

**Assessing Primary Care Provider Knowledge of Farmer Stressors and
Self-Perceived Confidence in Caring for Farmer Mental Health Needs:
A Pilot Study of Three Counties in Northeastern North Carolina**

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Abstract

Farming is a stressful occupation that can negatively impact farmers' mental health. Despite farmers' reluctance to seek care, primary care providers are one of the most common sources that farmers engage for mental health resources. Providers who know farmers' unique stressors are deemed more trustworthy. Identifying providers' knowledge and skills in meeting farmers' mental health needs may be important in ameliorating the farmer mental health crisis.

Objective: The purpose of this study was to investigate primary care providers' knowledge of farmer stressors and their confidence in caring for farmers' mental health needs. This pilot study provided preliminary information about methods and measures that may prove useful in investigating provider knowledge and ability to care for farmers' mental health needs in more definitive future studies.

Methodology: This was a non-experimental, cross-sectional pilot study to assess providers' knowledge of farmer stressors and their self-perceived confidence to care for farmers' mental health issues. A survey instrument was used to assess providers' demographic data and their knowledge and confidence. The survey was administered to 40 primary care providers in three agriculture-producing counties in northeastern North Carolina.

Results: A challenge to the planned research protocol was a lack of ability to obtain providers' email addresses, which necessitated mailing the survey to clinical sites. Twenty-four providers returned the survey for a response rate of 60%. Respondents in the study were generally older (mean age of 55.67 years) and experienced as providers (mean of 22.33 years). Thirty-three percent (33%) of respondents were physicians, 50% NPs,

and 17% PAs. Eighty-three percent practiced in a rural health clinic. Analysis of the survey instruments indicated that a shorter survey might enhance completion rates while still covering the content.

While the results of pilot studies are not generalizable, with this population ANOVA testing revealed no significant difference ($p = .479$) in knowledge of farmer stress among providers in the three different clinical positions. There was a significant difference ($p = .004$) in perceived confidence among the three provider positions with Tukey B post-hoc testing showing the small group of PAs ($n = 4$) had a lower level of confidence. Spearman's correlation testing found no association between providers' years of experience and knowledge of farmer stress ($r = -.086, p = .690$) or level of confidence ($r = -.280, p = .185$), no association between providers' experience with farming/farmers and knowledge ($r = -.071, p = .742$) or confidence levels ($r = .065, p = .761$), and no association ($r = .209, p = .327$) between providers' knowledge of farmer stress and their perceived confidence level. There was a very weak positive association ($r = .375, p = .071$) between perceived knowledge and actual knowledge of farmer stress.

Conclusion: This small pilot study provided meaningful information for consideration in a larger future study. An essential consideration for research design is how to reach a sample group that represents the larger provider population. More careful analysis of the survey instrument is needed to generate a more concise tool. The null results on research questions indicate that further investigation is needed to determine what factors influence providers' knowledge of farmer stress and their confidence. It is hoped that eventually factors affecting competence can be determined and evidence-based strategies generated that enhance farmers' mental health care.

Keywords: farmer stressors, farmer mental health, primary care providers and farmer mental health, primary care provider confidence in providing farmer mental health care, social ecological theory and farmer mental health

Dedication

This project is dedicated to all farmers and farm families, the very lifeblood of society. In the United States, farmers comprise less than 2% of the population, and this 2% feeds the other 98%. The work of a farmer is often not limited to just “sun-up to sundown” and is frequently underappreciated or unappreciated. It is hoped that one day the challenges and stresses of farming will be more universally understood, and the appropriate resources will be available to ensure the health of farmers and their families.

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List of Abbreviations

AFBF.....	American Farm Bureau Federation
ANOVA	Analysis of Variance
CDC	Centers for Disease Control and Prevention
COVID-19.....	Coronavirus Disease 2019
DO.....	Doctor of Osteopathic Medicine
ECU.....	East Carolina University
FRSAN.....	Farm and Ranch Stress Assistance Network
HRSA.....	Health Resources and Services Administration
IRB	Institutional Review Board
MD	Medical Doctor
NC	North Carolina
NCDA&CS	North Carolina Department of Agriculture and Consumer Services
NIH	National Institute of Health
NP	Nurse Practitioner
NRHA	National Rural Health Association
PA	Physician Assistant
PCP	Primary Care Provider
RHIHub.....	Rural Health Information Hub
RQ.....	Research Question
RU	Radford University
RUC	Radford University Carilion
SAMHSA.....	Substance Abuse and Mental Health Services Administration

USDA.....United States Department of Agriculture

Chapter 1

Introduction

As farmers are tasked with the responsibility of producing the commodities that feed the world, attention is needed to understand the plight farmers may experience. More and more, the literature points to a crisis in mental health among farmers. Previous studies have identified the multiple unique challenges that converge to make farming an incredibly high-stress occupation. These challenges or stressors include the extreme, unpredictable weather patterns, the input cost of farming compared to the financial return, volatile commodity markets, and changing government policies that disrupt world markets and impact price supports (Daghagh Yazd et al., 2019; Kearney et al., 2014; Rudolphi et al., 2020; Rudolphi & Barnes, 2020; Henning-Smith et al., 2022). Other stressors include the heavy workload combined with difficulty in finding the manpower to assist with the farm work, fear of losing the farm, social isolation, and the all-consuming nature of farming that limits time for family or self. Finances are often reported to be one of the most stressful factors impacting farmers (Kearney et al., 2014). Commodity prices and weather have been referred to as the twin towers of farmer stress (Brotherson, 2019). The United States Department of Agriculture (USDA) reports that the Coronavirus Disease 2019 (COVID-19) pandemic added disruptions to the supply chain at a time when commodity prices were falling, and this further exacerbated farm debt and financial distress for farmers (Johansson, 2021). Many of the stressors that farmers experience are unique, unpredictable, and beyond their control (Keeney et al., 2021). Despite exports of farm commodities increasing, a cloud of uncertainty remains over what lies ahead for farmers.

Research on farmer stressors and the effects of these stressors has evolved over the past decade and points to resulting anxiety, depression, and suicide rates among farmers that exceed that of the general population. Study results show that as many as 71% of farmers meet the criteria for anxiety and 53% meet the criteria for major depression (Rudolphi et al., 2020). Exact death by suicide rates among the farmer population have been elusive as farmers are often lumped with other occupations and only about a third of states have consistently reported suicide data by occupation. Despite this, the Centers for Disease Control and Prevention (CDC, 2020) reported that suicide rates for farmers are about double that of the average rate in the United States (U.S.).

Exposing the high rates of mental health issues among farmers has promoted action by the farmer support sector and health care professionals. One example is the 2018 Farm Bill, which authorized funds for the development of the Farm and Ranch Stress Assistance Network (FRSAN) to develop stress assistance programs across the nation for the agricultural community (USDA, 2021). While resources have increased, more farmer specific mental health resources are needed, and farmers remain reluctant to access these resources, especially mental health specialty care. This reluctance is attributed to stigma, cost, and hesitancy to admit to needing help (Brenes et al., 2015; Crumb et al., 2019; National Rural Health Association, 2015; Stewart et al., 2015). A survey undertaken by the American Farm Bureau Federation (AFBF, 2019) revealed that most farmers and rural residents (91%) agreed that mental health was important for their families and themselves. It is to be noted that the respondents in this same study felt their primary care provider (PCP) was their most trusted source for information on mental health information and the number one resource that they would feel most comfortable

talking with about stress or mental health issues. Research has shown that farmers are more likely to seek help and find their provider more acceptable if the primary care provider has “farm credibility” or some understanding of farming and farmer stress (Hagen et al., 2021; Vayro et al., 2021).

If farmers view PCPs as their most trusted source of mental health information and the one with whom they feel most comfortable seeking care (especially if the PCPs have an understanding of the farmers’ stressors), this raises the question of what knowledge PCPs have of farmer stress and how prepared they are to deal with mental health issues. The search of the literature did not produce any quantitative research on the topic of PCPs’ knowledge of farm stressors or their confidence or competence in caring for farmers with mental health concerns.

This capstone project was a non-experimental, quantitative pilot study to assess PCPs’ knowledge of farmer stressors and their self-perceived confidence to care for farmers with mental health issues. The pilot study utilized survey research to investigate knowledge and confidence and to determine relationships between variables. The survey instrument that was used includes an assessment of PCPs’ demographic data, knowledge of farm stressors, and self-perceived confidence in caring for farmers with mental health issues. PCPs in three agriculture-producing counties in northeastern North Carolina (NC) were assessed. As with any pilot study, the sample was small and although relationships were investigated, causation could not be determined. The pilot study provided an opportunity to evaluate the survey instrument and determine if the survey process might be effectively used to assess a larger provider population.

The social ecological theory provided a foundation for developing an understanding of the concept of farmer stress and guiding this study. A table (Table 1) was developed showing factors that may potentially impact farmer stress at the various social-ecological levels (individual, relationship, community, and societal) (Bronfenbrenner, 1977; CDC, 2007). These determinants of health move the focus beyond just the individual to the community and societal levels. Providers of mental health care must consider multiple contributing factors and determine how and where in the ecosystem to offer integrative approaches that will support the farmer (King et al., 2014; Thurston et al., 2003).

Statement of the Problem

Published research illustrates the unique stressors that farmers experience that result in mental health challenges. Farmers often rely on their PCPs for information and support in meeting their mental health needs. It is thought that PCPs who understand the stressors that farmers experience would be best poised to meet these needs. A missing component in comprehensively addressing the mental health issues of farmers is a lack of insight into whether PCPs have knowledge of farmer stressors and are prepared to meet the resulting mental health needs.

Significance

The Rural Health Information Hub (RHIHub, 2021, November 30) has been instrumental in addressing the rural response to farmer mental health and suicide prevention and refers to mental health needs as a rising crisis for farm communities. Increasingly, PCPs are playing a major role in ameliorating this crisis. However, little information is available about the knowledge these providers have about farmer stress or

their preparedness to adequately address farmer mental health needs. This information is necessary to ensure that appropriate resources are available for farmers. It can also assist in the allocation of resources and in planning for training to prepare PCPs for their crucial role in addressing the mental health needs of the farmer population. Informed PCPs are essential to decrease the stress-related morbidity and mortality of farmers and to ensure a healthy workforce that is prepared to feed the world.

Purpose of the Research

The purpose of this study was to take an initial step in investigating PCPs' knowledge of farmers' unique stressors and their confidence in meeting the mental health needs of farmers. This pilot study was aimed at obtaining preliminary information about concepts/variables, questions, hypotheses, a measure/survey instrument, and processes that might prove useful in investigating provider knowledge of farmer stress and their ability to care for farmers' mental health needs on a larger, more definitive scale in the future.

Research Questions and Hypotheses

RQ1: Do demographic factors for the primary care providers in three agriculture-producing counties in northeastern North Carolina affect their knowledge of farmer stressors?

H1.1_O: There will be no difference among providers with different clinical positions in their amount of knowledge of farmer stressors.

H1.1_A: There will be a difference among providers with different clinical positions in their amount of knowledge of farmer stressors.

H1.2_O: There will be no relationship between providers' years of experience and their amount of knowledge of farmer stressors.

H1.2_A: There will be a relationship between providers' years of experience and their amount of knowledge of farmer stressors.

H1.3_O: There will be no relationship between providers' experience with farming/farmers and their amount of knowledge of farmer stressors.

H1.3_A: There will be a relationship between providers' experience with farming/farmers and their amount of knowledge of farmer stressors.

RQ2: Do demographic factors for the primary care providers in three agriculture-producing counties in northeastern North Carolina affect their perceived confidence to competently meet the mental health needs of farmers?

H2.1_O: There will be no difference among providers with different clinical positions in their perceived confidence to competently meet the mental health needs of farmers.

H2.1_A: There will be a difference among providers with different clinical positions in their perceived confidence to competently meet the mental health needs of farmers.

H2.2_O: There will be no relationship between providers' years of experience and their perceived confidence to competently meet the mental health needs of farmers.

H2.2_A: There will be a relationship between providers' years of experience and their perceived confidence to competently meet the mental health needs of farmers.

H2.3_O: There will be no relationship between providers' experience with farming/farmers and their perceived confidence to competently meet the mental health needs of farmers.

H2.3_A: There will be a relationship between providers' experience with farming/farmers and their perceived confidence to competently meet the mental health needs of farmers.

RQ3: In three agriculture-producing counties in northeastern North Carolina, is there a relationship between the providers' perceived knowledge of the unique stressors of farmers and their actual knowledge of farmer stressors?

H3.1_O: There will be no relationship between the providers' perceived knowledge of farmer stressors and their actual knowledge of farmer stressors.

H3.1_A: There will be a relationship between the providers' perceived knowledge of farmer stressors and their actual knowledge of farmer stressors.

RQ4: In three agriculture-producing counties in northeastern North Carolina, is there a correlation between providers' knowledge of farmer stressors and their perceived confidence in ability to meet the mental health needs of farmers?

H4.1_O: There will not be a significant correlation between providers' knowledge of farmer stressors and their perceived confidence in ability to meet the mental health needs of farmers.

H4.1_A: There will be a significant correlation between providers' knowledge of farmer stressors and their perceived confidence in ability to meet the mental health needs of farmers.

Definition of Terms

Farm Credibility – the believability or trustworthiness of an individual because they have an understanding of the culture of farming and the unique needs and challenges of farmers. Having farm credibility can be helpful as providers work to develop a trusting relationship with farmers with mental health issues.

Farmer – owner/operator of a farm who is involved in making day-to-day management decisions for the purpose of producing agricultural commodities. The term “farmer” may also include family members who are engaged in the farm’s ownership and/or operation. It does not include farmworkers who are individuals employed to work on the farm year-round or seasonally.

Primary Care Provider (PCP) – a physician (Medical Doctor or Doctor of Osteopathic Medicine), physician assistant, or nurse practitioner who is allowed under state law to provide primary health care services.

Chapter 2

Review of the Literature

Presented within this chapter is a review of the current literature related to farmer mental health and the use of PCPs for farmer mental health care. First, an overview of rural mental health and mental health issues of farmers is reported with a focus on stress, anxiety, depression, and suicide. Emphasis is placed on the unique, multiple, complex stressors that farmers experience that relate to mental health issues and the impact farm culture has on mental health and its management. The social ecological theory, which guides this study, is discussed showing its applicability to farmer mental health management. Included is an examination of the challenges farmers face in procuring care for mental health issues and the role of the PCP in mental health care for farmers. The importance of PCPs having knowledge of farming and farmer stressors is explored. The chapter concludes with a review of the gaps found in the literature on farmer mental health and care by PCPs.

A variety of strategies were used to review the published literature for this chapter. While the preponderance of literature used was from 2016 to 2022, occasionally some older literature was included that provided background information. Online databases, including PubMed, MEDLINE via OVID, EBSCO, CINAHL (Cumulative Index to Nursing and Allied Health Literature), Agricola (Agriculture OnLine Access), and PsycINFO, were accessed from Laupus Health Sciences Library at East Carolina University and McConnell Library at Radford University. Keywords searched for relevant literature included *rural mental health*, *farmer mental health*, *agriculture and mental health*, *farm stress*, *farmer stressors*, *farmer anxiety*, *farmer depression*, *farmer*

suicide, North Carolina farmer mental health, farm culture, challenges with rural/farmer mental health, primary care providers and rural/farmer mental health, primary care provider confidence in providing mental health care, social ecological theory and mental health, and social-ecological model/framework. Internet searches via Google Scholar, Agency for Healthcare Research and Quality (AHRQ), Institute for Healthcare Improvement, and the RHI Hub were utilized to augment the information on farmer mental health and the utilization of PCPs for mental health care. Also, websites for the National Institute of Mental Health, National Institute for Health (NIH), Centers for Disease Control and Prevention (CDC), United States Department of Agriculture (USDA), North Carolina Department of Agriculture and Consumer Services (NCDA&CS), United States Department of Health and Human Services, and North Carolina Department of Health and Human Services were accessed for information on farmer mental health.

