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Original Research

Exploring Farmers' Motivators and Barriers to Adopting Stress Management Behaviors

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Abstract

Farmers experience high levels of stress, with negative sequelae including physical illness, depression, anxiety, and suicide. Despite this, farmers are often reluctant to adopt stress management behaviors. This study collected survey data on motivators and barriers to stress management behavior change among farmers from 162 participants at a regional fruit and vegetable growers' conference. Survey findings were analyzed using the Health Beliefs Model (HBM) as an organizing framework, calculating the frequency of survey item endorsement, identifying items above the median, and sorting these into the major constructs of the HBM. The study revealed that farmers seldom endorsed getting information about perceived susceptibility to and severity of unmanaged stress as factors that would move them to behavior change; only one survey item—a health crisis--rose above the median. Participants



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identified learning about stress management benefits from others, particularly other farmers, and family support for changing behavior as potent motivators. In addition, they frequently identified discomfort in talking about feelings and internalized stigma grounded in pride and embarrassment as barriers to change. Most frequently, they identified the time and labor demands of farming as barriers to change. In addition to these findings, during analyses, we noted parallels between the frequently endorsed items in the survey and two core constructs from the Interpersonal Theory of Suicide (IPTS)—thwarted belongingness (e.g., long hours of farming) and perceived burdensomeness (e.g., embarrassment at feeling stress and needing support). Study findings suggest that stress management interventions should consider both behavior change and addressing factors that can be risks for suicide. These include: 1) education provided by trusted others, including family and peers; 2) messaging that stress is normal and asking for support is not a burden; 3) opportunities for connection and decreased isolation; 4) programs that recognize and respect the harsh demands of farming life.

Keywords

Farm stress; stress management; health beliefs model; interpersonal theory of suicide; farmer mental health

1. Introduction

Farming is an inherently high-stress profession, driven by pressures like escalating input costs, navigating intricate and often-changing policies and programs, variable commodity prices, severe and unpredictable weather, reliance on loans and financial instability, and heightened accident risks [1, 2]. When farmers experience stress, it is also often coupled with increased levels of anxiety and depression [3]. All of these factors frequently lead to feelings of hopelessness and burnout for farmers, which only exacerbate mental health symptoms [4]. Farmer stress not only leads to poor mental health outcomes but increases the likelihood of engaging in risky health behaviors, such as elevated substance misuse [5]. Further, increased stress and substance use have been implicated in increasing farm accidents, which can be lethal [6, 7]. Research utilizing comprehensive longitudinal population surveys showed that farmers are more likely to experience symptoms of depression when evaluated against individuals in other occupations and have higher odds of showing depressive symptoms when compared to their siblings [8].

Research shows that stress-related symptoms can increase the likelihood of suicidal ideation and attempting suicide [9]. The risk of suicide in high-stress occupations is evident, as demonstrated in a systematic review and meta-analysis where authors found high levels of suicide among agriculture, fishery, and forestry workers [10]. More specifically, the occupational and lifestyle characteristics of farming are unique and may differentiate them from other occupations when assessing their risk of completing suicide [11]. Some of these variables include isolation due to living in a rural area [11, 12], access to firearms [11, 13], and exposure to harmful chemicals such as pesticides [11, 14]. The research indicates that farmers are at high risk of dying by suicide. In the United States, farmers die by suicide at rates much higher than national averages [15, 16]. Additionally, similar studies examining suicide rates among the farmer population in other countries such as France, India, and

China corroborate these results [17-19]. The prevalence of poor mental health and suicide among farmers proves to be a global problem that must be addressed thoughtfully.

Farmers face challenges and have needs across multiple dimensions, including financial, emotional, occupational, and more. The complex variables that farmers face make it challenging to create thorough and appropriate interventions. Multilevel interventions are effective, but many are not rigorously evaluated. A systematic review of mental health interventions for farmers found that, while various resources are necessary to mitigate these issues, multilevel interventions are lacking for farmers [20]. Similarly, other research focuses on the need for interventions to be sufficiently tailored with these multivariable characteristics in mind to reach farmers, who are a notoriously difficult population to access [21]. Farming is often contextualized within a rural culture that values independence and hard work without complaint. Farmers often subscribe and are subjected to a culture of stoicism, rooted in more traditional masculine beliefs about remaining resilient and strong, which may worsen mental health outcomes [22, 23]. Furthermore, stigma surrounding mental health and help-seeking behaviors persists in the farming community [24, 25]. While recent research suggests that mental health stigma may be decreasing among younger farmer populations, it is still quite prevalent [25]. Notably, the hesitance to seek help among farmers is not always intrinsic in nature, as limited access to resources in rural communities has been demonstrated by research [26, 27]. Additionally, farmers often feel that providers who understand what farming entails are lacking, acting as an additional barrier to help-seeking behaviors [11, 24].

