicide involved students in a teacher's school, but not in their classrooms; most personal exposure to suicide involved acquaintances. SBAE teachers recognized most warning signs and farm stressors; however, females, teachers who were more exposed to suicide in the professional setting, and teachers who were more aware of farm stressors were more likely to be aware of warning signs. SBAE teachers recognized most farm stressors; however, teachers from urban areas, teachers who were more exposed to suicide in personal settings, and teachers more aware of warning signs were more likely recognize farm stressors. Most SBAE teachers had attended suicide-related PD. While most who had not attended suicide-related PD indicated they were willing to attend, females, teachers with less teaching experience, teachers who were not previously offered PD, and teachers who were more exposed to suicide in personal settings were more willing to attend. This work was supported by the Farm and Ranch Stress Assistance Network, project award no. 2023-70028-41286, from the U.S. Department of Agriculture's National Institute of Food and Agriculture.

¹Chaney Mosley is an Associate Professor in the School of Agriculture at Middle Tennessee State University. chaney.mosley@mtsu.edu

²Eric Rubenstein is an Associate Professor in the Department of Agricultural Leadership, Education, and Communication at the University of Georgia. erubenstein@uga.edu

³Carla Jagger is an Assistant Professor in the Department of Agricultural Education and Communication at the University of Florida. carlajagger@ufl.edu

⁴Christopher Clemons is an Associate Professor in the Department of Agricultural Education, Leadership, and Communication at Auburn University. cac0132@auburn.edu

⁵OP McCubbins is an Associate Professor in the Department of Agricultural Education, Leadership, and Communications at Mississippi State University. am4942@msstate.edu

⁶Robert J. Davis is the Assistant Dean of the School of Agriculture and Biological Sciences at the University of Mount Olive. rdavis@umo.edu

⁷Ying Jin is an Associate Professor in the Department of Learning Technology and Leadership Education at James Madison University. jin4yx@jmu.edu

⁸Rebekah Epps is Director of Graduate Studies in the Department of Community and Leadership Development at the University of Kentucky. rebekah.epps@uky.edu

⁹Kristin Stair is a Professor and the Interim Department Head in the Department of Agricultural and Extension Education and Evaluation at Louisiana State University. kstair@lsu.edu

¹⁰Dale Layfield is an Associate Professor in the Department of Agricultural Education at Clemson University. dlayfie@clemson.edu

¹¹Jon Ramsey is Professor in the Department of Agricultural Education, Communications, and Leadership at Oklahoma State University. jon.ramsey@okstate.edu

¹²Andy Seibel, Virginia Tech. gseibel@vt.edu

¹³Chris Haynes is an Associate Professor in the Department of Agricultural Education and Communication at Tarleton State University. chaynes@tarleton.edu

¹⁴Donald Johnson is a professor in the Department of Agricultural Education, Communications, and Technology at University of Arkansas. dmjohnso@uark.edu

¹⁵Edly Santiago is a Professor in the Department of Agricultural Education at the University of Puerto Rico. edly.santiago@upr.edu

Introduction and Theoretical Framework

The World Health Organization (WHO, 2021) reported that global instances of suicide were the fourth leading cause of death for those 15–29 years old in 2019. Suicide was the second leading cause of death in ages 10–34 from 2000 to 2020 (Garnett et al., 2022). Agricultural professionals, including school-based agricultural education (SBAE) teachers, in the United States are not exempt from this crisis. A Centers for Disease Control (CDC) 2016 report detailed rates of suicide in the agricultural community at twice that of the general population (Curtin et al., 2016). This report followed a 2014 meta-review (Hirsch & Cukrowicz, 2014) which found that rural suicide rates were much higher than in urban areas. Explanations for these findings relate to (a) the nature of rural geography where isolation from people and lack of access to services permits unchecked and unmonitored warning signs to persist over time; (b) external pressures related to the economy and environment that devastate a person's feelings of control and ability to overcome; and (c) the sociocultural sanctioned pressure to perform as stoic, steadfast, and dependable providers (Hirsch & Cukrowicz, 2014).