Rural Mental Health

Mental health outcomes are among rural America's most significant disparities (Morales et al., 2020). In 2020, about 18% of the U.S. population lived in rural areas (Statista, 2021). One in five of these rural residents has a mental health condition, which is about the same rate as that of the general population (Substance Abuse and Mental Health Services Administration [SAMHSA], 2021). Although the prevalence of all mental illnesses in rural and non-rural areas is comparable, the literature indicates that mental health services to meet these needs are not comparable and that the rates of stress, anxiety, depression, and death by suicide may be greater with certain rural groups, such as farmers.

The National Rural Health Association (NRHA, 2015) identified four barriers to mental health services for rural residents, including availability, accessibility, affordability, and acceptability. Mental health professionals are more likely to practice in urban areas resulting in a chronic shortage of mental health providers in rural communities. One study found that for non-metropolitan counties, 65% did not have a psychiatrist (27% for metropolitan counties), 47% did not have a psychologist (19% for metropolitan counties), and 81% did not have a psychiatric nurse practitioner (42% for metropolitan counties), and some rural counties had no mental health providers (Andrilla et al., 2018). The Bureau of Health Workforce with the Health Resources and Services Administration (HRSA, 2022) found that 58% of the designated mental health professional shortage areas are rural. Due to the shortage of mental health professionals in rural communities, PCPs often must fill the gap (RHIHub, 2021). Generally, services that specialize in mental health care are less available in rural communities resulting in rural residents receiving specialty mental health care disproportionately less than other residents (Morales et al., 2020).

Accessibility challenges for rural residents include the long distances they must travel to access mental health services, the fact they are less likely to have insurance for mental health services, and the reality that their providers are not as likely to recognize or be skilled in managing mental health disorders (NRHA, 2015). Although the rate of those uninsured across the nation decreased in the decade from 2010 to 2020, uninsured rates are still higher for rural residents as opposed to urban residents (United States Census Bureau, 2019). Twelve percent of people in counties that are completely rural do not have health insurance compared to 10% in counties that are mostly urban. The Affordable Care

Act was responsible for a substantial fall in the uninsured rate among non-elderly adults in rural areas, but still the uninsured rate for these non-elderly adults is at 16% (Office for Health Policy, 2021). Affording health insurance or out-of-pocket cost of mental health care for those that are uninsured can be prohibitive for some rural residents. In 2020, the per capita income for rural areas was \$42,600 as compared to urban areas with \$62,000 (Economic Research Service, 2021). The poverty rate in rural areas in 2019 was over 15% (11% for urban areas) with rates as high as 31% for rural African American residents.

Acceptability of mental health services presents a further challenge in rural communities. There may be a greater susceptibility to the stigma surrounding mental health in small communities where individuals are more likely to know each other and there is less anonymity (RHIHub, 2021, November 30). Also, fewer choices of mental health professionals might lead to a lack of confidence in privacy (HRHA, 2015). Stigma may prevent rural residents from seeking mental health care and interfere with the quality of care received or the relationship between the provider and the patient. Farmer stoicism and desire for independence might impact their perception of the stigma surrounding mental health.

Mental Health and Farmers

Farmers are sometimes referred to as the 2% that feeds the other 98% (Center for Sustaining Agriculture and Natural Resources, 2015). Many people buy into the agrarian myth that farmers live peaceful, charmed lives and that crop and livestock production is an almost effortless, evolutionary process that somehow magically happens. However, nothing could be further from the truth. Pictures in history books depict the anguish of the

depression era and dustbowl farmers and their families as they were displaced from the land due to economic hardships. The 1980's farm crisis brought attention not just to the economic devastation of farm families as they lost their farms and farm communities collapsed, but to the mental health crisis that ensued as farmers faced depression and even suicide (Iowa PBS, 2013). Gradually that crisis subsided and was no longer front-page newsworthy, and the focus on farmer mental health waned. In 2016, the CDC published the results of a study from the National Violent Death Reporting System reporting that the suicide rate for the farming, fishing, and forestry occupations cluster was almost five times the national average. Since farmers make up about 85% of this cluster, farmer mental health was suddenly thrust into the limelight (Bureau of Labor Statistics, 2020). Later in 2016, the CDC retracted the study citing coding errors related to the composition of the occupational clusters. The study had limitations in that it only included two years of data from a sample of just 17 states (CDC, 2016). Despite the retraction, farmer suicide rates were still found to be one and a half to two times higher than the national average (CDC, 2020). The CDC error on farmer suicides, however, created more attention on the issue of farmer mental health. As a result, the period between 2016 and 2022 saw more studies centered on mental health issues in the agriculture section than had previously been seen. While there is no quintessential source for data that can truly depict the complex issue of farmer mental health, these studies have illuminated the need for more research, services, and funding. One consequence of this most recent resurgence of interest in farmer mental health was the development of the Farm and Ranch Stress Assistance Network (FRSAN), which was funded in the 2018 Farm Bill (USDA, 2021). FRSAN's purpose is to connect farmers, ranchers, and other

agriculture workers to programs that offer stress assistance and serve as a conduit for improved awareness, literacy, and outcomes in behavioral health for the agriculture sector.

Farmer Stress, Anxiety, and Depression

Farmers today work in increasingly complex and unpredictable environments that have multiple physical and emotional demands. These demands can set the stage for stress, anxiety, depression, and even suicide (Kennedy et al., 2021). Worldwide studies have investigated the question of whether farmers experience greater mental health problems than the general population. Such work has resulted in an evolving body of knowledge showing that farmers experience high rates of stress, anxiety, and depression (Brumby et al., 2012; Henning-Smith et al., 2022; Kallioniemi et al., 2016; Onwuameze et al., 2013; Sanne et al., 2004; Scheyett, 2020; Torske, Hilt, et al., 2016). The famous HUNT (an acronym for the Norwegian name: Helseundersøkelsen i Nord-Trøndelag) study was a large (76,583 participants) prospective cohort study that includes sibling comparison to control for confounding variables (Torske, Bjorngaard, et al., 2016). This study found that farmers had about the same odds as other manual occupation groups of having psychological distress and anxiety; however, farmers had the highest odds of having depression ($OR\ 1.99, 95\%, CI\ 1.55-2.55$). Hounsoume et al. (2012) performed face-to-face evaluations of 784 individuals using the General Health Questionnaire (GHQ-12) and found that farmers and their spouses or partners had significantly higher scores ($p < 0.001$), which indicated greater psychological morbidity than non-farmers. Thirty-five percent of farmers had a score of 12 (the cut-off for psychiatric disorders) or higher as opposed to only 27% of the general population. Higher scores were seen in self-employed

male farmers between the age of 45 and 64. Rudolphi et al. (2020) studied 170 young farmers and ranchers with a mean age of 28.9 years. They found that approximately 71% of those studied met the criteria for anxiety (score ≥ 5) using the Generalized Anxiety Disorder (GAD-7) measurement tool and 53% met the criteria for major depressive disorder (score ≥ 5) using the Patient Health Questionnaire-9 (PHQ-9) measurement tool. A modified Farm Stress Survey was utilized to identify sources of stress for the farmers and ranchers that contributed to anxiety and depression. One study found a higher prevalence of depressive symptoms in farmers who lived in lower-density areas with less formal and informal social support (Kanamori et al., 2021). This was consistent with the Brew et al. (2016) study's findings that farmers who lived in remote areas had worse self-reported mental health (β -0.33, 95% CI -0.53, -0.13) and well-being (β -0.21, 95% CI -0.35, -0.06) than non-farmer who lived remotely, yet there was no difference in their physical health. The estimated marginal means for self-reported mental health was 3.42 for farmers and 3.57 for non-farmers, and the estimated marginal means for the well-being index was -0.07 for farmers was 0.04 for non-farmers. While the study found worse self-reported symptoms impacting mental health and well-being among farmers, only 9% had sought help from a mental health provider in the previous 12-month period as compared to 16% of the non-farmers.

A large cross-sectional study of 1,132 farmers in Canada used the following three validated psychometric tools to assess stress, anxiety, depression, and resilience: Perceived Stress Scale (PSS), Hospital Anxiety and Depression Scale, and Connor-Davidson Resilience Scale (Jones-Bitton et al., 2020). The farmers had an average PSS score of 18.9. Fifty-seven percent were classified as having possible anxiety and 33% as

having probable anxiety. Thirty-four percent were classified as having possible depression and 15% as having probable depression. The Connor-Davidson Resilience Scale measures a person's ability to thrive during adversity and move forward. A mean score of 80.7 was reported for the general population. The average resilience score for the farmers in this study was 71.1 out of a possible score of 100. The findings by Jones-Bitton and her colleagues (2020) indicate that farmers had higher scores for stress, anxiety, and depression and a lower score for resilience than the normative data. All these outcomes were less favorable for female farmers who scored higher for stress, anxiety, and depression compared to male farmers. Another study of 600 midwestern farmers found that 27% met the criteria for generalized anxiety disorder and 29% met the criteria for depression (Bjornestad et al., 2021).

Farmers and Suicide

Since the CDC (2016) erroneously published suicide rates among the agriculture sector at 84.5 per 100,000 (almost five times the national average), there has been increased interest in the mental health issues that lead to stress, anxiety, depression, and suicide with farmers (CDC, 2018, 2020, 2021). The corrected suicide rate for farmers, ranchers, and other agricultural managers that the CDC settled on was 43.2 per 100,000 for the 2016 report compared to 27.4 per 100,000 for the general population (CDC, 2020). A significant number of farmer suicides may be unreported as the CDC data did not consider clusters beyond 64 years of age and many farmers continue working beyond this age (Bissen, 2020; Ringgenberg et al., 2018). Ringgenberg et al. (2018) estimated that 20.4% of male farmer suicides between 1992 and 2010 occurred among those who

were 65 years of age or older; yet a more recent study by Miller and Rudolphi (2022) found rates as high as 44.5% in a 15-year period from 2003 to 2018.

A comparison of the demographics of farmers who die by suicide with non-farmers who died by suicide over a 14-year period ending in 2016 found that farmers who died by suicide tend to be older, male, and less educated than non-farmers. The mean age of farmers who die by suicide was 54.2 years compared to 48.3 years for non-farmers, and a higher percentage of farmers were male (95.9% compared to 77.3% for non-farmers) (Kennedy et al., 2021). A higher percentage of farmer suicide deaths occur in the West (43%) and Midwest (37%), than in the South (14%) and Northeast United States (6%) (Riggenberg et al., 2018). Regional differences in the availability of mental health services, tolerance for violence, and farmer stressors (such as weather, commodity market prices or government supports, distance from resources, and availability of manpower) should be investigated as contributing factors for these regional differences.

The exact relationship between suicide attempts and successful suicides for farmers is not known, but it is thought that 95% or more of suicide attempts by farmers are successful due to the lethality of the methods chosen (Kennedy et al., 2021). In 70% of farmer deaths by suicide, the suicide mechanism was a firearm (52% in non-farmers), and of those, 43% were long arms (rifles or shotguns). Firearms are more generally available on farms as they are used for hunting and protection against predators, and they have a high lethality. There is no debate that death by suicide among farmers is a troubling issue and contributing factors must be identified and ameliorated.

Farmer Stressors

To understand the cascade of mental health disorders that farmers might experience and to propose prevention and management strategies, it is necessary to understand their unique stressors (Jones-Bitton et al., 2020). Truchot and Andela (2018) developed, validated, and implemented the Farmers Stressors Inventory with over 2,000 French farmers. They found eight factors that significantly influenced stress for farmers, including financial worries, unpredictable interference with work, uncertainty about the future and financial markets, family succession of the farm, lack of time and workload, agricultural legislative pressures, physical isolation, and conflicts with associates and family members. After a systematic review of 167 articles, Daghigh Yazd et al. (2019) discovered that the most frequently cited influences on farmer mental health were financial difficulties, climate variabilities, poor physical health or past injury, and pesticide exposure. A study of 170 young farmers and ranchers in the Midwest revealed that their greatest stressors were financial and time pressures, followed by economic conditions, employee relationships, weather, hazardous work conditions, and social isolation (Rudolphi et al., 2020). Several studies of farmers and other stakeholders concurred that the major drivers of stress for farmers are finances, weather, planning, health concerns, and family concerns (Henning-Smith et al., 2022; Rudolphi & Barnes, 2020). One qualitative study of 75 people was conducted to explain and add depth to a quantitative study of 1,132 farmers. The finding revealed a positive association of female gender ($B = 0.55$, CI: 0.12, 0.99), financial stress ($B = 2.30$, CI: 1.59, 3.00), pig farming ($B = 1.07$, CI: 0.45, 1.69), perceived lack of support from family ($B = 1.18$, CI: 0.39, 1.98), and perceived lack of support from the industry ($B = 1.15$, CI: 0.16, 2.14) to higher

perceived stress scores on the PSS and to anxiety and depression (Hagen et al., 2021). Resilience was negatively associated to a low degree ($B = -0.04$; CI $-0.06, -0.03$) with perceived stress indicating that using resilience skills tends to decrease stress levels. The quantitative analysis indicated that the uncertainty surrounding financial stress was a factor that increased perceived stress. Another study found that unpredictable factors, such as weather (mean = 2.67, $SD = 0.917$) and government regulations (mean = 3.42, $SD = 0.717$), were perceived as the most impactful stressors in farming (Keeney et al., 2021). In addition, the ability to obtain credit was positively correlated to depressive assessment scores ($r[24] = 0.56, p = 0.005$). A study of 217 husband-wife farmer dyads found that economic stress was positively associated with work-family conflict (husband: $b = .10, p < .05$; wife: $b = .09, p < .05$) and with family distress ($b = .25, p < .05$) (Sprung, 2021).

In addition to the stressors that farmers encounter on an ongoing basis, the COVID-19 pandemic added more challenges. During the pandemic, disruptions in farm production resulted from the decrease in available labor and other inputs while changes in commodity demands affected output prices (USDA, 2022). Farmers were shaken by disrupted supply chains and the exacerbation of their already unstable finances (Pappas, 2020). Along with unpredictable weather patterns and changing commodity prices, COVID-19 added another uncontrollable stressor to farming. A study of psychological well-being associated with COVID conducted by Rahman et al. (2021) revealed one in five rural participants experienced high to very high distress during the COVID-19 pandemic.

Other studies have investigated the coping strategies that farmers employ to deal with stressors. These strategies often align with masculine norms that value stoicism,

resilience to adversity, and resourcefulness (Roy et al., 2017) and agrarianism values of independence, achievement, group conformity, and keeping the family farm at all costs (Reed & Claunch, 2020). One study found that the most frequently used coping strategies for farmers were acceptance, planning, active coping, and positive reinterpretation with growth, and the least used strategies were denial, behavioral disengagement, religion, and drug or alcohol use (Gunn et al., 2012). Henning-Smith et al. (2022) found that farmers use a mix of positive coping strategies (self-care, seeking support from faith and other farmers, and seeking professional help) and negative coping strategies (isolation, denial, distraction, substance use, and leaving farming). In their review of 676 worldwide articles on farmers' mental health, Hagen et al. (2019) observed that most research concentrated on negative mental health outcomes (such as stress, depression, and suicide) almost to the exclusion of the positive outcomes (such as resiliency, life satisfaction, and quality of life). More research on positive mental health outcomes among farmers might promote the understanding of what can enhance farmers' well-being.