Changing behaviors can be an exceedingly difficult task that requires carefully curated and thoughtful science-driven approaches considering the psychosocial and systemic variables underlying people's motivations to engage in behavioral change [28]. The challenge of changing health behaviors is often a focus in the field of Public Health, where models and theories are utilized to frame an approach to these issues. One such model often utilized in Public Health is the Health Belief Model (HBM) [29]. Given the challenges associated with improving farmers' mental health and encouraging their participation in stress management practices, this article investigates the potential of the HBM as a framework for intervention. The HBM is particularly valuable because it focuses on understanding the factors that deter individuals from engaging in health-related behaviors, rather than solely addressing general behavioral intent [29]. The HBM proposes the following constructs that apply to predicting health behaviors: perceived severity, perceived susceptibility, perceived benefit, perceived barriers, self-efficacy, cues to action, and modifying variables [29-31].

The aim of this study was to identify the barriers and motivators farmers experience to engaging in stress management behaviors, and to determine whether the HBM is a useful lens in understanding the potential for changed behavior in farmers. Using survey data collected from farmers we sought to meet this aim as a first step in developing interventions to address farmer stress and well-being.

2. Materials and Methods

2.1 Survey Development

For data collection regarding farmer barriers and motivators to adopting stress management behaviors, we first developed a survey instrument grounded in the experience of those involved in farming. A survey was distributed to Cooperative Extension agricultural and natural resource agents (N = 47) in Georgia during their annual conference. Over half of the agents themselves farmed (24, 51%). The survey contained two open-ended questions: 1) What do you think would motivate a farmer to engage in stress management behaviors; and 2) What do you think are the barriers farmers face that keep them from engaging in stress management behaviors?

Responses were reviewed and condensed independently by two researchers, with similar responses combined to create a list of barriers and motivators. Any areas of disagreement were discussed to consensus. The resultant list of motivators and barriers was then reviewed by two additional researchers engaged in farm stress research, two Extension staff, and two farmers for input and revision, and returned to them after revision for pilot testing. The final list was comprised of twelve motivators and nine barriers. This list was used to create a data collection tool, which allowed respondents to select motivators and barriers (multiple responses allowed), and also gathered demographic information (age, race, gender). This tool was used as the survey.

The final survey contained 23 potential motivators and barriers to stress management, including one Other Motivators (please specify) and one Other Barriers (please specify). Participants were asked to check every item they believed would motivate or be a barrier to a farmer engaging in stress management behaviors. It also asked the respondents four demographic questions. In total, respondents took approximately two to three minutes to complete the survey.

In addition, since researchers planned to use the HBM [29] as an organizing analytic framework, each item in the survey was sorted into one of the model's constructs independently by two researchers, with areas of disagreement discussed to consensus. Final survey items organized by HBM constructs are shown in Table 1 below. (Note: this table was not used as the survey, simply for ease of data analysis.)

Health Beliefs Model Construct: How Defined for this	Survey Items
Survey	
Perceived Severity: Items that suggested that better	 Learning more about stress and what it
understanding of the potential damage from stress	does to you
would increase a farmer's perceived severity of stress	
Perceived Susceptibility: Items that could increase	A health crisis
farmers' awareness of their health vulnerability	A family member health crisis
Perceived Benefit: Items that could increase farmers'	• Hearing about other's positive experiences
awareness of the benefits of stress management	 Incentives (like money)
behaviors	 Hearing about it from other farmers
	 Hearing about it from your doctor
Perceived Barriers: Items that either identified	Knowing everything is confidential
barriers or a way to avoid/overcome barriers to stress	• Having it tied with other agricultural topics
management behaviors	• Time
	 Peer judgment/stigma
	Work responsibilities
	Expense

Table 1 Survey items organized using Health Beliefs Model.