One in five adults in the United States associated with agriculture work are subject to and suffer from mental disease and suicidal iterations (Cuthbertson et al., 2022). Historically, the perceptions of suicide have been viewed through the lenses of ignorance, prejudice, and discrimination (Nathan & Nathan, 2020). Long-held stereotypes of suicide, according to Nathan and Nathan (2020), reflect society's judgments of individuals demonstrating "emotional weakness, attention seeking, selfishness, malingering, and immorality" (p. 2). Hesitation and fear of judgment were often responsible for untold tragedies that with appropriate professional interventions and education may have been mitigated. The stigma of mental health and suicide has been detrimental to the common good. In recent years, the increased understanding and awareness of comprehensive mental health programs have diminished the negative connotations associated with psychological maladies (WHO, 2022). These insights have informed a more progressive response to mental health and suicide and removed the negative association between the individual and public perceptions of their struggles.

Browning et al. (2008) examined suicides among farmers in three southeastern states during the period of 1990 to 1998; results confirmed an increased suicide mortality rate among white male farmers compared to the total white male population in these three states. Further, the increased rate of suicide was especially high among those aged 25 to 34 years, 75 to 84 years, and 85 years and older; male farmers in the 75 to 84 age group were twice as likely to die from suicide compared to the total white male population (Browning et al., 2008). In a systematic literature review about depressive symptoms and suicide among U.S. primary farmers (those who own/manage the farm) and family members, Reed and

Claunch (2020) identified the need for more robust science where suicide is the primary focus of the investigation and for scientifically grounded interventions, given the limited number of studies they discovered.

Previous research has primarily focused on farmers and farm families; only one prior study (Comer & Layfield, 2020) involved agricultural education teachers. In rural communities, SBAE teachers build relationships with agriculture students, their families, and members of the community, leaving them well-positioned to recognize and respond to suicide ideation. However, even though many SBAE teachers participate in various professional development (PD) encompassing a myriad of topics, suicide-related training has been ignored. The Jason Flatt Act addressed suicide prevention and PD training for educators in response to the epidemic of student mental health and suicide (Navigate360, 2022). The Tennessee General Assembly was the first legislative body in the United States to pass the Jason Flatt Act in 2007 (Jason Foundation, 2015), mandating two hours of suicide-specific PD. While most states recommend some kind of suicide training for K–12 teachers, staff, and administration, only 14 states require annual suicide prevention training, another 22 states mandate training but do not specify that it happen annually, and another 12 states encourage but do not require training (Navigate360, 2022).

Lazenby (2006) estimated that in the year 2000, over 10,000 classroom teachers experienced the emotional impact of a student death, including suicide, based on national mortality figures for school-aged children. However, in a pilot study of SBAE teachers in South Carolina, a state that does mandate a one-time training (Navigate360, 2022), only 51% had participated in suicide-related PD, and 73% indicated a willingness to attend such (Comer & Layfield, 2020). Comer and Layfield (2020) recommended replicating the study throughout the southern region of the United States after revising the instrument. Therefore, following this recommendation, this study utilized a revised instrument to assess the perceptions of SBAE teachers across that geographic region.

This study was grounded in Interpersonal Theory of Suicidal Behavior (Van Orden et al., 2010). According to the theory, the most dangerous form of suicidal desire is caused by the simultaneous presence of thwarted belongingness and perceived burdensomeness, and the capability to engage in suicidal behavior is separate from the desire to do so. The model in Figure 1 shows a small area of overlap in the Venn diagram representing the minority of individuals who possess desire and capability for suicide. Further, according to the theory (Van Orden et al., 2010), interventions that address perceived burdensomeness and thwarted belongingness should produce the best outcomes, while prevention efforts targeting perceived burdensomeness and thwarted belongingness may be effective. Being aware of conditions that could lead to a desire for suicide is crucial to recognizing warning signs. In agriculture, unique stressful circumstances exist that do not cause stress in other industries. Similarly, agricultural workers often have increased access to lethal means, rendering them more capable of suicide. For agricultural educators to receive impactful training related to suicide, PD should target the most critical needs of teachers based on their prior knowledge.