Stress and Farmers in North Carolina

A study of farmers in North Carolina confirmed that farmers in the state have the same stressors as other farmers. A cross-sectional study of 128 farmers in the eastern region of NC by Kearney et al. (2014) used a modified version of three validated farm stress inventories to assess 28 potential stressors. During analyses of data, the stressors were grouped into three categories: farm-related factors (including weather, farm accidents/injuries, operating hazardous equipment, and problems with crops or livestock), financial factors (such as market prices, debt load, taxes, and health care cost), and social factors (including lack of time with family, limited social interactions, and distance from

shops/schools/health care). High proportions of farmers in the study reported that a financial factor caused them stress (55.2% to 88.3%) and that a farm-related factor caused them stress (45.3% to 89.9%). The most stressful factors were the weather (rated as the most stressful), market prices, taxes, health care cost, high debt load, concern about the future of the farm, outsiders not understanding the nature of farming, problems with machinery, and problems with livestock or crops. The researchers noted that some factors, such as weather and market prices, were beyond the farmer's control. Social factors were rated as the least stressful with 45% to 85% reporting that a social factor caused them no stress. Although there is limited research on stress with NC farmers, one study found that the four strategies that farmers employed to cope with stress were figuring out how to make farming a success and reassuring self and family, repression, distraction, and relying on a positive reserve (Marcom et al., 2018).

The Social Ecological Theory and Farmer Stress/Mental Health

A study by the American Farm Bureau (2019) found that farmers ($n = 2,004$) considered their PCPs their most trusted source of information on mental health and the resource they would feel most comfortable talking with about stress or a mental health condition. If farmers value their PCP as their source of information and feel most comfortable talking with them, it stands to reason that the providers need to have some knowledge of farmer stressors. This pilot study investigated the understanding that PCPs have about farmer stressors, as well as their perceived confidence to deal with these stress issues with their farmer patients. Theories and their models are useful when dealing with health issues as they can help to organize thinking and assist in the determination of where and how interventions can best be effectively applied to impact health issues

(Ruderman, 2013). The social ecological theory was selected as the theory to guide this pilot study.

In the 1970s, Urie Bronfenbrenner, Ph.D., introduced the social ecological conceptual model as a framework to understand human development (Bronfenbrenner, 1977). The concepts were refined in the 1980s into a theoretical model (Kilanowski, 2017). The theory is based on the dynamic relationship between an individual and their environment. It emphasizes the linkage of multiple levels of influence in the environment that shape one's behavior, including social, cultural, and economic factors.

Bronfenbrenner's model depicts individuals being influenced by interactions and relationships in the microsystem (immediate surroundings), mesosystem (school, work, church, and neighborhood), exosystem (community and social network), macrosystem (social, religious, and cultural influences), and chronosystem (policy).

The constructs from the social ecological theory have been used to conceptualize health as an individual is affected by their interaction with the community and the environment, including its physical, social, and political elements (Kilanowski, 2017). These are often referred to as the social determinants of health and include a shift from a person-focus to an environmental and community-oriented focus (Institute of Medicine, 2003; RHIHub, 2020). A revised four-level social ecological model grounded in Bronfenbrenner's social ecological theory was devised by the CDC (2007) specifically as a model for health and health promotion. Factors at the individual, interpersonal or relationship, community, and societal levels contribute to health issues and approaches to prevention and health promotion are also proposed at these levels. This model moves beyond simply focusing on the individual's health behavior to considering the

interrelatedness of diverse personal and environmental factors that influence health and to integrating broad approaches for changes to the environment (Stokols, 1996).

The RHI Hub (2020) found that the social ecological perspective was especially beneficial for analyzing the wide span of factors that impact the health and well-being of rural and farm residents. Thurston et al. (2003) declared that appropriate mental health support for farmers required awareness of influences in the physical, social, environmental, and economic realms, and that focusing only on a single issue caused major contributing factors to be missed. King et al. (2014) found the social ecological model to be the most suitable method to assess well-being in rural populations whose welfare and livelihoods were contingent on the flow of ecosystem resources. The model not only provides a comprehensive perspective of the factors that affect health behaviors, including the social determinants of health, but encourages an integrated approach to designing an effective health promotion program to address the health issues.

Utilizing the literature that has been analyzed for this study, Table 1 was developed using the framework from the social ecological model to show the multiple levels of influence and the factors in each level that could contribute to the stress for farmers. Any of these factors could be a determinant in the development of stress.

Table 1

The Social Ecological Model: A Framework for Farmer Stress

The Social Ecological Model: A Framework for Farmer Stress	
Level of Social Ecological Model	Factors that Potentially Impact Farmer Stress
Individual (biological factors individual characteristics, and personal history factors that increase the likelihood of developing stress, may include knowledge, beliefs, attitudes, and personality traits)	genetic and biological determinants; age; education; income; hopelessness; depression; mental illness; coping skills; substance abuse; health issues; victimization; work-load; balancing the roles of farmer and family member
Relationship (interpersonal relationships with family, friends, and peers that provide support, role definition, and social identity and may increase the risk of stress)	conflict; relationship issues; partner, spouse, or family members influence; sense of isolation; diminished circle of peers; lack of social support; financial and work stress; dealing with farm labor (both family and non-relative); lack of time with family & away from farm
Community (settings in the community and their characteristics, social networks and norms/standards that can be associated with stress)	inadequate community connectedness; barriers to health/mental health care (such as access, distance, health care cost, lack of health insurance; few mental health providers; lack of knowledge about resources; credibility of services/providers); lack of understanding by outsiders of the nature of farming; working with bankers and loan offers; high debt load; distance from neighbor and community resources
Societal (broad societal factors, including rules, regulations, policies, and laws that might create a climate that encourages the development of stress)	stigma associated with help-seeking and mental health; government export policies; economics (cash and capital issues, market prices; government farm price supports); environmental issues (especially weather); government support behavioral health initiatives
(CDC, 2007; Kearney et al., 2014; Marcom et al., 2018)	

In addition to providing a frame of reference for the complex factors that might influence stress in farmers, the social ecological framework may help identify where and at what level interventions can be applied to make a difference in the health status of the individual. This is referred to as the sphere of influence or leverage point (Stokols, 1996). In this capstone project, the focus for exploration was at the community level, on the source that farmers consider to be the most trusted and the one in which they feel most comfortable discussing mental health issues, the PCP. One of the features of the social ecological model is that practitioners can decide where in the model to leverage influence to exert change on the health status of the individual (Ruderman, 2013). To be effective in intervening in farmer stress and preventing the cascade of anxiety, depression, or suicide, health care providers must understand not just the personal characteristics of their farmer patients but the environmental factors (Stokols, 1996). The social ecological model can assist the provider by providing a multidimensional perspective of the factors that influence farmers' mental health and health behaviors. Health and mental health interventions are more likely to be successful when they address multiple levels of influence (RHIHub, 2020).

Challenges in Mental Health Care for Farmers and Rural Communities

The United States Department of Health and Human Services' Substance Abuse and Mental Health Services Administration (2021) found in their National Survey on Drug Use and Health that over seven million nonmetropolitan adults (or 20.5%) reported that they had any mental illness in 2020. In addition, 1.8 million (4.8%) of these nonmetropolitan adults reported they had thought seriously about suicide during that year. Mental health concerns have increased with the COVID-19 pandemic. The National

Center for Health Statistics (2021) found rates for anxiety and depression to be as high as 42% among some adult groups in their 2020-2021 Household Pulse Survey. SAMHSA has found the prevalence of mental illness among urban and rural residents are quite similar but mental health needs in rural areas often go unmet because of the inadequacies of mental health services. Rural communities do have higher documented rates of death by suicide. The National Vital Statistics System (2020) reported that in rural areas the suicide rate was 30.7 per 100,000 for males (compared to 21.5 for males in urban areas) and 8.0 per 100,00 for females (compared to 5.9 for females in urban areas) in 2018.

Newman et al. (2021) compared 1,000 urban and rural subjects in 24 clinics in three states and found that rural participants were less likely to initiate mental health therapy, and rurality had a small association with negative beliefs about mental health. Rural residents face many more obstacles to obtaining mental health services than urban residents, resulting in unmistakable mental health disparities that are characterized as a critical health imperative (NRHA, 2015). The NRHA (2015, 2022) has identified four overarching barriers to mental health care in rural communities: availability, accessibility, acceptability, and affordability.

Barriers to accessibility include rural residents having to travel further to access services, lack of public transportation, limited availability of dependable private transportation, or gaps in knowledge of where and when services are available (NRHA, 2015; RHIHub, 2021). Rural areas tend to have limited access to broadband and other technical infrastructures, which can limit their access to resources such as telehealth, a major source of mental health services, especially during the COVID pandemic (Myers, 2019). If barriers, such as the digital divide, can be addressed, tele-mental health in rural

communities can be advantageous in regards to accessibility, feasibility, cost-effectiveness, and the elimination of disparities (Hand, 2022).

Availability is the most significant challenge to rural mental health care. In 2021, 122 million Americans were living in areas designated as mental health professional shortage areas (HRSA, 2021). Of all the mental health professional shortage areas, two-thirds of them were in rural areas. Geographic disparities due to difficulty with recruitment and retention result in fewer providers serving rural areas and an inability to obtain care as readily (NRHA, 2022). The chronic mental health provider shortage in rural areas holds true for psychiatrists, psychologists, psychiatric nurse practitioners, and social workers. In a survey of rural residents in Indiana, Schultz et al. (2021) found that perceived mental health service barriers included availability, knowledge about services, and financial means to pay for services. A study of health behavior resources for farmers in rural Ohio found that the greatest barrier to any health services, including mental health, was the lack of service personnel (Drerup et al., 2022).

The acceptability of mental health services is impacted by issues such as stigma, confidentiality, and health literacy (NRHA, 2022). High levels of stigma regarding seeking care from mental health specialists have been found in both rural and older adults (Crumb et al., 2019; Stewart et al., 2015). Rural residents might have health literacy challenges that influence perceptions of mental health issues, management options, and resources (NRHA, 2022). A prevalent barrier to mental health care in rural areas is confidentiality, resulting in hesitancy to seek care if anonymity is in question. Brenes et al. (2015) identified barriers to mental health in their study of 478 rural older adults and found that common barriers were stigma, not desiring to talk with a stranger about mental

health concerns, lack of trust in providers, and not believing treatment would help. The most common barrier they encountered was a belief that the participant should not need help for mental health issues. Mental health care acceptability may also be contingent on receiving care that is culturally competent and in line with beliefs, preferences, and practices. Increased poverty rates, growing ethnic minority populations, geographic isolation, and specific cultural factors in rural communities contribute to the increased challenges of providing culturally appropriate mental health services (Yellowlees et al., 2008). When considering the farm community, personal characteristics may affect acceptance of mental health services. Hull et al. (2017) discovered in their study of 123 farmers and non-farmers that the stoicism and self-reliance stereotypes among the farmer were supported and considered barriers to the use of mental health services. This concurs with Alston and Kent's (2008) previous finding that normative hegemonic masculinity in rural areas serve farmers well in good time but are unhealthy in times of momentous stress as it prevents them from seeking help even when their mental health becomes compromised. When considering mental health help-seeking behaviors, a qualitative study by Vayro et al. (2020) found that farmers wanted their mental health providers to understand the uniqueness of farm life and stressors. If providers have an understanding of agriculture and the realities of farm life, they are considered to have "farm credibility" and farmers are more likely to seek help and find the provider more acceptable for providing mental health care (Hagen et al., 2021). A longitudinal cohort study in Australia found that farmers are less likely than non-farmers to access mental health services regardless of accessibility (Brew et al., 2016). This study concluded that services tailored to farmers are more likely to increase both trust and service utilization.

Affordability can be a barrier to rural residents receiving mental health care. Rural residents often have less income than urban residents, as well as inadequate health insurance coverage for mental health services (National Rural Health Association, 2015). High premiums, high deductibles, and lower reimbursement rates may lead individuals to avoid seeking mental health care. Farmers identify finances as a barrier to seeking mental health services and support, especially if they are undergoing financial stress on the farm (Hagen et al., 2021).

Primary Care Providers and Farmer Mental Health

There is evidence that farmers face numerous distinctive stressors, ranging from long work hours to uncontrollable weather to erratic financial conditions (Daghagh Yazd et al., 2019), and such factors increase their risk for psychological distress and their rates of suicide (Gunn et al., 2022). In 2019, Daghagh Yazd et al. published their systematic review of risk factors that affect farmers' mental health. Twenty articles (71%) out of the 28 articles that compared the mental health of farmers with other occupations found that mental health issues among farmers were worse than in the general population. Simultaneous with their stress and mental health issues, farmers encounter documented barriers to seeking care from established physical and mental health care services (Hagen et al., 2022). Because farmers have fewer physical and mental health encounters than non-farmers, they are sometimes defined as a difficult-to-engage group. A longitudinal cohort study of 1,184 participants compared farmers and non-farming workers (Brew et al., 2016). Over a 12-month period, farmers were half as likely as non-farm workers to have visited a primary care provider/general practitioner or mental health professional.

This study revealed that rural workers indicated that they preferred to manage their own physical (50%) and mental (75%) health needs when possible.

PCPs are often the first to encounter patients with mental health needs. It is estimated that anywhere between 20% to 80% of all PCP visits are related, in part, to mental health issues, which necessitates assessment for these underlying issues and provision of mental health care services (Terry & Terry, 2019; Wodarski, 2014). Almost 60% of all mental health visits were with a PCP (Wodarski, 2014). Nearly half of the people who get a referral to a mental health specialist do not follow through with that visit. A reality of primary care is that patients may come to PCPs as their first, and perhaps only, mental health point of contact. Rural patients are more likely than urban patients to use the PCP for mental health care, and some may even prefer to receive mental health care from their PCP even if specialty care is available (Colon-Gonzalez et al., 2013). Brenes et al. (2015) discovered that rural older adults had a general mistrust of specialty mental health care providers and did not desire to talk to strangers about private matters, preferring to seek mental health care from their trusted PCP.

A study of 2,004 rural adults, farmers, and farmworkers by the AFBF (2019) discovered that among farmers and farmworkers, 81% trusted their primary care doctor as a source of mental health information, while 65% trusted close friends, 60% trusted family members, and 60% trusted faith-based counselors. In that same survey, when asked who they would be comfortable talking to if they encountered high-level stress or a mental health condition, 81% of farmers and farmworkers indicated their PCP, 78% their close friends, and 72% their therapist. This study indicated that farmers regard their PCPs

as the most trusted source of mental health information and the resource they would feel most comfortable talking with about stress or mental health issues.