Self-Efficacy: Items that impacted farmers' confidence	 Lack of knowledge about helpful services
in their ability to engage in stress management	 Having easy access to information
behaviors (both knowledge and comfort)	 Not being comfortable talking about
	feelings
Cues to Action: Items that could move farmers to	 Having a financial crisis
action and engage in stress management behaviors.	• A health crisis
Note that some of these could also be considered	 A family member health crisis
items that increased farmers' perceived susceptibility	
and were listed in both categories	
Modifying Variables: Items involving personal	Personality
characteristics or norms that could influence farmers'	 Feeling embarrassed
perceptions regarding stress management behaviors	 Pride/not wanting to admit under stress
	 Getting support from family

2.2 Data Collection

Data were collected using the developed survey, with survey items randomized to preclude positional bias of responses. Collection occurred at the Southern Regional Fruit and Vegetable Growers Conference in January 2024 over a three-day period. As attendees walked past a display table they were invited to participate in the survey, and were given a small souvenir as a thank you for participating. A total of 162 surveys were collected.

2.3 Data Analysis

Demographic data (age, race, gender, ethnicity) were summarized using descriptive statistics. The number of times each response was selected was totaled, and as considered the item's "score". Looking separately at motivators and barriers, the median score was calculated and those responses with a score above the median were identified. The median was used to address potential skewness in score distribution.

A graphic representation of HBM, with each item that was above the median entered in the appropriate construct, was created. This was done for visual ease in understanding the most frequently identified motivators and barriers, and thus identifying potential targets for intervention. This deductive approach was complemented by a more inductive analysis, where themes that cut across the study's HBM model were noted by two researchers, first independently and then working together to discuss these themes and implications.

2.4 Ethics Statement

This study was reviewed and approved on December 12, 2023 by the University of Georgia Human Subjects Office, PROJECT00008842.

3. Results

3.1 Participant Demographics

Of the 162 study participants, 83 (51.2%) were male, 77 (47.5%) female, and 2 (1.3%) selected Prefer not to answer/Other. The majority (102, 63%) were White, with 31 (19.1%) Black, 12 (7.4%) Other, and 17 (10.5%) selecting Prefer not to answer. The mean age of participants was 46.39 (STD 15.30).

3.2 Stress Management Motivators

Responses to the question "What will motivate farmers to do stress management behaviors?" are summarized in Table 2 below. The median score (i.e. median number of respondents who selected a survey item) for these motivation items was 65.5; all items above the median are shown in **bold**.

Item	Number (%)
Hearing about other's positive experiences	96 (59.3%)
A health crisis	87 (53.7%)
Getting support from family	71 (43.8%)
Knowing everything is confidential	70 (43.2%)
Hearing about it from other farmers	68 (42.0%)
Incentives (like money)	67 (41.1%)
Having a financial crisis	64 (39.5%)
Having it tied in with other agriculture topics	60 (37.0%)
Having easy access to information	55 (34.0%)
A family member health crisis	52 (32.1%)
Learning more about stress and what it does to you	50 (30.9%)
Hearing about it from your doctor	33 (20.4%)

Table 2 Farmer motivators for stress management (N = 162).

3.3 Stress Management Barriers

Responses to the question "What are barriers to a farmer doing stress management behaviors?" are summarized in Table 3 below. The median score for these barrier items was 77; all items at or above the median are shown in **bold**.

Item	Number (%)
Time	134 (82.7%)
Work responsibilities	94 (58.0%)
Pride, not wanting to admit that under stress	94 (58.0%)
Feeling embarrassed	85 (52.5%)
Not being comfortable talking about feelings	77 (47.5%)

Expense	70 (43.2%)
Lack of knowledge about helpful services	65 (40.1%)
Personality	61 (37.7%)
Peer judgment or stigma	48 (29.6%)

3.4 Health Beliefs Model with Above-Median Items

Each of the survey items scoring above the median was diagrammed within a construct of the HBM, as can be seen in Figure 1. The perceived barrier, perceived benefit, and modifying variable constructs each had multiple above-median survey items. Self-efficacy, cues to action, and perceived susceptibility each had only one above-median item, with none in perceived severity (not included in diagram).

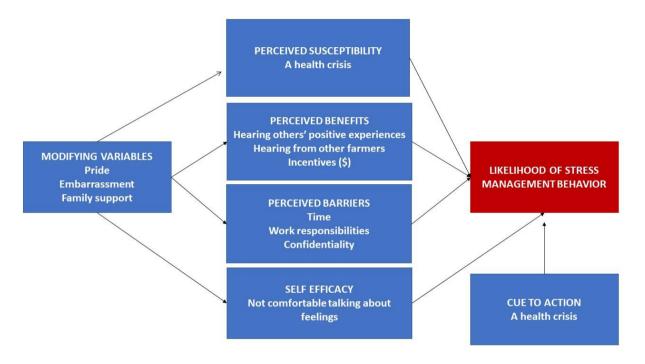


Figure 1 Health Beliefs Model with above-median survey items.