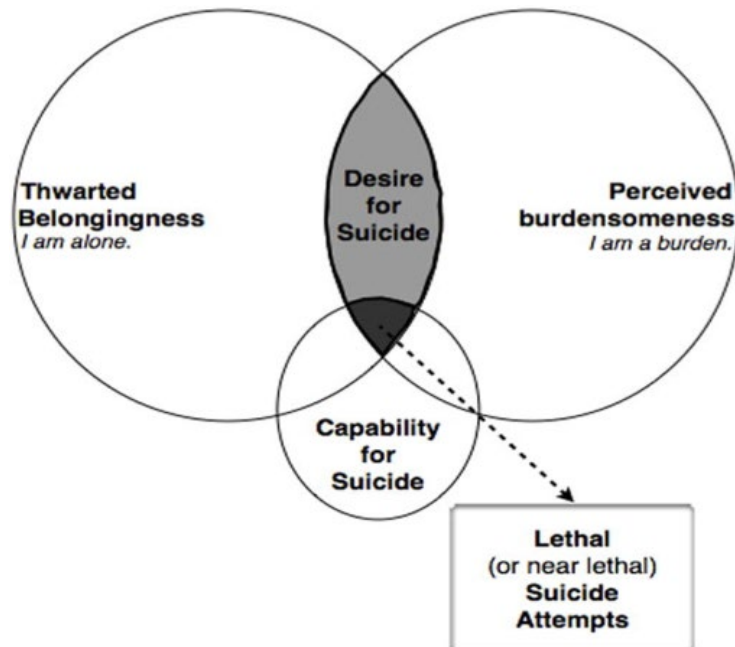


Figure 1. Interpersonal Theory of Suicidal Behavior (Van Orden et al., 2010).

Purpose and Research Questions

The purpose of this regional, multi-state study was to explore suicide exposure, awareness of suicide warning signs and farm stressors, and suicide-related PD experiences of SBAE teachers in the southern region of the United States, as defined by the United States Department of Agriculture (USDA). The study was guided by the following research questions:

1. To what extent have SBAE teachers in the southern region of the United States, as defined by the USDA, been personally and professionally exposed to suicide?
2. How aware of suicide warning signs are SBAE teachers in the southern region of the United States, as defined by the USDA?
3. How aware of farm stressors are SBAE teachers in the southern region of the United States, as defined by the USDA?
4. What are the experiences regarding suicide-related PD of SBAE teachers in the southern region of the United States, as defined by the USDA?
5. Is teacher awareness of suicide warning signs associated with gender, age, ethnicity, education, state, community, teaching experience, disability, being a farmer or not, frequency of interaction with farmers and agricultural workers, professional suicide exposure, personal suicide exposure, awareness of farm stressors, having attended suicide-related PD, and willingness to participate in suicide-related PD?
6. Is teacher awareness of farm stressors associated with gender, age, ethnicity, education, state, community, teaching experience, disability, being a farmer or not, frequency of interaction with farmers and agricultural workers, professional suicide exposure, personal suicide exposure, awareness of suicide warning signs, having attended suicide-related PD, and willingness to participate in suicide-related PD?
7. Is the willingness to attend suicide PD associated with gender, age, ethnicity, education level, state, community, teaching experience, disability, being a farmer, interaction with farmers, interaction with agricultural workers, professional suicide exposure, personal suicide exposure, PD being offered, and having attended PD?

Methods

The population for this study were SBAE teachers in the southern region of the United States as defined by USDA-NIFA. A researcher-designed survey collected self-reported demographic data, exposure to suicide attempts and death by suicide according to professional and personal relationships, suicide-related PD experiences, and awareness of suicide warning signs and farm stressors. The Likert-type scale for awareness of warning signs and farm stressors replicated the scale used by Comer and Layfield (2020).

Content validity was achieved using a panel of experts in agricultural education ($N = 14$) representing higher education faculty ($n = 11$), supervisors of agricultural education ($n = 1$), a higher education department chair ($n = 1$), and a higher education assistant dean ($n = 1$) who reviewed for wording and readability. Face validity was achieved through cognitive interviews conducted with SBAE teachers ($n = 5$) to determine understanding of questions and items; this process is used to improve instrument design as well as validity and reliability (Knafl et al., 2007). Feedback from the panel and cognitive interviews led to several revisions intended to enhance item clarity, interpretation, and overall usability for SBAE teacher respondents. Specifically, items were reworded to address issues such as ambiguous phrasing, double-barreled questions, and inconsistent terminology. Demographic questions were moved to the end of the instrument to improve flow. A web link to a mental health resource was added to provide participants with support options in the event they were experiencing stress or suicidal ideation or knew someone who was. We further refined the instrument by clarifying language to distinguish between personal and professional acquaintances, expanding descriptor options for items measuring frequency of interaction with farmers and farm workers, and standardizing capitalization throughout. The instrument was pilot tested, yielding a Cronbach's alpha reliability coefficient of .87 for the suicide warning signs scale and .88 for the farm stressors scale. The Cronbach's alpha reliability coefficients on the final scale were .86 for awareness of suicide warning signs and .89 for awareness of farm stressors. Missing data were treated using scale mean substitution, which is when the mean of all items in a scale is used to replace a missing item (Sabel-Soteres, 2004).