In their comparative study of the rural and urban differences in determinants of patient satisfaction with primary care, Weinhold and Gurtner (2018) found that interpersonal relationships were the most important driver of patient satisfaction in rural areas, not the structural aspects of care. A qualitative study of both farmers, farm partners, and medical providers found that positive interactions between farmers and medical providers were imperative in addressing help-seeking behaviors in farmers and that providers possessing an understanding of farming life was essential in this relationship (Vayro et al., 2021). The providers in the study reported that rapport-building was necessary to diminish farmers' hesitancy to seek help and to promote adherence to recommended treatment plans. Farmers in this study consistently purported that medical providers needed to have farm culture literacy, including an understanding of farming lifestyle and experiences. In their semi-structured interviews with 75 farmers, Hagen et al. (2022) found that farmers discredited providers who lacked knowledge of the realities of farm life and agriculture. Farmers believed providers had "farm credibility" if they understood the needs and challenges of farmers. Farmers wanted providers of mental health services to understand what they were going through and to consider the farming lifestyle and its stressors when dealing with mental health issues. "Farm credibility" was considered an important factor in building trust with providers. The Hagen et al. findings of the positive value that farmers place on the providers' agricultural knowledge were consistent with findings from three previous studies that Hagen referenced (Brumby & Smith, 2009; Gerrard, 2000; Rosmann, 2005). Lack of understanding of farm challenges

was frequently identified as a major barrier to accessing and accepting mental health support. Hagen et al. recommend that providers of mental health services engage in training to increase their understanding of agriculture and farming life and the potential stressors. Brumby and Smith (2009) had previously demonstrated success in dealing with farmers' mental health when providers increased their knowledge with a farmer-centered model of care. Back in 2005, Rosmann voiced the positive impact that culturally acceptable services delivered by providers with knowledge of agriculture had on farmers with mental health concerns. A search of the literature did not reveal any published evaluation of Rosmann's program. Lawrence-Bourne et al. (2020) reviewed the literature on rural adversity and found that using a rural ecosystem lens was helpful to pinpoint opportunities for interventions. The ecosystem approach would enhance the providers' understanding of the total farmer and how the environment affects their emotional and mental health and enhances engagement by diminishing access and attitudinal barriers (Newman et al., 2021).

Vayro et al. (2021) found that providers themselves felt that having an understanding of farming (such as when their busiest seasons occur) and farmer stressors was helpful when working with farmers and understanding their needs. Having some knowledge of farm lingo was also useful in "getting a foot in the door" in providing care for farmers. This enhanced the provider's ability to develop a positive working relationship and properly individualize care for farmers. Farmers and providers both believed that farm literacy was uncommon in primary care, and this impacted help-seeking. However, if providers had some knowledge about farmers and farming, they were seen as more successful in their practice by both the farmers and their peers. The

providers who were interviewed felt that farmers usually were more receptive when their mental health needs were managed with practical options rather than emotion-based options. One provider shared that he had the most success when he made mental health treatment sound like fixing up a tractor. For example, he found that if he said practical things to farmers such as, “This is what you’ve got to do; this is what happens if you don’t do this” and forgot about saying things like, “I feel this way, I feel that way,” he had much better outcomes (Vayro et al., 2021, p. 519).

Another helpful technique that Vayro et al. (2021) found in addressing mental health issues with farmers was opportunistic screening. The providers in the study found that the most effective way to investigate the mental health status of farmers was through screening whenever they had an opportunity to encounter farmers. Farmers rarely initiate the sharing of mental health concerns, so the provider must ask how the farm is going and how the farmer is doing when they see them for other issues. In other words, mental health screening is integrated into routine care in opportunistic medicine. In their qualitative study of rural clinicians, one of the themes gleaned by Cole and Bondy (2020) was that some clinicians felt it was important for health care providers to look beyond the surface level of conversations with farmers. They emphasized that if a farmer comes in to see a provider, it is important to pay attention and investigate what might be going on even if they tell you everything is “fine.” If a farmer comes in to see the provider, everything is probably not fine. Nowhere is this seen more critically than in a retrospective study of records of 1,375 Australian men (212 farmers, 1,163 other occupations) who died from suicide (Kavalidou et al., 2015). The study revealed that half of the farmers had contact with a primary provider for physical health issues in the 3

months prior to their death. Providers must take advantage of any contact opportunity with farmers to inquire about mental health. PCPs serve as a potential gateway to support for farmers at risk for suicide and should assess risks with every encounter. Providers must be aware of farmers' stressors and potential suicide risks. Primary providers might treat the somatic manifestations of anxiety or mood disorders instead of the underlying causes if they do not understand farm stressors (Colon-Gonzalez et al., 2013).

Some PCPs reported limited training and noted deficiencies in knowledge and skills in mental health care, and therefore had some discomforts in providing comprehensive mental health care (Acharya et al., 2016). Some rural clinicians expressed a need to understand the farmers' unique context, culture, and stressors, to provide better mental health care (Cole & Bondy, 2020). If the primary providers have more knowledge of the particular needs of farmers, it could enhance early interventions leading to positive and more enduring management of mental health issues (Vayro et al., 2021).

Gaps in the Literature

One gap in the literature identified included the lack of research on positive coping strategies (such as resiliency) that might increase understanding of how some farmers may thrive even in the face of overwhelming stress. There is much focus on the negative mental health outcomes for farmers, but little on positive mental health outcomes. More research is needed on farmer death by suicide. Since the CDC published erroneous suicide rates for the agriculture sector in 2016 and clarified the rate in 2017, there has been no new data. Not only does the CDC need to update its data, but they also need to consistently separate suicide rates for specific occupations within a cluster (for

example, farmers are included in the farmer, fishing, forestry cluster). More demographics on farmer suicide would be helpful when developing prevention programs.

Although the literature on farmer stressors seems to have increased overall, there is limited research on stress among farmers in NC. The one comprehensive study on farmer stress in NC was performed over a decade ago. The largest gap in the literature relates to PCPs' understanding of farming and the unique stressors that farmers experience and how this affects the PCPs' confidence and competence to meet farmers' mental health needs. A review of the literature on PCPs' engagement with farmers revealed only a few qualitative studies that mentioned providers' understanding of farming. No quantitative studies were found on this issue, and no studies of any type were discovered on providers' understanding of specific farm stressors. Specific studies assessing PCPs' confidence or competence in meeting the mental health needs of farmers were absent. If PCPs are the preferred providers for farmer mental health care, there must be a body of evidence-based best practices to guide that care.

Chapter 3

Methodology

The review of the literature clearly revealed that farmers may experience a unique set of social ecological stressors that can lead to anxiety, depression, and suicide at rates that are higher than those seen in the general population. There is evidence that if and when farmers seek help for their mental health issues, they prefer their PCP as their most trusted source of information and as the person with whom they feel most comfortable talking about their stress or mental health issues. PCPs are more accepted and trusted by farmers if they have “farm credibility” or some understanding of the farmer’s stress, challenges, and needs. The review of the literature revealed a gap in research on PCPs’ understanding of farmer stressors and the unique challenges farmers experience. In addition, there is a lack of research on providers’ confidence in meeting the mental health needs of farmers. The purpose of this study was to assess PCPs’ knowledge of farmer stressors and their confidence in caring for farmers’ mental health issues and to evaluate components of the study that might be useful in further studying this topic on a grander scale.

Study Design

This proposed cross-sectional study employed a non-experimental design that utilized survey research. As is true of non-experimental or nonmanipulative designs, the study did not have comparison groups with random assignment or manipulation of the variables (Patten & Newhart, 2018). Characteristics of both observational and correlational research were seen in this study as it explored what happened naturally and investigated the relationships or correlations that exist between variables but not direct

cause and effect (Cuttler, 2017). A survey tool was used to assess primary care providers at one point in time or cross-sectionally. The study was a pilot study conducted on a relatively small sample of PCPs. This novel pilot study assessed variables associated with provider knowledge of farmer stressors and their confidence in providing care to that population. As is true of a descriptive correlational design, this study described the variables and the relations that did or did not occur innately among them, but the variables were not manipulated (Research Hub, 2022). Pilot studies are small-scale studies used to test procedures and methods that might be utilized on a larger scale (NIH, 2023). Implementing the pilot study allowed this researcher to test a new measure (questionnaire) and generate preliminary information that might lead to hypotheses for future studies that explore causal relationships.

Study Population

The study population for this pilot study consisted of PCPs who did the majority of their clinical practice in three agriculture-producing counties in northeastern North Carolina: Bertie, Hertford, and Northampton. Details of the number of PCPs per county and their practice site are outlined in Table 2 below.

Table 2*Study Population*

Practice Site	Type of Practice Site	Location	Expected Number of Primary Care Providers
Clinical Site #1	Federally Qualified Health Center (FQHC)	Bertie County, Windsor, NC	4 (2MDs, 1PA, 1 NP)
Clinical Site #2 (Satellite of Clinical Site #1)	FQHC	Bertie County, Lewiston, NC	Same providers as those listed for Windsor Office
Clinical Site #3	Rural Health Clinic-Family Practice	Bertie County, Windsor, NC	3 (1MD, 1PA, 1NP)
Clinical Site #4 (Satellite of Clinical Site #7)	FQHC	Bertie County, Colerain, NC	4 (3PAs, 1NP)
Clinical Site #5	Private Practice	Bertie County, Powellsville, NC	1 (1MD)
Clinical Site #6	Private	Hertford County, Ahoskie, NC	1 (1NP)
Clinical Site #7	FQHC	Hertford County, Ahoskie, NC	14 (5MDs, 9NPs)
Clinical Site #8	Private Practice	Hertford County, Aulander, NC	5 (1MD, 1PA, 3NPs)
Clinical Site #9 (Satellite of Clinical Site #7)	FQHC	Hertford County, Murfreesboro, NC	4 (1MD, 1PA, 2NPs)
Clinical Site #10	Private Practice	Northampton County, Conway, NC	1 (1MD)
Clinical Site #11	FQHC	Northampton County, Jackson, NC	1 (1MD)
Clinical Site #12	FQHC	Northampton County, Rich Square, NC	1 (1PA)
Clinical Site #13 (Satellite of Clinical Site #7)	FQHC	Northampton County, Woodland, NC	1 (1MD)

There are a total of 13 primary care sites in the three-county area with a total of 40 PCPS including 14 physicians (MDs), eight physician assistants (PAs), and 18 nurse practitioners (NPs).

All three of the counties included in this study are designated as primary care health professional shortage areas (NC Office of Rural Health, 2022). In NC in 2018, 22% of the population lived in rural counties but only 18% of the family physicians were working in rural counties (Robert Graham Center). Based on knowledge of the providers in the three-county area, the providers have a range of experience from a few months to multiple decades working in health care and with rural residents and farmers. According to County Health Rankings and Roadmaps (2022), the three counties rank in the lower quartile of the 100 counties in NC for health outcomes. Hertford County ranks 84th, Northampton ranks 86th, and Bertie ranks 89th, indicating the counties have some of the worse health outcomes in the state.

Inclusion

For the purpose of this study, PCPs included physicians (both medical doctors [MDs] and doctors of osteopathic medicine [DOs]), physician assistants (PAs), and nurse practitioners (NPs) who practice in Bertie, Hertford, and Northampton Counties of NC. All 40 PCPs in these counties had an opportunity to participate in the study. Of course, providers had the freedom to consent to participate in the study or not.

Exclusion

Excluded from this study were health care professionals that are not classified as PCPs (MD, DO, PA, or NP) and those that do not practice at a clinical site in Bertie, Hertford, or Northampton Counties. Participants were asked about their provider

classification or clinical positions and county of clinical practice in the survey demographic section. The plan was for participants who did meet the PCP classification or who do not practice in the three designated counties, as well as participants who did not answer these two survey items, to have their surveys intentionally excluded from the data analysis. During the survey process, if confounding factors had been discovered with participants that would have created confusion or influenced the relationships between the studied variables, those participants would have been excluded from the study.

Sampling Method

This pilot study invoked a non-experimental approach to begin to assess provider knowledge of farmer stress and their confidence in caring for the farmer population with mental health issues and to explore the association between variables. A non-random or non-probability sampling method was utilized in this study, specifically convenience or purposive sampling (Heidel, 2022). This study purposively surveyed all PCPs in three of the 100 counties of NC (40 providers). The choice of these three counties was geographically convenient to the pilot study researcher. A concern of this limited sample is that segments of the PCP population might be under-represented, and this may have ultimately affected the outcome data upon which hypotheses and statistical relationships were based. Because of the biases (observational and selection) associated with purposive and convenience sampling, causal relationships could not be inferred.

Bertie, Hertford, and Northampton Counties were chosen not just because of convenience, but also because they are all rural, agriculture-producing counties that represent the state in the number of farms, acres of farmland, farm income, and diversity of commodities produced. The major crops in the three counties are peanuts, cotton,

soybeans, corn, sweet potatoes, and wheat. The primary livestock commodity is broilers (chickens) with smaller productions of hogs/pigs and cattle/beef cows. The following Table 3 provides information on the three counties based on the 2021 North Carolina Agriculture Statistic Bulletin (NCDA&CS, 2021).

Table 3

Farm Information for Three Counties

	Number of farms	Total land in farms (acres)	Average farm size (acres)	Total cash receipts from farm marketing and government payments (in millions)	Number of agriculture producers	Outstanding Ag facts
United States	2,019,000	896,600,000	444			
North Carolina	46,000	8,400,000	183	\$10,443		Ranks #1 in US in poultry production, #5 in peanut production, & #9 in cotton production
Bertie County	323	148,113	459	\$246	477	Ranks #1 in NC in peanut production, #4 in cotton production, & #5 in broiler production
Hertford County	126	80,902	642	\$94	201	Ranks #6 in NC in cotton production & #10 in peanut production
Northampton County	272	170,170	626	\$136	419	Ranks #3 in NC in cotton production & #4 in peanut production

Sample Size

Pilot studies tend to be conducted on small-sized samples. There is much debate in the literature about pilot studies and sample size calculation. Some propose that sample

size should be at least a certain minimal number (such as 10, 12, 30, or 50) or based on a percent of the projected larger population (such as 3% or 10%) (Lewis et al., 2021; O'Neill, 2022; Viechtbauer et al., 2015), while others argue that sample size calculation is not appropriate for a pilot study. In their presentation on pilot study sample size, Campbell and Eddy (2022) concurred that a power-based sample size calculation should not be used for a pilot. The purpose of a pilot study is to gather preliminary information about a topic, investigate some basic relationships, and determine if the instrument and methods used in the pilot study are appropriate to use in a larger subsequent study. So, no sample size calculation is needed if the sample is sufficient to address this purpose. Upon review of this proposed pilot study addressing provider knowledge of farmer stressors and confidence in providing farmer mental health care, Dr. Francis Dane, Researcher and Emeritus Professor of Psychology at Radford University Carilion (RUC) (personal communication, November 10, 2022), concluded that sample size calculation was not appropriate. Dr. Dane contended that a return of as few as 20 surveys in this study would yield enough information to describe the participant sample; provide a good measure of their knowledge of farmer stressors and confidence in treating farmers and determine if they differ based on demographic factors; and see how the variables relate to one another. It would also produce ample information to determine if the questionnaire and the survey process were sufficient to investigate the issues at hand.

Instrumentation and Measures

No study assessing provider knowledge of farmer stressors nor any survey instruments relating to this topic was found in the published literature. As part of this project, a three-part survey instrument was developed to use in this investigation

(Appendix A). The design and development of this instrument closely followed the multi-step process recommended by the Association for Medical Education (Artino et al., 2014). First, an extensive literature review was conducted to ensure that constructs were aligned with established research and to determine if any survey tools existed that could be incorporated into this instrument. The researcher held discussions with four farmers to determine how the constructs were conceptualized among the farmer populations. Once the survey items were developed, experts were solicited to review the items for relevancy and clarity, including agriculture health experts and medical providers with the NC Agromedicine Institute. The survey instrument was reviewed by Dr. Peter Francia, Director of the Center for Survey Research at East Carolina University (ECU) (personal communication, September 22, 2022), and Dr. Francis Dane, Researcher and Emeritus Professor of Psychology at RUC (personal communication, November 10, 2022), and revisions were made based on their feedback. Lastly, two providers were asked to review the survey and give feedback on the readability of the instrument and their interpretation of the tool. Utilizing a multi-step systematic process to design a survey can increase the probability that the instrument measures what it is intended to do (Artino et al., 2014).

