FarmResponse: Improving Mental Health Care by Educating Providers on Agricultural Health Competencies

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Abstract

Purpose: Agricultural communities experience elevated suicide rates and lack access to behavioral healthcare. FarmResponse is an online, interactive program designed to educate rural healthcare providers about the economic stressors and cultural aspects of working in agriculture. The curriculum is based on the Total Farmer Health model as it relates to factors for mental health in agriculture. The purpose of this report is to examine the quality of the measures used to assess training impact, quantify the effectiveness of the training, and assess participant perceptions in applying the training.

Sample: The sample was comprised of those who registered for the training between February, 2022 through February, 2023. A total of 621 completed the pretest and 520 completed the pretest and posttest. Although nearly all U.S. states were represented, 45.6% of participants resided in Texas and Pennsylvania.

Method: Classical test theory measures of difficulty and discrimination were used to examine the quality of the test questions at pretest. Distractor analysis was applied to the posttest questions to

evaluate the quality of the incorrect responses compared to correct responses. Grounded theory was used to identify themes related to how participants viewed applying the training to their profession.

Findings: The test questions covered a broad range of difficulty and a tighter range for discrimination. Distractor analysis revealed two questions that could be improved. Participants significantly increased their knowledge of agricultural culture with a within person increase of 5.05 points (95% CI 4.81, 5.29). Seven themes were identified in response to benefits and challenges expected when employing the training.

Conclusions: FarmResponse increased participant knowledge of farming culture based on quality measures of effectiveness. Participants reported feeling positive about gaining needed resources and developing cultural competency, but also expressed concerns related to accessing farmers and ranchers to provide services and the stigma that reduces help-seeking.

Keywords: Agriculture, behavioral health, rural mental health, classical test theory, grounded theory, medical education

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Agricultural operators (farmers and ranchers) experience economic stressors that are unique to the agricultural sector including falling commodity prices, increasing costs of inputs, increasing levels of debt, labor shortages, weather uncertainty and natural disasters, and disruptions due to trade disputes (Key et al., 2019; Odabasi & Hartarska, 2021). Male agricultural operators experience one of the highest suicide rates compared to other occupational groups for workers 16 to 64 years of age in 17 states at 32.2 per 100,000 in 2015 (Peterson et al., 2018). Agricultural operators live in areas where there is a shortage of mental and behavioral healthcare providers,

which is associated with elevated suicide rates (Ku et al., 2021), and many lack adequate health insurance coverage (Lueck & Broaddus, 2018).

To address behavioral health needs in rural agricultural communities, programs such as Question, Persuade, Refer (QPR) for Farmers and Farm Families have been training individuals to recognize and respond when interacting with someone who might be in distress (AgriSafe, 2024, January 8). The QPR program for Farmers and Farm Families uses the QPR Institute (2024) sanctioned suicide prevention gatekeeper concepts and training incorporating the cultural context of the suicide factors among the agricultural community. AgriSafe®, a national nonprofit in agricultural health and safety, has been offering this training online and in person across the US for several years now training over one thousand agricultural community individuals across forty-nine states (AgriSafe, 2024 January 11).

The Farm and Ranch Stress Assistance Network (FRSAN) established mental and behavioral health support systems in the west, north central, northeast, and southern regions of the US (United States Department of Agriculture, 2024). Efforts included the launch of phone and text resources and crisis hotlines, programming, and podcasts with the goal of reducing stigma and providing services to agricultural communities. These programs and efforts are designed to provide assistance, referrals, and interventions to those in distress or those impacted by a distressed individual. Health professionals with expertise and an understanding of farming culture and the inherent stressors are needed to address behavioral healthcare for this community. The need for informed behavioral health providers for referrals was the driving force behind the development of FarmResponse by AgriSafe and an interprofessional team of content experts (AgriSafe, 2023, December 1) .