Utilizing the most accessible email listserv in each state and territory was identified as the most consistent approach for contacting the population. Consistent with Dillman et al.'s (2014) *Tailored Design Method*, five strategically timed email contacts were made: a pre-notice, an initial invitation, and three follow-up reminders sent at one-week intervals. The invitation included a link to the survey hosted on Qualtrics software, Version 2022. Although Dillman et al. recommend four contacts as a general guideline, they emphasize the importance of tailoring strategies to the study population and research goals. Accordingly, a fifth contact was justified to improve response rates, enhance representativeness, and reduce nonresponse bias. Before accessing the informed consent, potential participants were asked two screening questions: (a) do you sometimes feel depressed to the extent you have contemplated suicide; and (b) do you sometimes feel isolated from others to the extent you have contemplated suicide. If answered "yes," potential participants were directed to online mental health resources and not allowed to participate.

This study employed a census sampling approach, in which researchers attempt to survey all members of a population (Lodico et al., 2006). While this approach aims to eliminate sampling error (Arnab, 2017), the low response rate and reliance on listservs may introduce nonresponse error and limit the generalizability of findings. Therefore, this study should be interpreted as having attempted a census but achieved only partial coverage of the intended population. Using National Association of Agricultural Educators' (n.d.) 2021 state-level agricultural education supply and demand profiles, we estimate the total population of SBAE teachers from states and territories involved in this study to be 6,961. Considering the multi-state nature of the study and the fact that each participating state or territory shares or

safeguards SBAE teacher contact information differently, introducing a barrier to random sampling, we deemed the census approach necessary for successful execution of the project (Cooper & Schindler, 2003).

Although we attempted a census approach, the final dataset represents a non-random sample of the target population due to low response rates and listserv limitations. Therefore, inferential statistics are used not to generalize to the full population, but to explore associations within the responding sample. This is consistent with “time and place” generalization, where findings are understood within the context of the sample and conditions under which the data were collected (Calder, Phillips, & Tybout, 1981). Of the total number of attempted respondents ($n = 1,155$), 21% ($n = 247$) were filtered out for suicidal ideation. Additionally, 95 did not consent to participation and of the 813 submitted responses, 20 were removed from analysis due to incompleteness. Therefore, we estimate the usable response rate was 11% ($n = 793$). We acknowledge utilizing email listservs represents a limitation of this study, as this approach can open participation to recipients who are no longer part of the population due to the timeliness of updating listserv members, varying requirements for inclusion on a listserv, and other factors.

Because nonresponse error can be a threat to external validity, an independent-samples t-test was conducted to compare awareness of suicide warning signs in early respondents and late respondents. Late respondents were those who responded to the instrument during the last wave of data collection as suggested by Lindner et al. (2001). There was not a significant difference in the scores for early respondents ($M = 32.67$, $SD = 4.04$) and late respondents ($M = 31.92$, $SD = 5.67$); $t(66) = 1.02$, $p = .31$. An independent-samples t-test was conducted to compare awareness of farm stressors in early respondents and late respondents. There was not a significant difference in the scores for early respondents ($M = 44.35$, $SD = 6.44$) and late respondents ($M = 43.44$, $SD = 7.36$); $t(69) = 0.94$, $p = .35$. Given the absence of significant differences, results can be generalized to the population under investigation (Lindner et al., 2001).

Participant Characteristics

Demographic data were collected to describe participant characteristics regarding gender, age, ethnicity, disability, state, community, education level, teaching experience, being a farmer or not, and frequency of interaction with farmers and agricultural workers. Regarding gender, 55.23% ($n = 438$) identified as woman, 44.39% ($n = 352$) identified as man, 0.25% ($n = 2$) identified as gender nonconforming, and 0.13% ($n = 1$) identified as transgender woman. Regarding age, 13.87% ($n = 110$) were between the ages of 21 and 25, 32.53% ($n = 258$) were between the ages of 26 and 35, 25.60% ($n = 203$) were between the ages of 36 and 45, 18.03% ($n = 143$) were between the ages of 46 and 55, 8.70% ($n = 69$) were between the ages of 56 and 65, 1.13% ($n = 9$) were between the ages of 66 and 75, and 0.13% ($n = 1$) preferred to not answer. Regarding ethnicity, 78.89% ($n = 697$) were white, 11.23% ($n = 89$) were nonwhite, and .88% ($n = 7$) preferred to not answer. Regarding disability, 7.69% ($n = 61$) reported having a disability, 91.68% ($n = 727$) reported not having a disability, and 0.63% ($n = 5$) preferred to not answer.