3.5 Broader Themes

In addition to identification of the most salient HBM constructs for farmer adoption of stress management behaviors, when considering our findings as a whole we identified three broader themes of particular note: *messaging*, *normalization of stress and stress management*, and *acknowledgement of farming realities*. Several highly endorsed survey items (hearing other's positive experiences; hearing from other farmers; getting support from family) identified getting messages from others as important to behavior change. The need to normalize stress and stress management as an important requirement for behavior change underpinned a number of items—pride/not wanting to admit under stress; feeling embarrassed; concerns about confidentiality; not comfortable talking about feelings. Finally, the financial and work demands of farming were highly endorsed by participants—financial incentives identified as a potential perceived benefit, and time and work responsibilities identified as perceived barriers.

4. Discussion

4.1 Using the HBM Framework

Findings from this study reveal that organizing survey results within a HBM framework was a useful way to identify potential targets for intervention. Using the model, we saw that specific perceived benefits of stress management, perceived barriers to stress management, and modifying variables of personal/family beliefs and norms are particularly important to consider when promoting farmer adoption of stress management behaviors. Targeting these by increasing awareness of the benefits of stress management, decreasing identified barriers to these behaviors, and addressing beliefs and norms that shape adoption of stress management behaviors could all be promising strategies for intervention. These findings support earlier work done to address farm stress through education programs like Mental Health First Aid [20].

Interestingly, perceived threats (perceived severity and perceived susceptibility) were not identified as important factors through our survey, with only a health crisis frequently identified as a factor that could change behavior. Neither finances nor a family health crisis were frequently endorsed as events that would shift farmer behavior. This would suggest that addressing farmers' perceived barriers to and benefits of behavior change may be more effective than "scare tactics" emphasizing susceptibility and severity of outcomes if stress management behaviors are not adopted. Also, it was interesting to note that survey items having to do with ease of access to information (having easy access to information; having it tied in with other agricultural topics) or even just having knowledge (learning more about stress and what it does to you; lack of knowledge of helpful services) were not frequently endorsed by participants. Simply providing information on stress management may be helpful, but may not be enough; as discussed below, additional factors should be considered.

4.2 Messaging, Normalization, and Farm Realities

In addition to identification of the most salient HBM constructs for farmer adoption of stress management behaviors, our findings revealed three broader themes woven across our HBM framework: messaging, normalization of stress and stress management, and acknowledgement of farming realities. First, the results of this study highlight the importance of messaging, particularly from relationally-connected others, in shaping farmer stress management behaviors. Hearing about positive experiences with stress management, and hearing about stress management from farmers were identified as important ways to learn about the benefits of stress management behaviors through relationship with family was found to be an important modifying variable. These findings echo earlier studies that show farmers are most likely to trust and talk about their stress with family members and other farmers [32], and that farmer-to-farmer peer support can be effective in improving farmer mental health [20]. Interestingly, hearing about stress management from one's doctor was not a frequently identified item, which suggests that more personal and frequent relationships (family, other farmers) may be more influential than professional and infrequent ones such as one's doctor.

Study results also underscore the importance of normalizing struggles with stress and the need for stress management and support. Participants most frequently endorsed embarrassment, pride,

not wanting to admit they are under stress, and the importance of confidentiality as issues in adopting stress management behaviors. This is similar to other research that has shown that values such as stoicism, privacy, and independence are barriers to help-seeking in farming communities [33]. Interestingly, while much of the literature identifies stigma and fear of peer judgment as barriers to help-seeking in farmers [34], in this study it was internalized norms—self-stigma of embarrassment and not wanting to admit one is under stress—that were most frequently identified as barriers. Stigma and fear of peer judgment were must less often identified as relevant factors. Another finding that emphasized the need to normalize talking about stress was the fact that participants frequently identified a lack of comfort, and thus of self efficacy, in talking about their feelings as getting in the way of stress management behaviors. These barriers and lack of self efficacy point to the importance of normalizing the experience of stress, talking about emotions, and the need for stress management and support from others. Broad community education about stress and mental health have shown some positive impact [20]; including content specifically normalizing stress and the need for help with an emphasis on internalized stigma ("it is ok for *me* to not be ok and ask for support") may increase intervention effectiveness.