Rural nursing theory concepts and theoretical statements support training that address the unique needs of rural residents. While rural health beliefs, self-reliance, and the insider/outsider phenomenon can serve as protective factors for people living and working in agriculture, they also influence health seeking behaviors (Lee et al., 2022). Providers practicing in rural areas, outside rural areas, or providing telehealth services may not be equipped to understand and manage the unique stressors and injury risks associated with agricultural work (Butzner & Cuffee, 2021). Revised rural nursing theory proposes that health is defined as a way of life, the ability to work and be productive particularly for those in agricultural occupations (Lee & McDonagh, 2022). Addressing the occupational behavioral health risk factors and desired health goals for agricultural communities with informed conversations can build trust and enhance health seeking behaviors. Healthcare providers benefit from knowing how to initiate conversations with farmers and ranchers about stress and behavioral health.

FarmResponse is an on-demand, interactive professional development course for a wide range of healthcare professionals. The training was launched in February 2022 through AgriSafe's Learning Lab with a variety of health professional continuing education offerings. FarmResponse addresses farm and ranching cultural competencies for healthcare providers and specialists by exploring the effects of financial stress, land ownership and legacy issues, family and cultural dynamics, substance use, suicide, and the work of agriculture on mental well-being. The curriculum is based on AgriSafe's Total Farmer Health model as it relates to factors for mental health in agriculture (AgriSafe, 2024, January 10). The Total Farmer Health model is a holistic illustration of the factors impacting well-being in the agricultural workforce. The purpose of the FarmResponse evaluation was to assess the quality of the test questions used at pre-test and post-test to assess participant learning outcomes, examine the level of participant learning after

completing the training, and understand the impact the training had on the practice of behavioral health in those completing the training.

Methods

Sample

The sample was composed of those who registered for the FarmResponse training between February 2022, when it was launched, until the end of February 2023. Participants were recruited through regional and state outreach leaders from farm bureaus, commodity groups, university extensions, agricultural businesses, and rural health care clinics. They were nurses, social workers, audiologists, and speech pathologists. Veterans Administration Services outreach leaders recruited certified safety professionals, industrial hygienists, physical therapists, and those who worked hotlines as crisis counselors. The current report is an evaluation of the FarmResponse training and was deemed to be exempt due to not being human subjects' research.

Measures

Upon registering for the FarmResponse training, participants were asked about their state of residence, occupation, employer, and whether they worked in a rural area. We define rural here similarly as the U.S. Census Bureau as areas that are not contained within an urban area (U.S. Census Bureau, December 2016). After completing FarmResponse, learners were provided a course evaluation consisting of twenty-three questions. Table 1 provides a complete listing of the FarmResponse course evaluation questions with corresponding Likert scales. The first question addressed the level of content difficulty. Ten questions directly evaluated the FarmResponse learning objectives. Four questions focused on the learning platform, audiovisuals, and activities. Two questions addressed conflict of interest and bias. Four questions asked the learner to reflect on gained knowledge, changes in communication, referral awareness, and endorsement of the

program to other colleagues. In an attempt to elicit feedback on barriers for implementation, learners were asked to rank how difficult implementation of a FarmResponse informed approach would be in their clinical setting. Finally, three open-ended questions were asked of participants. The first open-ended question was "Why or why not would you recommend this training to your healthcare colleagues? ". The second open-ended question was "What do you see as the challenges or benefits of your intended change?". The last question was "Would you like to share anything else about this training?". In this report, the focus is on the results of the second question since overwhelmingly participants reported that they would recommend the course to others.

Learners completed a 20-question pre-test before beginning the training and the same test was administered at post-test. The post-test could be taken as many times as the test taker desired. As common with most professional development courses, learners were allowed multiple posttests attempts to achieve the minimal required score to demonstrate content mastery and earn continuing education credits. Using a repeated measures design, we used the pre-test and the first post-test to analyze the effectiveness of the training since participants could take the same exam repeatedly until they attained the desired score. Using the final test taken would provide evidence of perseverance but not necessarily program effectiveness. We assessed test question quality to better understand how well the questions were measuring training effectiveness. Pre/post test questions are not provided in this publication to avoid compromising the integrity of ongoing and future pre/post test results.