Regarding state where teaching, 0.50% ($n = 4$) were from Alabama, 6.05% ($n = 48$) were from Arkansas, 5.55% ($n = 44$) were from Florida, 7.82% ($n = 62$) were from Georgia, 7.94% ($n = 63$) were from Kentucky, 4.67% ($n = 37$) were from Louisiana, 2.90% ($n = 23$) were from Mississippi, 13.49% ($n = 107$) were from North Carolina, 12.99% ($n = 103$) were from Oklahoma, 1.77% ($n = 14$) were from Puerto Rico, 4.54% ($n = 36$) were from South Carolina, 7.06% ($n = 56$) were from Tennessee, 168 ($n = 21.19\%$) were from Texas, 0.38% ($n = 3$) were from the U. S. Virgin Islands, and 3.15% ($n = 25$) were from Virginia. Regarding community where teaching, 69.8% ($n = 554$) were in a rural location, 21.44% ($n = 170$) were in a suburban location, and 8.70% ($n = 69$) were in an urban location.

Regarding education level, 49.05% ($n = 389$) held a master's degree or higher, while 50.95% ($n = 404$) held a bachelor's degree or lower. Regarding years of teaching experience, 29.76% ($n = 236$) had between 1 and 5 years, 25.22% ($n = 200$) had between 6 and 10 years, 13.37% ($n = 106$) had between 11 and 15 years, 11.10% ($n = 88$) had between 16 and 20 years, 9.96% ($n = 79$) had between 21 and 25 years, 6.05% ($n = 48$) had between 26 and 30 years, and 4.54% ($n = 36$) had 31 or more years of experience.

Regarding being a farmer or not, 50.19% ($n = 398$) did not identify as a farmer, 49.18% ($n = 390$) did identify as farmer, and 0.63% ($n = 5$) preferred to not answer. Regarding frequency of interaction with farmers, 2.02% ($n = 16$) never interacted with farmers, 35.69% ($n = 283$) interacted with farmers daily, 32.28% ($n = 256$) interacted with farmers weekly, 22.07% ($n = 175$) interacted with farmers monthly, 5.30% ($n = 42$) interacted with farmers every six months, 1.77% ($n = 14$) interacted with farmers yearly, and 0.88% ($n = 7$) interacted with farmers at a frequency not listed in the survey. Regarding frequency of interaction with farm workers, 1.89% ($n = 15$) never interacted with farm workers, 43.63% ($n = 346$) interacted with farm workers daily, 33.67% ($n = 267$) interacted with farm workers weekly, 15.01% ($n = 119$) interacted with farm workers monthly, 4.41% ($n = 35$) interacted with farm workers every six months, 1.13% ($n = 9$) interacted with farm workers yearly, and 0.25% ($n = 2$) interacted with farm workers at a frequency not listed on the survey.

Results and Findings

Research question one asked to what extent SBAE teachers in the southern region of the United States had, as defined by the USDA, been professionally (see Table 1) and personally (see Table 2) exposed to suicide. Data were analyzed using descriptive statistics. The grand mean score for professional exposure to suicide attempts was 0.53 ($SD = 0.58$); for professional exposure to death by suicide, the grand mean was 0.19 ($SD = 0.20$). Most professional exposure to suicide attempts and death by suicide involved students in a teacher's school, but not in their class with a mean of 1.66 ($SD = 4.45$) and 0.56 ($SD = 1.27$), respectively. The grand mean score for personal exposure to suicide attempts was 0.26 ($SD = 0.25$); for personal exposure to death by suicide, the grand mean was 0.17 ($SD = 0.17$). Most personal exposure to suicide attempts and death by suicide involved acquaintances with a mean of 0.75 ($SD = 1.32$) and 0.50 ($SD = 0.95$), respectively.