The first part of the survey instrument was composed of 11 demographic questions. Each question was used to elicit information that would describe the surveyed population or be used as demographic data variables in the study of relationships. While there is debate over whether demographic questions should be placed at the beginning or the end of a survey, Hughes and her associates (Hughes et al., 2016) argued that placing the questions at the beginning improves the response rate of these questions and does not affect the non-demographic questions' response rate. Placing them at the beginning

worked well since demographic data was an essential component of the research questions and data analysis.

Following the demographic section, there were 23 questions that assessed the factual knowledge of providers about farmer stressors. These questions were based totally on research on farmer stressors procured from the literature review, and they took the format of true and false questions. True/false questions might not be best suited for assessing in-depth knowledge, but they are well suited for assessing basic knowledge especially when questions must be processed quickly (Camosun College, 2021). In addition to true or false, this questionnaire had the added option of choosing IDK for “I don’t know.” This option was added to reduce the probability of participants guessing the right answer and lend insight into their actual knowledge about the question material.

In the last section of the survey tool, there were 14 questions on providers’ confidence in caring for farmers with stress and mental health issues. Constructs from a previously validated instrument developed by Loeb and her associates (2018) in the Division of General Internal Medicine in the School of Medicine at the University of Colorado were used in the design of this section of the survey instrument. Loeb’s instrument was used to determine factors that are associated with the self-efficacy of providers in the management of mental illness. Format, some item verbiage, and the confidence scale for this section of the tool closely parallel the Loeb instrument but were adapted to reflect the topic more closely. Participants were asked to use a Likert scale ordered from 0 (not at all confident) to 10 (extremely confident) to respond to declarative statements about their belief in their confidence to care for farmers experiencing stress and mental health disorders. The Likert scale format was used consistently for each

question in this section. Although there has been some debate about the general use of Likert scales, Willits et al. (2016) concluded that Likert scale items are a useful means for researchers to gather information on attitudes and beliefs.

Confidence was chosen as a concept to be assessed in this research. Confidence is acknowledged as one of the most significant factors that influences performance (Owens & Keller, 2018). In this research study, it was impractical to attempt to measure provider clinical performance or competence in caring for farmers with stress issues. Although confidence cannot be used as an actual substitute for competency in clinical performance, confidence has often been cited as a predictor of both behaviors and outcomes in clinical practice (McClimens et al., 2012; Sergeev et al., 2012). Research has shown that confidence can affect someone's perception of a health care worker's competence, and it can promote control over obstacles that might impede positive clinical outcomes. In their study on health care provider workforce confidence, Owen and Keller (2018) concluded that confidence is an essential characteristic of that workforce. Patients' perceptions of their care are rated as higher when the health care workforce has a higher level of confidence. It is hoped that future research might be undertaken to include the assessment of providers' competence in caring for farmers with mental health issues through patient scenarios or simulations.

Data Collection

After obtaining approval from the Radford University Institutional Review Board (IRB) on June 2, 2023, the survey was printed in a booklet format (including a cover letter, the informed consent, and the survey) with an appropriate-sized envelope. Then, the survey process and data collection began when the survey was mailed on June 9,

2023, to the 40 providers in the three-county area. Health care providers, especially physicians, are known to be a difficult-to-survey group, and they generally have low survey response rates no matter what the survey method (Booker et al., 2021; Brtnikova et al., 2018). Dr. Peter Francia, Director of the ECU Center for Survey Research, has experience in successfully surveying providers in rural eastern NC. Based on this experience, he suggested that there might be a higher survey response rate if a pen-and-paper survey format was employed (personal communication, September 22, 2022). Despite internet use for surveys being well established, research by Taylor and Scott, (2019) found that response rates on surveys by health care providers tend to be higher when postal surveys are utilized. In addition, Pentzek et al. (2022) found that physicians responded more often to postal surveys than online surveys. Providers usually choose to complete surveys in the most convenient manner, which is generally using a pen to complete the survey and returning it in a reply-paid envelope, as opposed to logging into an online survey (Taylor & Scott, 2019). In this study, surveys were mailed to the PCPs practice site address. Email addresses for PCPs were a challenge to obtain. Professional boards, such as the North Carolina Medical Board and the North Carolina Board of Nursing, do not share email addresses for physicians, PAs, or NPs, nor do agencies, such as the North Carolina Area Health Education Center. However, postal addresses are readily available on the websites of the 13 primary care sites where the providers practice.

The PCPs were mailed the packet that contains a cover letter, a booklet that includes the consent form and questionnaire, and a return addressed, stamped envelope. PCPs were invited to participate in the research study and given information about the

research, including the purpose, the procedures, risks/discomforts, compensation, benefits, confidentiality, cost to participant, and information on how to contact the researcher with questions. The PCPs could decide if they wished to voluntarily participate in the research study. If they chose to participate, they were instructed to complete the consent form and the questionnaire, place them in the return addressed, stamped envelope, and place them in the mail. There was no coercion to participate in the survey. It was estimated that the one-time survey would take about 15 minutes to complete.

Providers who did not return their survey by July 3, 2023 were mailed a printed postcard reminder with a handwritten note about the survey. A postcard sent as a reminder to return a survey can be an effective, low-cost means of increasing response rates (Levere & Wittenburg, 2019). In one study, Brtnikova et al. (2018) found that a mailed reminder with a handwritten address increased response rates by 11%.

When the researcher received the completed consent and questionnaire via return mail, the consent and questionnaire were separated so that no one could identify who completed which questionnaire. Confidentiality was strictly maintained. Consents and questionnaires collected by the researcher were stored in separate files in a locked office file cabinet. Data from the completed survey instruments was entered manually into a Microsoft Excel spreadsheet by the researcher. The electronic data files were stored on an office computer that is password protected and secured in the researcher's office with a combination cable lock. The data was also saved in an encrypted cloud-based storage system. The files will be kept for 5 years.

To ensure data was accurately entered and available for analysis, the data was cleaned. This entailed identifying any incomplete, incorrect, or irrelevant data and removing and replacing it with accurate data. Not only did the researcher review the data entries for accuracy and completeness and fix any problems, but a peer with graduate-level research skills (Tommie Oppegaard, MS) repeated this process after being trained on how to identify data that was incomplete, incorrect, or irrelevant.

Data Analysis

Data entered in the Excel spreadsheet was exported to the IBM SPSS statistical software program (version 29). A codebook had been manually created to define each variable in the study's dataset. The codebook included the survey information, the variable name, its value, and the data type (Appendix B). This codebook was key in preparing the plan for data analysis as it provided essential information on the content, structure, and layout used in the data file (SAMHDA, 2022). Table 4 outlines the data analysis processes that were utilized to determine if the research in this project can answer the proposed research questions (RQs).

Table 4

Data Analysis Table

#	Hypotheses	IV(s)	IV(s) Data	DV(s)	DV Data	Statistical Test
(IV = Independent Variable; DV = Dependent Variable)						
RQ1: Do demographic factors for the primary care providers in three agriculture-producing counties in northeastern North Carolina affect their knowledge about farmer stressors?						
#	Hypotheses	IV(s)	IV(s) Data	DV(s)	DV Data	Statistical Test
H1.1 _A	There will be a difference among providers with different clinical positions in their amount of knowledge of farmer stressors.	Clinical Position: Physician, Physician Assistant, Nurse Practitioner, Other (CLPOSIT)	categorical	Knowledge (Total score on T/F questions)	continuous	ANOVA
H1.2 _A	There will be a relationship between providers' years of experience and their amount of knowledge of farmer stressors.	Years of experience (YRS-EXP)	continuous	Knowledge (Total score on T/F questions)	continuous	Correlation (Pearson or Spearman)
H1.3 _A	There will be a relationship between providers' experience with farming/farmers and their amount of knowledge of farmer stressors.	Sum total of farm experience (SUMFE)	continuous	Knowledge (Total score on T/F questions)	continuous	Correlation (Pearson or Spearman)
RQ2: Do demographic factors for the primary care providers in three agriculture-producing counties in northeastern North Carolina affect their perceived confidence to competently meet the mental health needs of farmers?						
#	Hypotheses	IV(s)	IV(s) Data	DV(s)	DV Data	Statistical Test
H2.1 _A	There will be a difference among providers with different clinical positions in their perceived confidence to competently meet the mental health needs of farmers.	Clinical Position: Physician, Physician Assistant, Nurse Practitioner, Other (LPOSIT)	categorical	Average Score for Confidence (CONFIDEN)	continuous	ANOVA
H2.2 _A	There will be a relationship between providers' years of experience and their perceived confidence to competently meet the mental health needs of farmers.	Years of experience (YRS-EXP)	continuous	Average Score for Confidence (CONFIDEN)	continuous	Correlation (Pearson or Spearman)
H2.3 _A	There will be a relationship between providers' experience with farming/farmers and their perceived confidence to competently meet the mental health needs of farmers.	Sum total of farm experience (SUMFE)	continuous	Average Score for Confidence (CONFIDEN)	continuous	Correlation (Pearson or Spearman)
RQ3: In three agriculture-producing counties in northeastern North Carolina, is there a relationship between the providers' perceived knowledge of the unique stressors of farmers and their actual knowledge of farmer stressors?						
#	Hypotheses	IV(s)	IV(s) Data	DV(s)	DV Data	Statistical Test
H3.1 _A	There will be a relationship between the providers' perceived knowledge of farmer stressors and their actual knowledge of farmer stressors.	Perceived knowledge rating (PERCEIVK)	continuous	Knowledge (Total score on T/F questions)	continuous	Correlation (Pearson or Spearman)
RQ4: In three agriculture-producing counties in northeastern North Carolina, is there a correlation between providers' knowledge of farmer stressors and their perceived confidence in ability to meet the mental health needs of farmers?						
#	Hypotheses	IV(s)	IV(s) Data	DV(s)	DV Data	Statistical Test
H4.1 _A	There will be a significant correlation between providers' knowledge of farmer stressors and their perceived confidence in ability to meet the mental health needs of farmers.	Knowledge (Total score on T/F questions)	continuous	Average Score for Confidence (CONFIDEN)	continuous	Correlation (Pearson or Spearman)

Research Question 1 (RQ1) and Research Question 2 (RQ2) investigated the effects of the primary care providers' demographic factors on their knowledge of stress and their perceived confidence to competently meet the mental health needs of farmers. Analysis of variance (ANOVA) testing was used to examine the first hypothesis for each of these questions, which proposed that among the three different provider clinical positions (MD/DO, PA, or NP), there was or was not a difference in their knowledge about farmer stressors and their perceived confidence to competently meet the mental health needs of farmers. The three clinical positions were the independent variables (categorical [nominal] data), and knowledge of farmer stressors or the perceived confidence to competently meet the mental health needs of farmers was the dependent variable (continuous data). An analysis of variance test (ANOVA), which yields the difference among means, was used here (Patten & Newhart, 2018). An ANOVA test produces an F value, which indicates if a group of variables is significantly joined, a df (degree of freedom), mean square, sum of squares, and a p or probability value. In order to reject the null hypothesis and find significance in the differences, a p -value less than or equal to .05 will be used.

All other hypotheses in this study explored relationships between a continuous independent variable and a continuous dependent variable and were tested using correlation studies (Pearson or Spearman). Relationships investigated were between provider demographic factors and knowledge or confidence, between perceived knowledge and actual knowledge, and between knowledge and confidence. Correlation testing was used to answer the question if there was a connection between the variables in this pilot study. In other words, it investigated if a change in the value of one variable

resulted in a change in the value of another variable. A correlation coefficient reveals if there is an association between variables, the strength of the association, and the direction of that association (Patten & Newhart, 2018). Pearson coefficient is used if there is a linear relationship between the variables, and Spearman coefficient is used if there is a monotonic relationship (the rate of the relationship between the two variables is not exactly constant or perfectly linear) (Ramzai, 2020). Pearson coefficient was used exclusively in this study. A correlation coefficient is recorded as an r-value ranging from -1.00 (a perfectly negative or inverse relationship between variables) and 1.00 (a perfectly positive or direct relationship between variables) (Patten & Newhart, 2018). Exploring relationships is the first step in understanding how providers' knowledge of farmer stress and their confidence impacts the care they provide.

Institutional Review Board

Approval from the Radford University's IRB was secured before the initiation of this study as it involved human subjects. The researcher did not need to seek IRB approval from any of the clinical agencies. RU's IRB reviewed and will continue to monitor this study.

Study Considerations

Limitations

As with any pilot study, there were potential limitations in this study, and the greatest limitation came from the sample. The sample was non-randomized (purposive sample based on convenience), so this might introduce biases that affect results. The sample could fail to reflect the larger population and compromise the internal validity of the studying. The sample size was small, so this affected the precision of the study and

the ability to draw valid conclusions. Pilot studies are not designed to draw causal inferences but can be used to understand relationships. Still, there could be confounding factors that influence the relationship between variables in this study. No obvious confounding factors were detected during the survey process; however, if they had been detected, participants would have been excluded from the study.

This study was also affected by the lack of previous research on provider knowledge of farmer stress and how it impacts primary mental health care, which could have provided a foundation for this research study.

Delimitations

Venturing into uncharted research using a new survey instrument created potential delimitation such as problems with the tool and the data collection process that the pilot study was designed to reveal. Also, a novel study may have delimitations in the research questions that are proposed and in the variables that have been chosen.

Chapters 4 and 5 review the results of the pilot study and the suggestions for future actions. While farmer stress is a key concept that was assessed, farm culture was not used as a key concept in this pilot study. The measure of confidence was chosen as a component of this study. It was not feasible with this study at this time to attempt to measure clinical performance or competence. It is understood that while confidence does not imply competence, confidence does influence performance and clinical outcomes.

Chapter 4

Results

The purpose of this chapter is to present findings from the pilot study and analyses of the research questions proposed for this capstone project. In this cross-sectional pilot, PCPs from three counties in northeastern North Carolina were surveyed about their understanding of farmer stressors and their confidence in caring for farmers with mental health issues. As is typical of a pilot study, this project was aimed at undertaking a small study to evaluate the research protocols, utilization of the survey instrument, the recruitment process, and the research questions and techniques to determine the feasibility of a larger study.

Data from this study was organized into Microsoft Excel and coded according to the Codebook found in Appendix B. The Microsoft Excel spreadsheet was imported into IBM's Statistical Package for Social Sciences (SPSS) version 27. Descriptive statistics were used to describe the demographic data and the survey results of the true/false questionnaire on farmer stressors and the confidence scale items. While pilot studies are not designed to test hypotheses that produce assumptions that can be generalized, hypotheses were proposed for this target population, and inferential statistics were used to determine the relationships among variables. An analysis of variance (ANOVA) test was used to determine the difference between means of groups on one dependent variable, and Pearson correlation coefficient was used to determine the association between two quantitative variables.

Sample

Surveys were distributed to 40 PCPs via postal mail on June 9, 2023. There was an 8-week survey window as the last returned survey was received on August 9, 2023. In total, 24 surveys were returned, which denotes a 60% response rate. A power analysis for sample size was not necessary for the pilot studies, but a goal of at least 20 returned surveys was proposed for this study to get information to meet the goals of the pilot project. Providers are a challenging group to survey with typical survey response rates 10-13% below that of the general population (Taylor & Scott, 2019). The average response rate on surveys for physicians is less than 50% with a rate of below 40% more commonly found. The 60% response rate by providers in this study exceeded the known averages.