Table 1

FarmResponse course evaluation questions

The overall level of content presented was:	Too Basic 1	Appropriate 2		Too Advanced 3	
How well did the activity help you achieve stated objectives?	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Explain the Total Farmer Health model as it relates to factors for mental health in agriculture.	5	4	3	2	1
Describe characteristics of US farm producers and their farms.	5	4	3	2	1
Contrast financial stressors in farm and ranch operators to non-agricultural employees.	5	4	3	2	1
Summarize the impact of mediation as a tool to mitigate farmer stress.	5	4	3	2	1
List work challenges inherent in agricultural production as it relates to mental wellbeing.	5	4	3	2	1
Identify the impact of farming cultures on farmer mental health and health-seeking behaviors.	5	4	3	2	1
Identify barriers that agricultural workers face in accessing health care.	5	4	3	2	1
Describe risk factors for suicide in agricultural populations.	5	4	3	2	1
Identify three agricultural stress referral sources that can be used to address the needs of this population.	5	4	3	2	1
Improve clinical communication skills concerning mental health distress and stressors of agricultural workers and their families.	5	4	3	2	1
This activity increased my professional knowledge.	5	4	3	2	1
This activity changed my communication approach.	5	4	3	2	1
This activity expanded my range of referrals for agricultural workers.	5	4	3	2	1
I would recommend this training to my healthcare colleagues.	5	4	3	2	1
Why or why not would you recommend this training to your healthcare colleagues? (free text)					
	Very Easy	Easy	Neutral	Difficult	Very Difficult
How difficult would it be for you to implement changes in your communication and referrals in your practice?	5	4	3	2	1
What do you see are the challenges or benefits of your intended change? (free text)					
How conducive were the following aspects to the learning process?	Excellent	Good	Average	Fair	Poor
a. Virtual Learning Platform					
b. Audiovisuals					
c. Interactive Activities					
d. Glossary					

Was an announcement made regarding conflict of interest?	Yes	No
Was this program content presented in a non-biased* manner?	Yes	No
Share anything else you would like about this training. (free text)		

Analysis

Test Question Quality

The test questions were not expected to form latent constructs, so a psychometric analysis was not appropriate. Classical test theory measures of difficulty and discrimination were used to assess test question quality (Crocker & Algina, 1986). Quality test questions should cover a spectrum of difficulty and discrimination. Those who score well overall on a test should also score well on the harder questions. The correct responses should be answered correctly more often than the wrong answer in 45% to 90% of test takers. We calculated item difficulty and item discrimination on pre-test questions. Item difficulty is the proportion of correct answers to each item. Discrimination is the point biserial correlation between each item and the total score. We also conducted a distractor analysis on the post-test questions to assess test question quality in relation to incorrect responses. Distractor analysis compares the quality of the incorrect responses to the correct response. The point biserial results should show that the correct answer is positively correlated to the overall test score and the incorrect responses are negatively correlated with the total test score. The classical test theory package, CTT, in R version 4.2.2 (R Core Team, 2021) was used for these analyses.

Quantitative Analysis

After confirming that the test questions were of sufficient quality, the participant post-test scores were compared to their pre-test scores using a non-parametric two-sample test (group change) and a paired t-test (individual change). Although the raw scores were not normally distributed, the differences were normally distributed. The Spearman correlation coefficient was

used to assess how correlated the pre-test score was to the post-test score. Of interest was how strongly knowledge prior to the training predicted performance on the post-test. The coefficient of variation, which is the ratio of the standard deviation to the mean, assesses differences in variation around the mean and can be used to compare summary statistics where the means are statistically different. These analyses were conducted in SAS version 9.4 (SAS Institute Inc., 2016).