Table 1

Professional Exposure to Suicide

Professional Relationship	Attempted		Died By	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Student within your class	0.91	2.36	0.17	0.51
Former student	0.92	1.88	0.42	0.79
Student within your school, but not your class	1.66	4.45	0.56	1.27
Teacher in your school	0.10	0.38	0.06	0.27
Administrator in your school	0.01	0.12	0.01	0.11
Staff member in your school	0.05	0.31	0.01	0.12
Teacher in your professional organization	0.19	0.64	0.11	0.39
Other	0.40	1.74	0.19	0.82
Grand Mean	0.53	0.58	0.19	0.20

Table 2

Personal Exposure to Suicide

Personal Relationship	Attempted		Died By	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Friend	0.54	1.06	0.34	0.87
Acquaintance	0.75	1.32	0.50	0.95
Family friend	0.35	0.75	0.23	0.62
Relative of a friend	0.41	0.87	0.28	0.67
Parent	0.04	0.19	0.01	0.11
Grandparent	0.05	0.23	0.03	0.18
Sibling	0.05	0.24	0.01	0.08
Romantic partner	0.04	0.19	0.01	0.09
Extended family member	0.31	0.78	0.22	0.56
Other	0.08	0.38	0.06	0.47
Grand Mean	0.26	0.25	0.17	0.17

Research question two asked how aware of suicide warning signs were SBAE teachers in the southern region of the United States, as defined by the USDA. Data were analyzed using descriptive statistics, shown in descending order, and are summarized in Table 3. On a 3-point Likert-type scale (1 = not a warning sign; 2 = may be a warning sign; 3 = definitely a warning sign), the grand mean score for awareness of suicide warning signs was 2.51 (*SD* = 2.04); on average, SBAE teachers recognized most suicide warning signs.

Table 3*Awareness of Suicide Warning Signs*

Warning Signs	<i>M</i>	<i>SD</i>
No reason for living; no sense of purpose in life	2.90	0.31
Feeling trapped—like there's no way out	2.83	0.39
Withdrawing from friends, family, or society	2.82	0.41
Hopelessness	2.69	0.49
Increasing alcohol or drug use	2.69	0.50
Getting plans in order for the end of life	2.61	0.55
Dramatic changes in mood	2.50	0.55
Acting reckless	2.49	0.58
Anxiety, agitation, unable to sleep	2.39	0.57
Engaging in risky activities	2.38	0.57
Sleeping all the time	2.28	0.60
Rage, anger, seeking revenge	2.26	0.62
Seasonal variations in workload	1.76	0.63
Grand Mean	2.51	2.04

Research question three asked how aware of farm stressors were SBAE teachers in the southern region of the United States, as defined by the USDA. Data were analyzed using descriptive statistics, shown in descending order, and are summarized in Table 4. On a 3-point Likert-type scale (1 = not a farm stressor; 2 = may be a farm stressor; 3 = definitely a farm stressor), the grand mean score for awareness of farm stressors was 2.46 ($SD = 2.01$); on average, SBAE teachers recognized most farm stressors.

Table 4*Awareness of Farm Stressors*

Stressors	<i>M</i>	<i>SD</i>
High debt load	2.86	0.39
Immense debt load	2.86	0.39
Not enough money for day-to-day expenses	2.79	0.47
Not enough cash/capital for unexpected problems	2.76	0.46
Concern about the future of the farm	2.67	0.56
Demanding workload for one person	2.55	0.63
Time constraints for family	2.49	0.61
Health care costs	2.47	0.62
Financing for retirement	2.47	0.63
Poor health	2.47	0.61
Taxes	2.44	0.62
Government regulations or restrictions	2.34	0.68
Lack of personal support	2.32	0.65
Not enough funding for improvements or technological advancements	2.30	0.68
Lack of support group	2.17	0.70
Lack of support groups/systems	2.17	0.68
Seasonal changes in workload	2.12	0.71
Being physically isolated from neighbors or the community	2.04	0.73
Grand Mean	2.46	2.01

Research question four asked what the experiences regarding suicide-related PD of SBAE teachers in the southern region of the United States were, as defined by the USDA. Data were analyzed using descriptive statistics (see Table 5). Regarding being offered, 33.29% ($n = 264$) reported PD was not offered, 51.32% ($n = 407$) reported PD was offered, and 15.38% ($n = 122$) were unsure; on average, most SBAE teachers have been offered and have attended suicide-related PD. Regarding attending, 48.42% ($n = 384$) had not attended, while 51.58% ($n = 409$) had attended PD. For those who had not attended, 22.92% ($n = 88$) indicated they were not willing to attend PD if it were offered, while 76.56 ($n = 294$) indicated they would, and 0.52% ($n = 2$) preferred to not answer.