Recruitment Strategies

A list of all PCPs in Bertie, Hertford, and Northampton Counties of North Carolina was obtained from the practice websites. The practice managers for each clinical site were contacted via phone to confirm that the provider list was up to date. While the original plan for this project was to electronically survey the PCPs in the target area, roadblocks in accessing email addresses prevented this. Neither the North Carolina Medical Board, the North Carolina Board of Nursing, the Eastern Area Health Education Center, nor the practice sites provide access to medical providers' email addresses. To ensure all providers received a survey instrument, the survey was mailed to the individual providers at their practice site.

Radford University Institutional Research Board approved this project on June 2, 2023. The research packets were mailed via the postal service to the 40 PCPs in the target

area on June 9, 2023. Each of the packets included a cover letter, instructions for completing the packet, the informed consent, the survey instrument, a stamped, addressed return envelope, and an additional copy of the informed consent for the participants to keep. The survey was designed to take approximately 15 minutes. By July 3, 2023, only 10 surveys had been returned, and a reminder letter with a handwritten note was mailed to all providers who had not returned the survey. The survey window was open for 8 weeks as surveys continued to trickle in, with the last survey being received on August 9, 2023. During the survey window, the researcher received three emails and one phone call from providers with one asking a question about their eligibility to take the survey, one requesting another copy of the survey instrument, and two inquiring if it was too late to return their surveys.

Demographics

Of the 40 providers surveyed, 14 were physicians, eight were physician assistants, and 18 were nurse practitioners. Of the 14 physicians, eight completed the survey for a 57% participation rate. Four of the eight physician assistants surveyed completed the survey for a 50% participation rate. Nurse practitioners' responses included 12 of the 18 surveyed for a 67% participation rate. Seven of the 12 providers from Bertie County returned surveys (58%), 16 of the 24 providers from Hertford County returned surveys (67%), and only one of the four providers from Northampton County returned a survey (25%). It is worth noting that several providers work in clinics in at least two of the counties but for data collection, they designated the county where they do the majority of their clinical practice. Also, all clinics serve residents across county lines, not just from the county where they practice.

Univariate descriptive statistics were used to describe demographic data. The age for participants ranged from 29 to 90 years of age with a mean age of 55.67 (standard error of mean 3.17 and standard deviation 15.55). The average years of experience of participating providers was 22.33 (standard error of mean 3.50 and standard deviation 17.15) with a range from 1 to 60 years. The average years at the current practice site was 11.65 (standard error of mean 2.78 and standard deviation 13.64) with a range from less than one to 48 years. PCPs reported that the percentage of their patients who were farmers ranged from 0% to 65% with an average of 16.29% for the group (standard error of mean 3.26 and standard deviation 15.98). Other demographic information for the 24 providers who participated in the survey is included in Table 5.

Table 5*Demographic Information for Responding Providers (n = 24)*

Characteristic	<i>n</i>	Rate per the 24 respondents
Age		
25-34	2	8%
35-44	4	17%
45-54	5	21%
55-64	6	25%
65 and older	7	29%
Gender		
Male	9	38%
Female	15	63%
Race		
African American	8	33%
White/Caucasian	15	63%
Two or More	1	4%
Clinical Position		
Physician	8	33%
Physician Assistant	4	17%
Nurse Practitioner	12	50%
Years of Experience		
1-2	3	13%
3-4	2	8%
5-9	3	13%
10-19	2	8%
20-29	5	21%
30-39	5	21%
40 or More	4	17%
Practice Setting		
Primary Care: RHC, CHC, FQHC	20	83%
Primary Care: Private Practice	3	13%
Primary Care: Other	1	4%
County of Majority of Practice		
Bertie	7	29%
Hertford	16	67%
Northampton	1	4%
Years Practicing in Current Clinical Site		
1-2	7	29%
3-4	6	25%
5-9	1	4%
10-19	6	25%
20-29	1	4%
30-39	1	4%
40 or More	2	8%
% of Patient Population Who Are Farmers		
0%-9%	8	33%
10%-19%	8	33%
20%-29%	3	13%
30%-39%	2	8%
40%-49%	2	8%
50% or More	1	4%
Sum of Experience with Farmers or Farming		
Score of 1-4	6	25%
Score of 5-9	11	46%
Score of 10-15	7	29%
Level of Perceived Knowledge of Farm Stressors		
0-3	7	29%
4-7	13	54%
8-10	4	17%

Survey Instrument

The survey instrument included 23 true/false items on knowledge of farmer stressors. For each item, participants could choose true, false, or “I don’t know” depending on their knowledge of the content. Scores for the 23 items were based on the participant receiving one (1) point for each correct item, minus one (-1) point for each incorrect item, and zero (0) points for each item that they indicated they did not know the answer. Based on this scoring system, the mean score on the true/false section for all participants was 11.17 (standard error of mean 1.30 and standard deviation 6.36) with a range of -1 to 20 points. The range of correct answers was from 0 to 21. This resulted in an average of 14 out of 23 questions correct or 61%.

A confidence scale was included on the survey instrument that included 14 items for the provider participants to identify their level of confidence on a scale from 0 (not at all confident) to 10 (extremely confident) for 14 domains of care related to farmer mental health. The 24 participants had a mean confidence level score of 6.96 (standard error of mean .41 and standard deviation 2.01) with a range from 0 to 10 for these average scores.

The survey instrument also included two open-ended questions to glean additional information from the PCPs on their knowledge of the research topic and the survey process. Table 6 includes the open text comments made by survey participants on these two questions.

Table 6*Open Text Comments from Survey*

<p>Please share any additional information about your knowledge of farmer stressors or your confidence in caring for farmer mental health needs that might be helpful to the researcher.</p>
<ul style="list-style-type: none"> • Substance abuse issues play a role in farmers' wellbeing and success or lack thereof, and this needs to be addressed. • Have seen stress R/T being unable to manage farm when out for illness. They are reluctant to take time off for illness. May be viewed as having issues with compliance. • Not a subject that is often discussed - need more discussion/education of providers. • In my experience, farmers are proud and autonomous. Those factors must be considered. Often male farmers want to involve spouses if they are married. Farmer stress causes include staff management. Variations in political climate may contribute to stress. • Farmers can uniquely be outside as a solace to stress, however being outside might increase isolation and rumination. • Having patients who are farmers would make me more knowledgeable of their needs thereby making me more confident in taking care of their needs. • I tend to educate myself prior to appointments; we specifically have a migrant and farmer program at my job.
<p>Please share any feedback about the survey process or survey tool that might be helpful for future research.</p>
<ul style="list-style-type: none"> • Sounds like a great study that is very important. • None noted currently. • The questions enlightened my knowledge of the various stressors that affect farmers. I personally was not aware of the suicide rates of farmers. I am open to any new resources to provide the best support and care to farmers. • Needs to be briefer! • If there are family, child, provision issues to ask about them also. • Process was good. • No suggestions. Thank you. • Asking about farmworkers' stressors as well; that may in turn add to the stressors of farm owners. • It is a thorough and interesting survey. Quick and easy to use. "User-friendly."

Results of the Study

Inferential analyses revealed associations and relationships between variables in the study. These associations and relationships are as follows:

RQ1: Do demographic factors for the primary care providers in three agriculture-producing counties in northeastern North Carolina affect their knowledge of farmer stressors?

H1.1₀: There will be no difference among providers with different clinical positions in their amount of knowledge of farmer stressors.

This hypothesis focuses on the difference between the mean amount of knowledge of farmer stressors for providers in three groups of clinical positions. Since clinical position is the categorial independent variable, and the one continuous dependent variable is amount of knowledge (total score on the true/false questions), the one-way analysis of variance (ANOVA) test was performed. ANOVA testing yields a sum of squares, degree of freedom (*df*), mean square, analysis of variance (*F*), and *p*-value, which is used to determine the probability of the null hypothesis being correct (Patten & Newhart, 2018). A *p*-value of .05 or less implies that there is statistical significance to reject the null hypothesis.

Table 7

Descriptive Statistics for Providers' Knowledge Scores

	Mean	Standard Deviation
Physicians	10.75	4.621
Physician Assistants	8.00	9.309
Nurse Practitioners	12.50	6.446

Table 8*ANOVA: Knowledge and Clinical Position*

	Sum of Square	df	Mean Square	F	Sig. (p)
Between Groups	62.833	2	31.417	.761	.479
Within Groups	866.500	21	41.262		
Total	929.333	23			

The statistical significance of .479 is greater than $p < .05$ so the results are not statistical significance to reject the null hypothesis, thus indicating a probability that the null hypothesis is true. Therefore, the null hypothesis is not rejected, but the alternate hypothesis is rejected. There was no difference among surveyed providers with different clinical positions in their amount of knowledge of farmer stressors.

To further confirm that there is no significant difference in the mean knowledge score among the providers in different clinical positions, a Tukey B post hoc test was performed. This test runs pairwise comparisons among each of the clinical position groups to determine if they are statistically different from one another using an error estimate.

Table 9

ANOVA Tukey B Post-hoc Test: Comparison of Mean Knowledge Scores Among Providers in Different Clinical Positions

Clinical Position	N	Subset for alpha = 0.05
		1
Physician Assistant	4	8.00
Physician	8	10.75
Nurse Practitioner	12	12.50

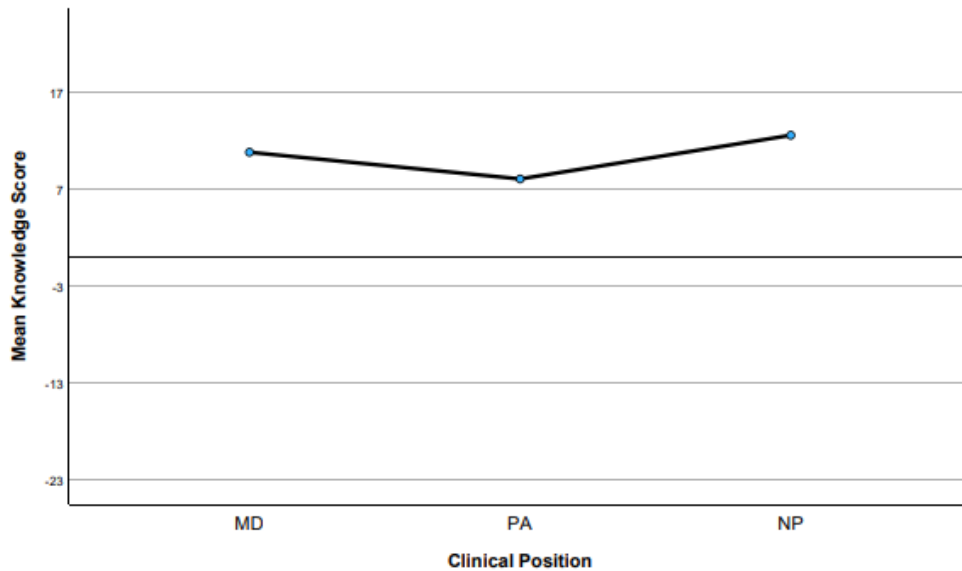
Means for groups in homogeneous subsets are displayed.

- Uses Harmonic Mean Sample Size = 6.545
- The group sizes are unequal. The harmonic means of the group sizes is used. Type 1 error levels are not guaranteed.

The Tukey post-hoc test can be depicted as follows:

Figure 1

Means Plots of Provider Mean Knowledge Score and Clinical Position



This graph visually demonstrates that the mean knowledge scores are not significantly different among providers in the three different clinical positions.

H1.2o: There will be no relationship between providers' years of experience and their amount of knowledge of farmer stressors.

This hypothesis investigates the association between a continuous independent variable (provider's years of experience) and a continuous dependent variable (provider's knowledge of farmer stressors). The Pearson correlation coefficient (r) test was used to determine if there was an association between variables and how strong and in what direction the association was.

Table 10

Spearman Correlation Coefficient: Years of Experience and Knowledge of Farmer Stressors

		Knowledge
Years of Experience	Pearson Correlation	-.086
	Sig. (2-tailed)	.690
	<i>N</i>	24

The results indicated that the relationship between years of experience and the amount of knowledge of farmer stressors was not significant, $r(24) = -.086, p = .690$. Therefore, this indicates a failure to reject the null hypothesis.

H1.3o: There will be no relationship between providers’ experience with farming/farmers and their amount of knowledge of farmer stressors.

The Pearson correlation coefficient test was used to evaluate the relationship between the provider’s experience with farming and farmers (continuous independent variable) and their amount of knowledge of farmer stressors (continuous dependent variable).

Table 11

Spearman Correlation Coefficient: Experience With Farming/Farmers and Knowledge of Farmer Stressors

		Knowledge
Total of farming/farmer experience	Pearson Correlation	-.071
	Sig. (2-tailed)	.742
	<i>N</i>	24

The results indicated that the relationship between provider's experience with farming and farmers and their amount of knowledge of farmer stressors was not significant, $r(24) = .071$, $p = .742$. The null hypothesis failed to be rejected, so there is no relationship between the provider's experience with farming and farmers and knowledge of farmer stressors.

RQ2: Do demographic factors for the primary care providers in three agriculture-producing counties in northeastern North Carolina affect their perceived confidence to competently meet the mental health needs of farmers?

H2.1o: There will be no difference among providers with different clinical positions in their perceived confidence to competently meet the mental health needs of farmers.

An ANOVA test was used to determine if there was a difference among providers with different clinical positions (categorical independent variable) in their perceived level of confidence to competently care for farmers' mental health needs (continuous dependent variable).

Table 12

Descriptive Statistics for Average Scores for Confidence

	Mean	Standard Deviation
Physicians	6.723	.765
Physician Assistants	4.429	2.959
Nurse Practitioners	7.952	1.507

Table 13*ANOVA: Average Score for Confidence and Clinical Position*

	Sum of Square	<i>df</i>	Mean Square	<i>F</i>	Sig. (<i>p</i>)
Between Groups	37.898	2	18.949	7.186	.004
Within Groups	55.375	21	2.637		
Total	93.274	23			

The ANOVA was significant at the alpha level of .05, $F = 7.186$, $p = .004$. The ANOVA results indicated that there were significant differences among the clinical positions regarding their confidence but did not determine which differences were significant. A Tukey B post hoc test was used to find how the clinical positions differ from one another in their confidence. It should be noted that the results of this set of data might be skewed by the fact that there were only four physician assistants in the data set and one of them scored all 14 confidence items as a “0.”