Qualitative Analysis

Themes were based on the qualitative question asking about challenges and benefits of applying the training in the participants' workplaces. The three-step method of grounded theory was used to analyze the qualitative data based on the inductive nature of this approach (Strauss & Corbin, 1990). We did not have a relevant theory from which to code the data. In step one, open coding was used to break down the responses by analyzing and labeling different concepts that were grounded within the responses. Concepts were compared for similarities and differences, and then they were grouped into categories. In step two, axial coding was used to link categories together and in step three, selective coding incorporated axial codes to derive a central category that successfully included all relevant categories from both open and axial coding. The QDA Miner Lite (2021) version 2.0.9 was used to code the data and identify themes among the responses.

Results

Sample

A total of 621 participants completed the pre-test and 520 completed both the pre-test and post-test. Although nearly all states were represented among the participants, 95 were from Pennsylvania and 142 were from Texas; 45.6% were from two states in the US. Nearly all (98.4%) answered the occupation question as "not applicable", so it is not known who was undertaking the FarmResponse training. The information on the participants' employer indicated a diverse group

of learners. Only five responded that they were a healthcare professional. Of the 158 who responded to the question asking whether they served rural communities, 118 (74.7%) responded "yes"; 362 (69.6%) did not respond to this question. Not all participants completed all modules. Almost half (45.4%) completed 17 of 18 modules, 32.7% completed 16 modules, 12.3% completed all 18 modules and the remaining almost 10% completed 14 or 15 of the modules.

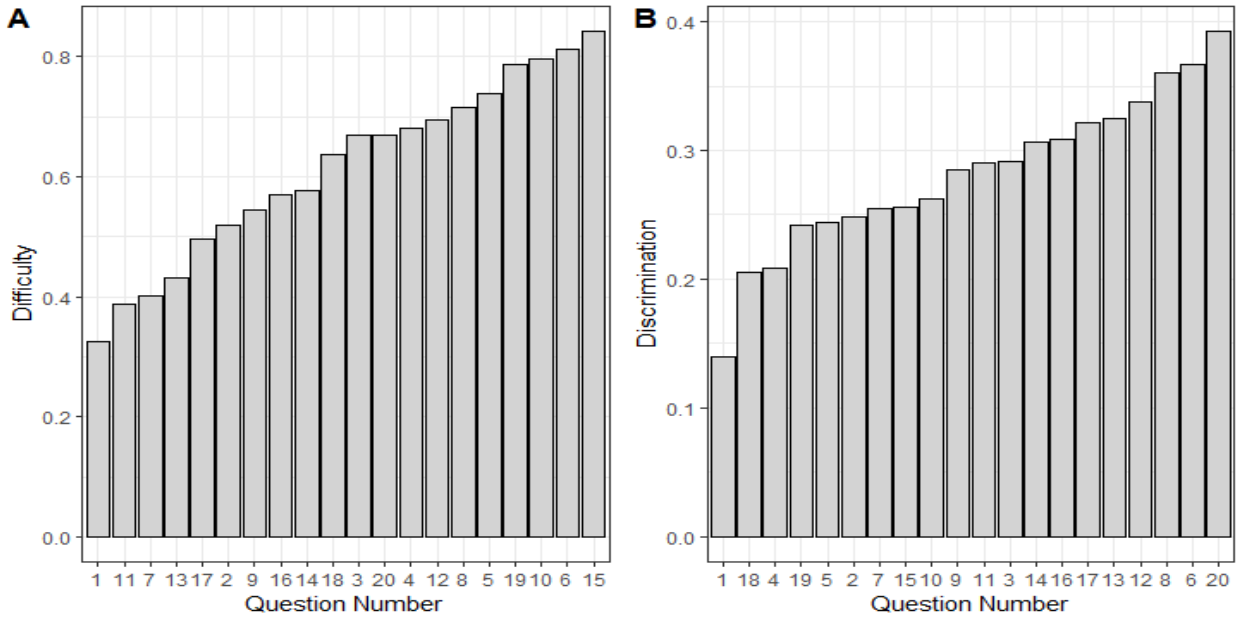
Nearly all, 95.7%, reported that the difficulty of the material was appropriate. Only 2.13% (n=12) individuals thought it was too advanced and the same number felt it was too basic. When asked how difficult it would be to implement changes in their communication and referral practices, 77.1% (n=434) responded that it would be easy or very easy to make changes, 2.66% (n=15) were neutral, and only 2.84% (n=16) said that it would be difficult. A significant percentage, 17.4%, said that this question did not apply to them.