Table 5*Suicide-related Professional Development Experiences*

		<i>n</i>	%
Offered	No	264	33.29
	Yes	407	51.32
	Unsure	122	15.38
Attended	No	384	48.42
	Yes	409	51.58
Willing to attend ^a	No	88	22.92
	Yes	294	76.56
	Prefer to not answer	2	0.52

Note. ^aOnly those who indicated they had not attended suicide-related professional development were asked to indicate if they would be willing to attend if that type of professional development was offered.

Research question five asked if teacher awareness of suicide warning signs was associated with gender, age, ethnicity, education, state, community, teaching experience, disability, being a farmer or not, frequency of interaction with farmers and agricultural workers, professional suicide exposure, personal suicide exposure, awareness of farm stressors, having attended suicide-related PD, and willingness to participate in suicide-related PD. A multiple regression model was fitted to the data with teacher awareness of suicide warning signs as the dependent variable and the other variables as the independent variables. Gender was significantly associated with awareness of suicide warning signs ($b = -1.12$, $p < 0.05$) after controlling for the other independent variables, indicating that females are more aware of the suicide warning signs than males. Suicide exposure in the professional setting was significantly and positively associated with the awareness of suicide warning signs ($b = 0.04$, $p < 0.05$) after controlling for the other independent variables, indicating that teachers who were more exposed to suicide in the professional settings are more likely to be aware of suicide warning signs than teachers who were less exposed. Awareness of farm stressors was significantly and positively associated with the awareness of suicide warning signs ($b = 0.30$, $p < 0.05$) after controlling for the other independent variables, indicating that teachers who were more aware of farm stressors are more likely to be aware of suicide warning signs than teachers who were less aware of farm stressors. Ten-fold cross-validation was performed to compare the full model (i.e., with all the independent variables included) and the reduced model (i.e., with the three significant independent variables included). The root mean square error (RMSE) for the full model was 3.54 with an R^2 of 28.74%, and the RMSE for the reduced model was 3.52 with an R^2 of 28.67%, indicating that the optimal model for the first research question was to retain the three significant independent variables, and 28.67% of the variance in awareness of suicide warning signs was explained by gender, suicide exposure in the professional setting, and the awareness of farm stressors.

Research question six asked if teacher awareness of farm stressors was associated with gender, age, ethnicity, education, state, community, teaching experience, disability, being a farmer or not, frequency of interaction with farmers and agricultural workers, professional suicide exposure, personal suicide exposure, awareness of suicide warning signs, having attended suicide-related PD, and willingness to participate in suicide-related PD. A multiple regression model was fitted to the data with teacher awareness of farm stressors as the dependent variable and the other variables as independent variables. Community was significantly associated with awareness of farm stressors ($b = 2.08$, $p < 0.05$) after controlling for other independent variables, indicating that teachers from urban areas are more aware

of farm stressors than teachers from rural areas. Suicide exposure in the personal setting was significantly and positively associated with the awareness of farm stressors ($b = 0.10, p < 0.05$) after controlling for the other independent variables, indicating that teachers who were more exposed to suicide in the personal setting are more likely to be aware of farm stressors than teachers who were less exposed to suicide in a personal setting. Awareness of suicide warning signs was significantly and positively associated with the awareness of farm stressors ($b = 0.76, p < 0.05$) after controlling for the other independent variables, indicating that teachers who were more aware of suicide warning signs are more likely to be aware of farm stressors than teachers who were less aware of suicide warning signs. Ten-fold cross-validation was performed to compare the full model (i.e., with all the independent variables included) and the reduced model (i.e., with the three significant independent variables included). The RMSE for the full model was 5.63 with an R^2 of 26.54%, and the RMSE for the reduced model was 5.60 with an R^2 of 26.31%, indicating that the optimal model for the second research question was to retain the three significant independent variables, and 26.31% of the variance in awareness of farm stressors was explained by the community, suicide exposure in the personal setting, and awareness of suicide warning signs.