Table 14

ANOVA Tukey B Post-hoc Test: Comparison of Average Confidence Scores Among Providers in Different Clinical Positions

Clinical Position	<i>N</i>	Subset for alpha = 0.05	
		1	2
Physician Assistant	4	4.43	
Physician	8		6.72
Nurse Practitioner	12		7.95

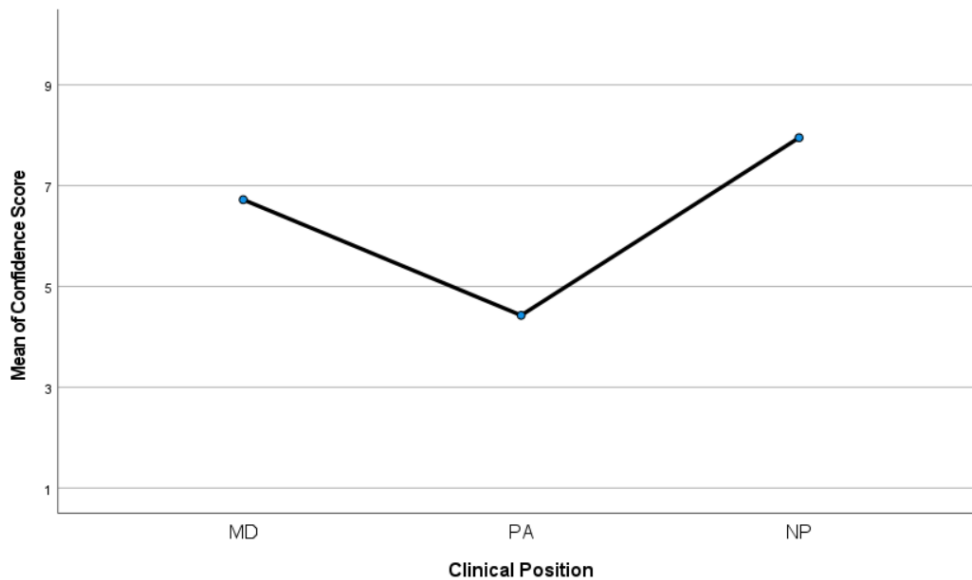
Means for groups in homogeneous subsets are displayed.

- Uses Harmonic Mean Sample Size = 6.545
- The group sizes are unequal. The harmonic means of the group sizes is used. Type 1 error levels are not guaranteed.

The Tukey test found that the physician assistant group was statistically different from the physicians and the nurse practitioners, and this is visually depicted in Figure 2.

Figure 2

Means Plots of Provider Mean Confidence Score and Clinical Position



Since the ANOVA test found a significant difference among providers with different clinical positions in their perceived confidence to competently care for farmer mental health needs, the null hypothesis was rejected.

H2.2o: There will be no relationship between providers' years of experience and their perceived confidence to competently meet the mental health needs of farmers.

To evaluate the relationship between the provider's years of experience (continuous independent variable) and their perceived confidence to competently meet farmers' mental health needs (continuous dependent variable), a Pearson correlation coefficient test was performed.

Table 15

Spearman Correlation Coefficient: Years of Experience as a Provider and Perceived

Confidence to Meet Farmer Mental Health Needs

		Confidence
Years of Experience as a Provider	Pearson Correlation	-.280
	Sig. (2-tailed)	.185
N		24

The results indicated that the relationship between years of experience as a provider and perceived confidence to competently meet the mental health needs of farmers was not statistically significant, $r(24) = -.280$, $p = .185$. The null hypothesis failed to be rejected.

H2.3o: There will be no relationship between providers' experience with farming/farmers and their perceived confidence to competently meet the mental health needs of farmers.

The Pearson correlation coefficient test was employed to evaluate the relationship between provider's experience with farming and farmers (continuous independent variable) and their perceived confidence to meet farmers' mental health needs (continuous dependent variable).

Table 16

Spearman Correlation Coefficient: Experience With Farming/Farmers and Perceived Confidence to Meet Farmers' Mental Health Needs

		Confidence
Total of farming/farmer experience	Pearson Correlation	.065
	Sig. (2-tailed)	.761
N		24

There was not sufficient evidence to show a relationship between the provider's experience with farming and farmers and perceived confidence to meet farmers' mental health needs, $r(24) = .065$, $p = .761$, so there was a failure to reject the null hypothesis.

RQ3: In three agriculture-producing counties in northeastern North Carolina, is there a relationship between the providers' perceived knowledge of the unique stressors of farmers and their actual knowledge of farmer stressors?

H3.1o: There will be no relationship between the providers' perceived knowledge of farmer stressors and their actual knowledge of farmer stressors.

To test the relationship between the two continuous variables, providers' perceived knowledge of farmer stressors and their actual knowledge of farmer stressors, a Pearson correlation coefficient test was employed with the following results:

Table 17

Spearman Correlation Coefficient: Perceived Knowledge of Farmer Stressors and Actual Knowledge of Farmer Stressors

		Actual Knowledge
Perceived Knowledge of Farmer Stressors	Pearson Correlation	.375
	Sig. (2-tailed)	.071
N		24

The results indicated a very weak positive relationship between the two variables with $r(24) = .375, p = .071$. However, since the study population is so small, there is not sufficient evidence for a correlation to be significant. There is a failure to reject the null hypothesis.

RQ4: In three agriculture-producing counties in northeastern North Carolina, is there a correlation between providers' knowledge of farmer stressors and their perceived confidence in ability to meet the mental health needs of farmers?

H4.1o: There will not be a significant correlation between providers' knowledge of farmer stressors and their perceived confidence in ability to meet the mental health needs of farmers.

The Pearson correlation coefficient test was used to determine if there was a significant correlation between providers' knowledge of farmer stressors and their perceived confidence in meeting farmers' mental health needs.

Table 18*Spearman Correlation Coefficient: Provider Knowledge and Perceived Confidence*

		Perceived Confidence
Knowledge of Farmer Stressors	Pearson Correlation	.209
	Sig. (2-tailed)	.327
	<i>N</i>	24

Once again, the results indicated that the relationship between knowledge and perceived confidence was not significant ($r = .209$, $p = .327$), and thus there is another failure to reject the null hypothesis.

In summary, the statistical analyses of data from this group of PCPs failed to reject all proposed null hypotheses except one. The analyses found there was no difference in knowledge of farmer stressors for providers in three different clinical positions. There was a difference in perceived confidence to meet farmer mental health needs among the three levels of providers with physician assistants indicating they felt less confident. No relationship was found between providers' years of experience or their experience with farming/farmers and either their knowledge of farmer stressors or their perceived confidence to meet farmer mental health needs. No relationship was found between providers' perceived knowledge of farmer stressors and their actual knowledge. There was also no significant correlation between knowledge of stressors and perceived confidence to meet mental health needs. Even though the findings in this pilot study are not generalizable, they can be helpful in determining how to move forward with future research. In Chapter 5, study results will be further investigated along with future implications.

Chapter 5

Discussion

This chapter includes a discussion of the findings of the pilot study and an interpretation of those results. Since pilot studies are designed to determine the feasibility of subsequent studies, recommendations for future research, practice, and policies are also incorporated into this chapter.

The purpose of this study was to investigate primary care providers' knowledge of stressors that impact farmers' mental health and their confidence in caring for the mental health needs of farmers. Understanding levels of knowledge and confidence might be key to eventually enhancing providers' knowledge of farmer stressors and strengthening competencies to adequately address the challenges of the farmer mental health crisis.

Interpretation of Results

Components of the pilot study that were evaluated and interpreted during this project include the research process, the survey instrument, and the research questions.

Research Process – Interpretation of Results

In this cross-sectional study, 40 providers in a three-county area convenient to the researcher were surveyed via postal mail. Challenges in obtaining email addresses for these providers from licensing agencies and professional organizations precluded the original plan to conduct the survey online. Surveys were mailed to the provider at their clinical practice sites. Respondents were generally older and experienced with a mean age of 55.67 years and an average of 22.33 years of experience. Eighty-five percent of respondents worked in either a rural health clinic or an FQHC. During the 8-week survey window, 60% ($N = 24$) of surveys were returned. This rate is relatively high for

providers, as survey response rates for healthcare providers typically are 40% or less (Hutchinson & Sutherland, 2019). Some of the factors that might have contributed to this higher response rate include the researcher living locally and having name recognition as a nurse and nurse practitioner in the area, older providers being more comfortable with a pen-and-paper mailed survey, or providers in rural health clinics or FQHCs having an interest in the topic. Survey completion rates have been found to be higher if they are done online if the health care provider is in general practice (not a specialist), practices in a remote setting, and is younger or male (Taylor & Scott, 2019). An online survey should be considered if the survey is done on a larger scale where there might be a larger number of younger or male providers than were seen in this sample.

Since this was a small study, the effort and cost to carry out the survey was manageable for one researcher. The researcher collated and mailed the survey packet and entered data in an Excel spreadsheet as surveys were returned. A conservative estimate of the cost to produce the survey packet is \$6.45 per packet (printing = \$2.10, envelopes and office supplies = \$0.75, mailing [envelope with packet and stamped return envelope] = \$3.60). The cost plus the task of distributing the survey and collecting and entering data could be burdensome if the survey was carried out on a large scale without a sponsor.

Survey Instrument – Interpretation of Results

The survey instrument consisted of three pages with three major parts that included 11 demographic items, 23 true/false items on knowledge of farmer stressors, and 14 confidence scale items. The survey concluded with two brief open-text questions where the respondent could share any additional information about farmer stress or the survey process or tool. One responder commented in the open-text area that the survey

should be briefer. Based on his research, Sharma (2022) recommended that a good questionnaire should not be more than 25 or 30 questions/items in total. It is not known if the length of the survey impacted the response rate. Certainly, the entire survey packet that was mailed might be intimidating as it contained 11 pages (cover letter, packet instruction page, three-page consent, three-page survey instrument pages, and an additional copy of three-page consent for the recipient to keep) and a return envelope.

The survey instrument opened with a definition of “farmer” for the purpose of the survey. The definition stated that “farmer” could include family members who engage in farmer ownership or operation including the day-to-day production of agricultural commodities. Two providers who worked primarily in pediatrics and women’s health in an FQHC did not consider that they had any farmers in their patient population. It might not have been clear that spouses and children could be considered farmers.

In the demographic section, four of the 14 items gathered data that was necessary to test the hypotheses, and the other seven solicited information to demographically define the population. One question that seemed to garner some confusion (especially for the nurse practitioner respondents) related to the number of years as a healthcare provider as respondents were unsure whether to include their years as a nurse before becoming a nurse practitioner provider. In a future study, it would be important to clarify this question to either ask specifically the number of years as a PCP or the number of total years of experience in health care.

The true/false section of the survey instrument contained 23 items that had been paired down from the original 36 items, which were based on researched facts about farmer stress. True/false items were scored as “-1” if an answer was incorrect, “0” if the

response was “I don’t know,” and “1” if an answer was correct. The mean score on this section was 11.17 with a range of scores from -1 to 20 points. The average correct items were 14 out of the 23 questions (61% of questions answered correctly). The serious nature of farmer stress and the resulting sequela of anxiety, depression, and suicide is well documented. An average score of 61% on the knowledge questions raises the concern of whether providers have enough knowledge to deliver quality person-centered care to a population that is in crisis. While no glaring concerns arose about any item in the true/false section, it is important to note that extensive item analysis needs to be done on each item to ensure the highest level of reliability and validity. This would be necessary before advancing with further research with this instrument.

The confidence scale section of the survey instrument consisted of 14 items that closely paralleled a previously validated instrument. Providers rated their confidence on each item from 0 (not at all confident) to 10 (extremely confident). No difficulty was reported with the providers completing this scale. When the confidence scores for the 14 items were averaged, participants’ scores ranged from 0 to 10 with a mean of 6.96. With the current scale, it is difficult to interpret exactly what level of confidence this score indicates. In future studies it might be helpful to future define the numbers on the scale in descriptive terms.

Research Questions – Interpretation of Results

Interpretation of the inferential analyses of relationships of the variables in the research study yielded some interesting and unexpected results. The first research question was aimed at determining how demographic factors affected providers’ knowledge of farmer stressors. No difference was found among providers in the three

different clinical positions (MD, PA, NP) in their amount of knowledge of farmer stressors ($p = .479$). This uniformity among the providers in their knowledge about this topic might help ensure that care is consistent across the various clinical positions.

No significant relationship was found between providers' years of experience and their amount of knowledge of farmer stress ($r = -.086, p = .690$) or between providers' experiences with farming/farmers and their amount of knowledge of farmer stress ($r = -.071, p = .742$). This might imply that knowledge of farmer stressors is perhaps a complex topic that cannot be merely explained by the demographics assessed in this study. What might cause a relatively inexperienced provider to have more knowledge on farmer stress than a more experienced provider might be related to some obscure factor such as a special interest in the topic or some formal or informal education they experienced.

The second research question investigated how demographic factors affected the provider's perceived confidence to competently meet the mental health needs of farmers. A significant difference was found in perceived confidence among the providers with the three different clinical positions ($p = .004$). The Tukey B post-hoc test found that the level of confidence for the physician assistants was statistically lower than that of the physicians and nurse practitioners. It should be noted that in this study this finding might have been skewed by the fact that the PA group was smaller ($n = 4$) than the other two groups and one of the PAs scored their confidence level as a "0" on all 14 items. It is difficult to purport if the confidence level of the PAs is of true significance as the surveyed population was small.

No significant relationship was found between providers' years of experience and their confidence in farmer mental health care ($r = -.280, p = .185$) or between their experience with farming/farmers and their confidence ($r = .065, p = .761$). Future exploration with a larger sample might yield the discovery of the variables that are associated with knowledge or confidence.

With the third research question, there was a very weak positive relationship ($r = .375, p = .071$) between providers' perceived knowledge of the unique stressors of farmers (self-rated level of knowledge) and their actual knowledge (score on the 23 true/false items). Since the study was small, this significance may be too minor to be worthy of attention. A study of a larger population might confirm a stronger correlation between perceived and actual knowledge.

On the last research questions, statistical analysis did not show a significant correlation ($r = .209, p = .327$) between providers' knowledge of farmer stressors and their perceived confidence in meeting farmers' mental health. This leads to the question of what factors impact the providers' confidence. In their study on healthcare provider confidence, Kim et al. (2020) found that knowledge scores were not strongly associated with confidence. Scores on knowledge in the highest scoring tertile were associated with a mere 4% increase in confidence when compared to scores in the lowest tertile, and there was no statistical significance ($p = .08$). However, this study found that exposure to a full scope of clinical practice (both knowledge and clinical skills) was significantly associated with confidence ($p = .00$). There was a 13% increase in confidence as providers moved to the highest tertile on clinical skills/scope of practice. Also, the more confident the

provider was, the higher the quality of care they delivered. Future studies might do well to focus on how to improve both knowledge and clinical skills.

Pilot studies are not designed to test hypotheses or to make generalizations about the results. This pilot study produced many null results, and much can be learned from results that do not show associations and relationships (General Services Administration, n.d.). Null results can spur a researcher to consider other factors and make needed modifications in future studies, an important step in the pilot study stage of research.

Recommendations for Future Research, Practice, and Policy

After the completion of this pilot study, it is imperative to think critically about what comes next to expand research, improve clinical practice, and develop policies that enhance PCPs' knowledge, skills, and confidence. If PCPs are the first line of mental health care for the farmer populations, they must be well-prepared to execute quality, evidence-based person-centered care in clinical practice.

Based on the results of the pilot study, it would be a costly and laborious task to perform the pen-and-paper postal mail survey on a large scale statewide or nationally. It would be ideal to email the survey to providers via an online survey platform that collates the data. Obtaining provider email addresses is a challenge. It may be feasible to work cooperatively with the state or national rural health associations or community health center associations to email the survey to rural health clinics and community health centers and have the surveys disseminated to providers by the administrators of the centers. This would entail considerable commitment by and coordination with the associations and the clinical agencies. Another possibility is to perform the survey with providers at state and national conferences. This method would be limited by the fact that

the survey population is a group that is motivated to attend a conference and might not be a true representation of the larger provider population.