Test Question Quality

Figure 1A shows the items ordered from more difficult to less difficult. The percentages on the y-axis represent the average percentage correct. Question (Q)1 was the most difficult and Q15 was the easiest for participants. The range of just over 0.25 to just over 0.75 is acceptable. There were not too many easy, nor too many difficult questions. Discrimination varied across items, but less so than difficulty (range 0.14 to 0.39; Figure 1B).

Figure 1

Difficulty (Panel A) and Discrimination (Panel B) of Test Questions Based on Pre-test Responses in 621 Who Completed the Pre-test Assessment, 2022



The distractor analysis showed that at post-test, all but two items performed well. One question had two distractors with zero responses and a second question showed all the point biserial correlations to be negative. Eighteen questions behaved as desired with a positive point biserial correlation for the correct response and a negative correlation for the incorrect responses. Among the incorrect answers for the 18 questions, there was an equal distribution across the incorrect responses. This result indicates that the questions adequately captured participant knowledge of the training and that two questions could be improved in the future.

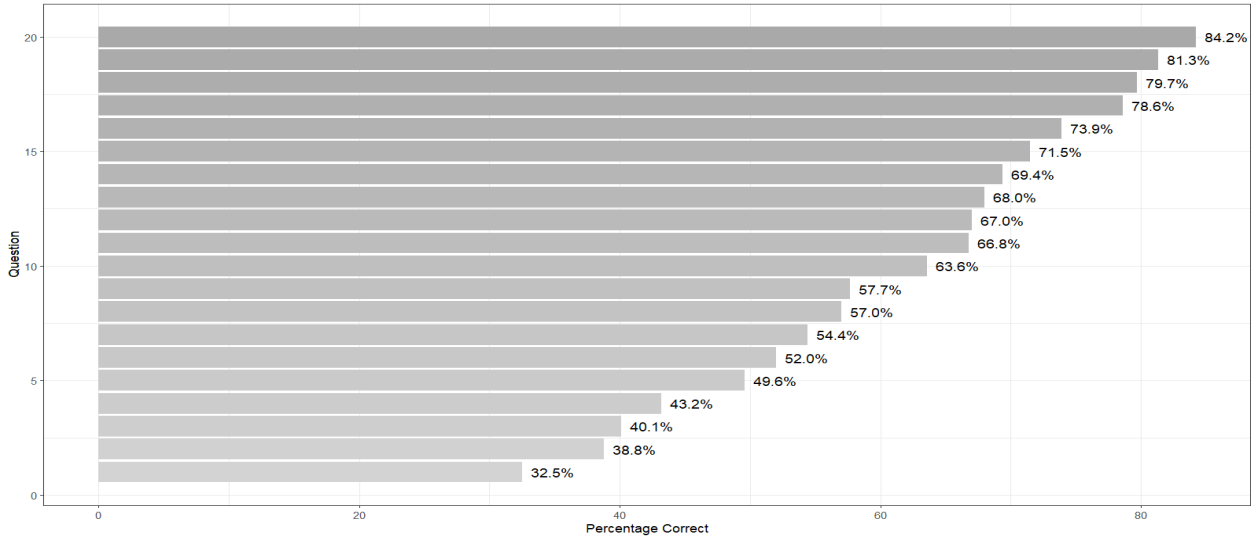
Quantitative Analysis

In the 520 who completed the pre-test, the percentage of correct responses ranged from 32.5% to 84.2% (Figure 2). The within-person pre-test score increased 5.05 points (95% confidence interval (CI) 4.81, 5.29; p-value <0.0001) at post-test. The mean pre-test score was