Research question seven asked if willingness to attend suicide PD was associated with gender, age, ethnicity, education level, state, community, teaching experience, disability, being a farmer, interaction with farmers, interaction with agricultural workers, professional suicide exposure, personal suicide exposure, PD being offered, and having attended PD. A logistic regression model was fitted to the data with the willingness to attend suicide PD as the dependent variable and the other variables as the independent variables. Gender was significantly associated with the willingness to attend the suicide PD ($OR = 2.55, p < 0.05$) after controlling for the other independent variables, indicating that females were 2.55 times more willing to attend the suicide PD than males. Teaching experience was significantly associated with willingness to attend the suicide PD ($OR = 1.36, p < 0.05$) after controlling for the other independent variables, indicating that teachers with less teaching experience were more willing to attend the suicide PD than teachers with more teaching experience. Suicide PD being offered was significantly associated with the willingness to attend the suicide PD ($OR = 2.07, p < 0.05$) after controlling for the other independent variables, indicating that teachers who were not offered PD were 2.07 times more willing to attend the suicide PD than teachers who were not sure if they were offered PD or not. Suicide exposure in the personal setting was significantly associated with the willingness to attend the suicide PD ($OR = 1.09, p < 0.05$) after controlling for the other independent variables, indicating that teachers who were more exposed to suicide in the personal setting were more willing to attend the suicide PD than teachers who were less exposed to suicide in the personal setting. Ten-fold cross-validation was performed to compare the full model (i.e., with all the independent variables included) and the reduced model (i.e., with the four significant independent variables included). The classification accuracy for the full model was 74.44%, and the classification accuracy for the reduced model was 78.24%, indicating that the optimal model for the third research question was to retain the four significant independent variables: gender, teaching experience, suicide PD being offered, and suicide exposure in the personal setting.

Conclusions, Recommendations, and Implications

Conclusions

Based upon the results of this study, we concluded that SBAE teachers recognized most warning signs and farm stressors. However, females, teachers with more professional exposure to suicide, and those with greater awareness of farm stressors were more likely to recognize suicide warning signs. Similarly, teachers from urban areas, those with more personal exposure to suicide, and those already aware of warning signs were more likely to be aware of farm stressors. White male farmers continue to

have an increased suicide mortality rate compared to the total white male population (Browning et al., 2008), reinforcing the importance of this work. Additionally, most SBAE teachers had attended suicide-related PD, and those who had not were generally willing to do so, especially females, less experienced teachers, and those with more personal exposure to suicide. Interestingly, more teachers had participated in suicide-related PD than those who reported it being offered in their school systems, suggesting that SBAE teachers are seeking these opportunities independently. These findings mirror and expand upon Comer and Layfield's (2020) pilot study, affirming the regional relevance of suicide-related PD needs among SBAE teachers.

Recommendations

Based on these findings, suicide-related PD offerings for agricultural educators should be robust, frequent, and designed to address critical areas such as farm stress and suicide warning signs. PD should be delivered in a tiered model that aligns with teachers' years of classroom experience. Additionally, teachers with more personal exposure to suicide could be recruited as PD facilitators to build peer rapport, combat stigma, and foster deeper understanding. Certification or credentialing may serve as an incentive for participation, particularly in states that do not require annual training. PD should also be embedded into spaces where agriculture teachers already convene, such as conferences and professional meetings. Importantly, implementation requires the support of those who plan and oversee professional development. Thus, the results of this study should be shared with decision makers, including members of the National Association of Supervisors of Agricultural Education, National FFA Organization staff, leadership of the National Association of Agricultural Educators, and the American Association for Agricultural Education. As prior literature has noted, agricultural workers face unique stressors that elevate suicide risk (Cuthbertson et al., 2022; Reed & Claunch, 2020), and SBAE teachers may serve as key gatekeepers within these rural support systems.

Implications

Given SBAE programs' influential role in communities, this study reinforces the need to investigate why some agricultural educators choose not to engage in suicide-related PD experiences. While 36 states mandate some form of suicide training (Navigate360, 2022), there is no uniformity in how training is delivered or encouraged. Further research should explore how additional demographics, such as sexual orientation, religious beliefs, and personal mental health experiences, affect teachers' awareness and willingness to engage. Investigating attitudes about suicide, how teachers cope during crises, and what contributes to feelings of thwarted belongingness or perceived burdensomeness among educators could inform future interventions. These constructs align with Van Orden et al.'s (2010) Interpersonal Theory of Suicide, which underscores the importance of addressing these feelings through targeted prevention and intervention efforts. There is also a need to examine the preferred delivery formats for suicide-related PD to ensure alignment with educator needs and expectations. Lastly, replication of this study in other geographic regions will help determine whether findings hold beyond the southern region of the United States.

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