Finally, our study findings underscore the importance of ensuring that interventions acknowledge the very real difficulties of farm life, including physical demands and high financial risks [3]. The overwhelming work and time demand of farming were the most frequently endorsed barriers to farmers adopting stress management behaviors in survey findings. The need for financial incentives to encourage stress management behaviors was also frequently endorsed, and can be seen as a way of conveying that "time is money" --if a farmer is going to give up time in order to manage their stress, the money lost as a result of that time will need to be replaced somehow. Given these farming realities, interventions that recommend that farmers simply slow down, participate in a class, or take time off may be seen as unrealistic or even blaming by farmers. Interventions must be crafted to fit within the realities of farm life.

4.3 Interpersonal Theory of Suicide as a Secondary Framework

When considering study findings, the authors noticed similarities between the highly endorsed items in the survey and elements of the Interpersonal Theory of Suicide (IPTS) [35]. There are high rates of suicide seen in famers [16], and IPTS has been used as a framework when discussing farmer suicide from a public health perspective [36]. Given this, we thought it would be of utility to superimpose the IPTS on our HBS model to explore additional implications for intervention. In IPTS, four constructs are seen as the drivers of suicidal behavior--thwarted belongingness; perceived burdensomeness; hopelessness specifically regarding the previous two states improving; and capability for suicide [35]. In this study, several of the highly endorsed items could also be seen as representing an increase or decrease of a farmer's sense of belongingness and perceived burdensomeness.

The time demands of farming and the heavy work responsibilities, identified as barriers to stress management behaviors, require long hours of isolated work, and may thus also create a farmer's sense of lack of belonging in the larger community or even lack of a sense of connection with their family. Other studies have identified farming as a very lonely and isolated occupation, in one qualitative study a farmer simply stated "It's a lonely old world ([37], p. 11). Similarly, a lack of comfort in talking about feelings, identified as a lack of self-efficacy regarding emotional expression

in the study's HBM, could also put a farmer at risk for a decreasing sense of belongingness [37]. Farmers under great stress have talked about feeling like "I am the only one" experiencing this stress until they were able to talk with someone and find out that many farmers in their area were feeling the same thing [38]. Thus, lack of self-efficacy in emotional expression could greatly decrease a sense of belongingness. Hearing about other's, particularly other farmers', positive experiences with stress management was a highly endorsed perceived benefit in the model. This could also be experienced by a farmer as a form of connection with another person who is struggling with high stress, and therefore could decrease a sense of isolation and increase a sense of belongingness.

Perceived burdensomeness is seen as a high-risk factor for suicide in IPTS. Being a burden on the family is particularly taboo in farming, where being a strong, independent, good provider is highly valued [33]. Feeling embarrassed and not wanting to admit one is under stress, identified as important modifying variables in this study, could also be seen as a fear of being seen as not independently capable and thus a burden on family and friends. Receiving support from one's family for engaging in stress management behaviors, identified as a modifying variable in the HBM, could be experienced by the farmer as both increasing a sense of belonging as part of the family and decreasing a sense that they are a burden on the family through the family's emotional reassurance and support.

Using the HBM as a lens to analyze motivators and barriers to adoption of stress management behaviors by farmers has helped identify salient targets for intervention. Farmers are a population at high risk of suicide, in great part because of the myriad stresses they experience. In our findings we also found themes of IPTS-defined risk factors for suicide—particularly thwarted belongingness and perceived burdensomeness. The implications for intervention from these findings complement intervention points identified using the HBM framework. By considering them together we may have the opportunity to develop interventions that will both decrease risk of suicide and increase resilience through stress management.

4.4 Implications for Practice

Using the HBM to organize study findings points to several important recommendations for practice. First, the low endorsement of items regarding perceived threat (susceptibility and severity) suggest that interventions emphasizing farmer education on the harms and health risks of unmanaged stress may be less effective than other interventions. Information on high suicide rates and stress-related health conditions in farmers may not be enough to overcome the perceived barriers or underlying negative norms regarding adopting stress management behaviors.