12.3 (standard deviation (SD) = 2.73) and the mean post-test score was 17.3 (SD=1.22) out of a possible score of 20. The coefficient of variation (CV) at pre-test was 22.2 and at post-test, 7.06. The CV shows that the variability around the mean was much lower at post-test compared to pre-test. The correlation between the pre-test and the post-test was significant, but somewhat low at 0.19 ($p<0.0001$). Restricting the analysis to the 158 who responded to the question asking whether they provided rural care, there was no difference in test scores in those who worked in a rural community and those who did not. Module completion was not associated with a lower score on the post-test.

Figure 2

Percentage of Correct Responses on the Pre-test for Each of 20 Questions in 520 Participants.



Qualitative Analysis

Participants responded to the two open-ended questions with a sentence or two, and sometimes a sentence fragment. The first asked whether the participant would recommend the training to colleagues. There were only five individuals who said they would not recommend the training. The reasons to recommend the training were related to participants feeling it was informative and that they had learned much by participating (42.5%). Other related reasons cited

were that it was beneficial to rural providers (18.1%) and good for those working with farmers (9.60%). A less common reason was that it addressed a much-needed resource that they could not find anywhere else (5.20%) and that the training specifically addressed the stress of farming as an occupation (5.20%). Some of the participants gave more than one reason. Less frequent reasons were that it was free and provided CEU credits. Many of these reasons were noted in response to the second open-ended question asking about benefits and challenges in applying what they learned to their work. The few individuals that did not recommend the training cited insufficient information on communication and lack of credentials by a governing body in mental health (e.g. American Psychological Association [APA]).

The second qualitative question was of most interest because understanding the benefits and challenges can aid in knowing what steps need to be taken to support the providers. The benefits fell into themes of having access to resources, being able to support the agricultural community, having solutions to challenges, increased knowledge and understanding of agricultural experiences, and cultural competence to address agricultural community concerns. The participants provided many challenges, which were divided into stigma and other barriers, although they are related. Table 2 shows examples of comments of participants by the themes identified. The barriers represent the frustration that providers have in connecting to farmers and ranchers. They want to help but are trying to figure out how to encourage them to talk and how to build trust. Many participants understand that a profound change is needed in their community so that these barriers can be overcome.

Table 2

Examples of themes from asking about barriers and challenges to using the FarmResponse training in their practices, 2023.

Theme	Examples of Participant Comments
Resources	Now I have the information to refer them to someone if they are really struggling. It feels like it will be easy to incorporate change due to having easy access to resources I think it will help me steer more individuals to resources that will help improve quality of life
Support	Helping farmers see the benefit of putting time and energy into their mental health as a long-term goal that isn't quickly fixed Benefits to extend our reach to those who have traditionally either been reluctant to seek help or have had limited access Being better able to help farmers and their families.
Solutions	How to proceed when these approaches don't work Have real solutions that are practical for the patient. Training didn't provide much actual concrete guidance on how to intervene
Increased knowledge	Greater understanding of the farm community Greater understanding and empathy Better understanding farmer stressors
Cultural competence	It increases cultural sensitivity. I have more cultural competence around rural workers now and appreciate that expanded perspective. I work with many folks who would not traditionally talk to a therapist due to differences in background. I hope this expands my reach to help others
Stigma	Stigma is still prevalent, and it's hard to screen people who are not getting any care Challenges include facing the stigma Stigma, clients not wanting the service due to the cultural beliefs
Barriers	Getting farmers to actually make time for mental health services Clinicians finding time to complete the training will be a challenge The cost associated with MH counseling for farmers without insurance The biggest challenge would be finding financial resources for uninsured patients to see me A challenge for my clients to accept assistance in mental health and/or substance abuse Challenges will be many will still refuse services at first Getting the farmers to talk Those resistant to change I am in a private practice in a very small town, I do believe that the chances of running into someone you know is a barrier to receiving care. Breaking through the stoicism of some farm workers. The population's perception of mental healthcare The challenge is a systemic change