This study does suggest that interventions emphasizing the benefits of adopting stress management behaviors, particularly when communicated by trusted and relationally close others such as other farmers, may encourage farmers to adopt health behaviors related to stress. Education provided by peers, through one-on-one or small group support, could be an effective intervention. An important component of this education should be normalization of the experience of stress and need for help, to address the internalized stigma farmers may be feeling about their stress. Building basic mental health literacy through programs like mental health first aid, have shown promise in helping farmers under stress [20]; the additional of education on ways to talk about emotions to build emotional fluency and sense of emotional self-efficacy could be a valuable additional component. In addition, providing this education to family members, so they can support

farmers, underscore the message of normalization of stress, and encourage stress-managing health behaviors, could be an important intervention.

The perceived barriers to adopting stress management behaviors are strongly embedded within the demands of farming—long hours, hard physical labor, and risky finances. Any initiatives to address farmer stress must consider these in program design. In addition, macro-level interventions such as advocacy for policy change to decrease time demands and financial risks or support for technology changes to decrease labor time, will be important in the big picture of addressing farmer stress.

Superimposing the IPTS lens on our findings highlighted several factors that should be considered across any intervention promoting stress management behaviors in farmers, in order to also address potential risks for suicide. Any intervention should emphasize belonging and building trusted relationships for farmers, connecting farmers with each other, building stronger connections within the family, and giving an opportunity for farmers to create new connections within a community. Some work has suggested that connections can be in person or virtual [39]; given the vast distances in rural areas, expanding work in the area of virtual connection among farmers will be an important avenue to pursue. A second factor that should be addressed in any intervention is dissuasion of the idea that a farmer struggling with stress is a burden to family or friends. Education for farmers should specifically address this topic as part of normalizing stress. The message "Not only is stress normal and everyone experiences it, but when someone is under stress and needs support, listening and helping is *not* a burden on others who care about them" is important for farmers to hear, and also important for family. Family will need to understand that their support and reassurance that the farmer is not a burden is important to help the farmer adopt safer and healthier behaviors.

4.5 Limitations

While informative, this study had several limitations. The survey instrument was grounded in prior findings from farmers and farmer-adjacent professionals and had good face validity, but no formal psychometric testing was done, and thus results must be considered preliminary. In addition, the study sample was not large (N = 162) and was limited to one kind of farmer (fruit and vegetable growers in the Southern US), limiting the generalizability of findings. In addition, closed survey questions provide limited information; additional qualitative research would be very useful to examines more deeply farmers' motivators and barriers to stress management behaviors. Finally, our small N made us reluctant to engage in further analyses broken out by demographic characteristics. In future larger studies it would be beneficial to examines barriers and motivators to look for differences by race, age, and gender. Despite these limitations, we believe this study provides useful information on potential targets when developing interventions to encourage farmer adoption of stress management behaviors.

5. Conclusions

Farmers experience high levels of stress, with negative sequelae that can include physical illness, depression, anxiety, and suicide [3]. Despite this, farmers are often reluctant to adopt healthy stress management behaviors. Our study surveyed farmers on motivators and barriers to adopting stress management behaviors. Using the HBM and the IPTS as analytic lenses, findings suggest that farmers do not find perceived threats from stress as compelling a motivator for behavior change as

understanding perceived benefits and overcoming perceived barriers, with messages coming from trusted others such as farmers and family. Building farmers' sense of self-efficacy for emotional communication and normalizing the experience of stress to decrease internalized stigma are also important to consider when promoting stress management behavior change. Any intervention with farmers must consider and respect the harsh time and work demands of farming. In addition, many of the perceived barriers to stress management endorsed by study participants also highlighted the sense of isolation and thwarted belongingness farmers feel, while the perceived benefits of hearing about stress management from other farmers and getting support from family emphasized the importance of strengthening connections through interventions. Participants reported internalized stigma and shame in feeling stress, suggesting farmers' fear of being a burden to others plays a role in the dynamics of behavior change decisions. All of this together indicates that to promote healthy stress management behaviors and also address underlying feelings that can increase risk of suicide, behavior change interventions for farmers must be multifaceted, relational and promoting of connections, normalizing and de-stigmatizing, and respectful of the lived experience of farming life.

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Author Contributions

Each author contributed equally to this manuscript.

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Competing Interests

The authors have declared that no competing interests exist.

Data Availability Statement

Survey data supporting the results reported in this article are available from the corresponding author upon request, if requested for research purposes.

Additional Materials

The following additional materials are uploaded at the page of this paper.

1. Survey.

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