Discussion

The FarmResponse training increased knowledge about stressors in the agricultural community and was reported by participants to be beneficial to anyone who works with farmers and ranchers. In the course evaluation of the first year of FarmResponse, we found that the pre-test questions were effective in measuring participant learning. The questions showed acceptable variability on difficulty and discrimination. We also saw that two of our 20 questions would benefit from changing the incorrect answer choices to improve the purpose of having a multiple-choice test. Overall, these results provide confidence that the pre-test and post-test questions were adequately measuring participants' learning experience.

The qualitative analysis indicated that participants gained a new understanding of what the lived experience of a farmer or rancher is like. The evidence suggested an increase in empathy, greater confidence in having conversations about mental and behavioral health, and greater appreciation for the stressors experienced in this occupational group. They also said they benefited from the resources they acquired during the training. Many of those who undertook the training were not mental health professionals, but they worked with farmers and ranchers in other capacities. It is equally important for rural nurses who may be new to the rural culture to feel comfortable initiating conversations about mental health with farmers and ranchers. Being more sensitive to the stressors experienced and knowing about the elevated suicide rates due to the stressors, can help those who come into contact with farmers and ranchers be active listeners and increase their attentiveness to the warning signs of distress.

The message from the qualitative analysis is that rural nurses and counselors who work in mental health are highly motivated to help those in agriculture, but they do not know how to overcome the barriers. These barriers include stigma, stoicism, trust, lack of health insurance

coverage, and generally making services acceptable to this occupational group. The next steps are to address the gap between available providers and those who desire services or would benefit from services.

Going forward it is hoped that more specific demographic information can be captured about learner backgrounds and what populations they serve. Greater outreach to rural healthcare professionals such as nurses, physician assistants, medical doctors and others who serve the medical needs of rural communities can be enhanced. There are also opportunities to reach the individuals who serve as supports and assets in the community such as clergy, schoolteachers, and organizations and businesses that work with agricultural producers. Simply having caring individuals in the lives of farmers and ranchers who understand the hardships that come with growing the nation's and the world's food will help to reduce the burden of isolation many agricultural people feel.

Several learners provided feedback expressing "they didn't know how to connect with agricultural populations directly". AgriSafe has responded by launching a public-facing searchable database of behavioral healthcare providers educated in FarmResponse. AgriSafe gives behavioral health providers completing FarmResponse the option of listing in the provider directory. Families in agricultural rural communities seeking a behavioral health service provider that understands the stress factors in agriculture can search by location, credential type, services offered, financial agreements (insurance, private pay), and telehealth or face-to-face delivery. The AgriStress Helpline (unique agricultural 24/7 call and text suicide crisis/resource line) crisis staff also uses the provider directory to connect individuals directly to providers that can meet their behavioral health needs with an understanding of agricultural stressors.

Conclusion

AgriSafe continues to offer FarmResponse training to healthcare professionals. As of this publication, AgriSafe has trained close to one thousand health professionals across forty-three states in FarmResponse. In January 2024, FarmResponse was approved by the Suicide Prevention Resource Center's for inclusion in their Best Practices Registry following a rigorous evaluation process (Suicide Prevention Resource Center, 2024, January 9). Helping nonagricultural health professionals understand the stressors related to agricultural work has the potential to enhance mental and behavioral health assistance programs and treatment. FarmResponse uses a holistic framework supported by the Total Farmer Health model acknowledging the rural health beliefs of balance and interconnectedness with the environment. FarmResponse supports a definition of health illustrated by a strong relationship between the agricultural values of the ability to work, independence, and self-reliance also acknowledged in rural nursing theory (Lee & McDonagh, 2022; Lee et al., 2022). It is important for farmers, ranchers, and their families to have access to healthcare providers that possess an understanding of their values to generate helpful conversations, connection, and trust.

Conflicts of Interest

These authors declare no conflicts of interest.

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