Survey return rates might be enhanced if an incentive to complete the survey is offered. Offering an incentive to a healthcare provider, especially a monetary incentive, has been shown to increase survey response rates (Noel & Huang, 2019). The larger the monetary incentive the greater the response, but even a \$5 or \$10 incentive has demonstrated improved response rates. Another approach might be to offer an incentive that is a farm commodity, such as roasted peanuts or another locally produced farm product. With future research, a cooperative sponsoring agency might assist in providing the incentive. It is worthwhile to consider a farm-related sponsor, such as the American Farm Bureau Federation, the North Carolina Agromedicine Institute, or another agency in the Farm and Ranch Stress Assistance Network.

More evaluation is needed to determine what changes are needed in the survey instrument. If the tool was shorter, response rates might be higher. Deliberation should be done to carefully evaluate if some questions from each area of the instrument could be removed and still maintain the integrity of the instrument. Two demographic questions that might easily be removed for a larger study are the questions on county of current practice and number of years working at current clinical site. Further testing of validity and reliability of each true/false knowledge item may indicate that some items need to be removed or replaced. "I don't know" might be removed as an option with the true/false questions to force the respondent to choose between true or false. Some confidence items verge on redundancy and could be merged or purged. Confidence items could easily be pared down to six items (from the current 10) focusing on the areas of relationship

building/communication, assessment, diagnosis, planning, treating, and over all competently caring for mental health needs. If the survey is done on a larger scale, another consideration is whether it is sufficient to just assess knowledge (and not confidence) to justify the need for expanding provider education on farmer stress.

It would be helpful to share the results of the pilot study with area experts (such as an agromedicine specialist, rural PCPs, and mental health experts). These experts might assist with careful analysis of the pilot studies' research questions, hypotheses, instrument, method, results, and analysis to determine the best steps in moving forward. Important questions to consider in regards to future research include:

- Is it useful to continue to research the relationship between provider demographic and their knowledge and confidence, the relationship between perceived versus actual knowledge, or the relationship between knowledge and confidence?
- Is there value in just evaluating providers' knowledge of farmer stress and mental health and not focusing on confidence?
- Is it more important to focus on building a model to assess providers' clinical skills in delivering farmer mental health than continuing to assess relationships?

Recommendations for clinical practice include expanding both the knowledge and skills of the providers who care for the mental health needs of farmers. In this pilot study, on average the providers correctly knew 61% of the facts about farmer stress that were covered in the true/false questions. The 2018 Farm Bill established the Farm and Ranch Stress Assistance Network (FRSAN), a program designed to begin to address farmer

stress by connecting farmers and their families with stress assistance programs (USDA, 2021). FRSAN funding is expected to continue as part of the 2023 Farm Bill. The FRSAN programs have made progress in increasing behavioral health awareness, improving mental health literacy, and developing networks for managing farmer stress and mental health issues. A review of the literature did not reveal any specific programs that have been directed at expanding PCP knowledge and practice skills through medical education or continuing education. The study conducted by the American Farm Bureau Federation in 2019 revealed astounding information about PCPs being the most trusted source of mental health information for farmers and the resource with which they felt most comfortable talking about stress. It is imperative to know if PCPs have the knowledge and clinical skills to assume these roles, and then to provide any needed education and training.

There are some ways to increase PCPs' awareness about farmer stress. A simple fact sheet (including information such as that in this survey instrument) could be distributed to providers at their clinical practice sites and through the state and national rural health associations and community health centers. After completion of this research project, this researcher plans to send all 40 PCPs surveyed a summary sheet about farmer stress and mental health facts and the results of the study. Another means of improving providers' understanding of farmer stress is by developing a continuing education course (providing CMEs) offered asynchronously online and free of charge. Funding for the course might be procured from an agromedicine or FRSAN program. It would be helpful to develop farmer stress/mental health clinical simulations or objective structured clinical examinations (OSCEs) that providers could engage in a non-judgmental manner. These

activities could evaluate clinical skill performance and build improved competencies and critical thinking skills (Blamoun et al., 2021).

The crisis in farmer mental health cannot be fully addressed unless meaningful policies are developed. Working on this project from its inception through the literature review and completion of the research component has made this researcher acutely aware of the lack of understanding of farmer stress and the mental health crisis by farmers, community members, healthcare providers, and political figures. Public awareness and education of stakeholders is essential. A larger study might contribute data that would increase awareness on this topic and eventually influence policies. Additionally, partnering with and supporting advocacy groups that are already active in farmer health and mental health policy building is important.

Conclusion

This research began with an exploration of farmer stress, a critical problem resulting in sequential morbidity (anxiety and depression) and mortality (suicide) rates that exceed that of the general population. A variety of unique factors, both modifiable and non-modifiable, influence farmer stress including farm-related, financial, and social factors (Kearney et al., 2014). When considering how to ameliorate farmer stress, the barriers to mental health care for farmers were perused. It was impactful for this researcher, who has practiced as a nurse/nurse practitioner for many years, to discover that the American Farm Bureau (2019) found that PCPs are farmers' most trusted source of information and the ones they feel most comfortable sharing about their stress. This raised the question of what level of understanding PCPs actually have about farmer stress and how prepared they are to deal with farmer stress and mental health issues. On review

of the literature, no qualitative studies were found regarding how prepared PCPs are to deal with these issues. This was the impetus to begin this pilot project to investigate a small piece of the preparedness of providers to deal with farmer stress and the social ecological factors that influence it.

During a discussion with Dr. F. Dane while planning for data analysis (personal communication, November 20, 2022), he shared that the beauty of exploratory research on a novel topic is that one begins with some small area of research (a small bite). Based on the research results in that one area, the researcher(s) will move on to explore another area and so on. In other words, one has to start somewhere with exploratory research, which will continue to expand the field of evidence-based knowledge. This project has been an attempt to begin to investigate one small piece of this novel topic.

This pilot study can be deemed a success as the research process was probed, a survey instrument was tested, and basic relationships about providers' knowledge on the topic and confidence in providing care were investigated with an eye on how to expand the research in a larger, more definitive study. This study has provided a starting point in exploring the question of whether PCPs are prepared for their role of providing quality mental health care to the vulnerable farmer population. The question now is where we go from here in investigating providers' competence in care delivery for farmers with the eventual goal of generating evidence-based strategies that will enhance that care. Surveying a larger population may provide the next bit of information needed to determine the future course of research on this previously unexplored topic.

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Appendix A

Primary Care Provider Survey Tool

Questionnaire: Understanding of Farmer Stressors and Confidence in Caring for Farmers' Mental Health Needs

(Please note that for the purpose of this survey, the term "farmer" is defined as the owner/operator of a farm who is involved in making day-to-day management decisions for the purpose of producing agricultural commodities. The term "farmer" may also include family members who are engaged in the farm's ownership and/or operation. It does not include farmworkers who are individuals employed to work on the farm year-round or seasonally.)

Section 1: Demographic Questions	
Read each question carefully and choose the answer that best describes you.	
1. What is your age? (Fill in the blank.) _____ years old	7. In which county do you currently do the majority of your clinical practice? <input type="radio"/> Bertie <input type="radio"/> Hertford <input type="radio"/> Northampton <input type="radio"/> Other: Please specify _____
2. What gender do you identify as? <input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Other	8. How many years have you worked in the clinical site where you do the majority of your current clinical practice? (Fill in the blank with the number of years. Use a decimal if less than one year.) _____ years
3. What is your race/ethnicity? <input type="radio"/> African-American <input type="radio"/> Asian <input type="radio"/> White/Caucasian <input type="radio"/> Latino or Hispanic <input type="radio"/> American Indian or Alaskan Native <input type="radio"/> Native Hawaiian or Pacific Islander <input type="radio"/> Two or More <input type="radio"/> Other: Please specify _____	9. What percentage of your patient population would you estimate are farmers? (Fill in the blank.) _____ %
4. What is your clinical position? <input type="radio"/> Physician (M.D., D.O.) <input type="radio"/> Physician Assistant (P.A.) <input type="radio"/> Nurse Practitioner (N.P.) <input type="radio"/> Other: Please specify _____	10. What experience do you have with farmers or farming? (Choose all that apply.) <input type="radio"/> I have little or no experience with farmers or farming <input type="radio"/> I have taken courses that provided information about unique stressors of farmers <input type="radio"/> I grew up on a farm <input type="radio"/> I have family or close friends who are farmers <input type="radio"/> I have worked in rural, farm communities for many years <input type="radio"/> I live on a farm now <input type="radio"/> I work on a farm in addition to my clinical practice
5. How many years of experience have you had a healthcare provider? (Fill in the blank to the nearest year.) _____ years	
6. In what type of setting do you currently conduct the majority of your clinical practice? <input type="radio"/> Primary Care: Rural Health Center, Community Health Center, FQHC <input type="radio"/> Primary Care: Private Practice <input type="radio"/> Primary Care: Other <input type="radio"/> Acute Care <input type="radio"/> Other: Please specify _____	11. How knowledgeable do you think you are about the unique stressors that farmers experience? (Please use the following scale and circle what level you rate your knowledge. 0 indicates that you have no knowledge about farmer stressors and 10 indicates that you have a very high level of knowledge about farmer stressors.) 0 1 2 3 4 5 6 7 8 9 10

Section 2: TRUE/FALSE – Farmer Stressors			
Directions: Read each statement below carefully. Circle T if you think the statement if TRUE. Circle F if you think the statement if FALSE. Circle IDK if you if you do not know whether the statement is TRUE or FALSE.			
1. As a population, farmers have more stress-free lives than other populations.	T	F	IDK
2. Farmers have lower rates of depression than most other populations.	T	F	IDK
3. Younger farmers have higher suicide rates than older farmers.	T	F	IDK
4. Retrospective studies find that farmers who die from suicide were likely to have had contact with their primary care provider for a physical issue in the 3 months prior to their death.	T	F	IDK
5. Social factors (such as social interactions, time spent with family, distance from resources) cause more stress for famers than farm-related factors (such as the weather, problems with crops, farm injuries, and operating hazardous machinery) or financial factors (such as market prices, taxes, and debt load).	T	F	IDK
6. Farmers state that financial stressors are their greatest source of stress.	T	F	IDK
7. Since farming is seasonal, farmers tend to work fewer hours on average than other workers.	T	F	IDK
8. Since farmers tend to live close to their farm, it is easy for them to separate their home life from their work life.	T	F	IDK
9. Consumers are paying higher prices for food and other farm commodities, so farmers are getting a higher percentage of the retail cost for their products.	T	F	IDK
10. Farmers rate the factors that they can control about farming as more stressful than factors that they cannot control.	T	F	IDK
11. While COVID was stressful for most people, overall farmers were less affected by the stress of the COVID pandemic since they work outside and tend to be more isolated from other people.	T	F	IDK
12. Farmers do not care if their health care provider has any knowledge about the nature of farming and farm life.	T	F	IDK
13. For farmers, their health takes precedent over the status of their crops (or other farm commodities).	T	F	IDK
14. Farmers tend to take time away from the farm when they are stressed.	T	F	IDK
15. Farmers tend to make decision that affect their farm with their heart more than their head.	T	F	IDK
16. Since farmers are likely to consider seeking mental health services as a sign of weakness, they may feel it is best to “tough it out”.	T	F	IDK
17. Farmers’ sense of independence can be helpful factors when dealing with stress.	T	F	IDK
18. Farmers are most likely to trust their primary care doctor for information on mental health than their family, friends, counselors, clergy, or other sources.	T	F	IDK
19. Farmers would feel more comfortable talking to their primary care providers if they are dealing with high levels of stress than they would talking to a counselor/therapist, family, or close friends.	T	F	IDK
20. The primary care providers’ lack of understanding of the unique needs and challenges of farmers (“farm credibility”) is not a barrier for farmers accepting mental health support.	T	F	IDK
21. When farmers come to their primary care provider for stress-related issues, they are likely to present with a physical complaint.	T	F	IDK
22. Farmers are sometimes defined as a difficult-to-engage group by their primary care providers, yet it makes no difference if the provider spends time during the visit inquiring about how things are going on the farm with their crops (or other commodities).	T	F	IDK
23. Since farmers are not “fixers” by nature, they do not respond well to being told specific actions to improve their stress, such as problem-solving strategies or psychoeducation strategies.	T	F	IDK

Section 3: CONFIDENCE Questions	
Directions: Please answer the following on a 0 – 10 scale regarding your confidence in the following domains of patient care. 0 indicates you are not at all confident and 10 indicates you are extremely confident. Circle one number for each question.	
How confident are you that you can...	0 (not at all confident) – 10 (extremely confident)
1. develop a trusting relationship with your patients who are farmers	0 1 2 3 4 5 6 7 8 9 10
2. communicate effectively with your patients who are farmers	0 1 2 3 4 5 6 7 8 9 10
3. pursue both verbal and non-verbal cues given by your patients who are farmers	0 1 2 3 4 5 6 7 8 9 10
4. assess the unique stressors of your patients who are farmers even if they present with physical complaints	0 1 2 3 4 5 6 7 8 9 10
5. assess if your patients who are farmers have suicidal ideations	0 1 2 3 4 5 6 7 8 9 10
6. diagnose stress issues in your patients who are farmers	0 1 2 3 4 5 6 7 8 9 10
7. develop a realistic plan of care that considers farm culture for your patients who are farmers with mental health issues	0 1 2 3 4 5 6 7 8 9 10
8. explain treatment options in a manner that ensures a high level of understanding for your patients who are farmers with mental health issues	0 1 2 3 4 5 6 7 8 9 10
9. actively involve your patients who are farmers in their plan of care	0 1 2 3 4 5 6 7 8 9 10
10. secure a commitment to follow the plan of care from your patients who are farmers	0 1 2 3 4 5 6 7 8 9 10
11. utilize resources that are specific to farmer mental health management when addressing farmer mental health issues	0 1 2 3 4 5 6 7 8 9 10
12. educate your patients who are farmers on stress management strategies like coping and resiliency-building	0 1 2 3 4 5 6 7 8 9 10
13. evaluate the ongoing mental health status of patients who are farmers	0 1 2 3 4 5 6 7 8 9 10
14. competently care for the mental health needs of your patients who are farmers even if they are reluctant to share concerns	0 1 2 3 4 5 6 7 8 9 10

Comments:

(Information obtained in these comments will not be utilized in the data analysis for this research.)

1. Please share any additional information about your knowledge of farmer stressors or your confidence in caring for farmer mental health needs that might be helpful to the researchers.

2. Please share any feedback about the survey process or survey tool that might be helpful for future research.

Thank you for completing this survey. Your participation is greatly appreciated. Please return the consent form and the survey in the enclosed, stamped envelope to Jean Matthews.

Appendix B

Codebook

Question/Issue	Variable Name	Values	Data Type
Section 1: Demographic Questions			
1. What is your age?	AGE	(actual number)	Continuous
2. What gender do you identify as?	GENDER	1: Male 2: Female 3: Other	Categorical (Nominal)
3. What is your race/ethnicity?	RACE-ETH	This question may have a numerical and a text answer. See the sub-questions below.	
3a	RACE	1: African-American 2: Asian 3: White/Caucasian 4: Latino or Hispanic 5: American Indian or Alaskan Native 6: Native Hawaiian or Pacific Islander 7: Two or More 8: Other	Categorical (Nominal)
3b	OTHERRAC	8: Other: Please specify = text ["string']	text
4. What is your clinical position?	POSITION	This question may have a numerical and a text answer. See the sub-questions below.	
5a	CLPOSIT	1: Physician (M.D., D.O.) 2: Physician Assistant (P.A.) 3: Nurse Practitioner (N.P.) 4: Other	Categorical (Nominal)
5b	OTHERPOS	Other: Please specify _____	text
5. How many years of experience have you had a healthcare provider?	YRS-EXP	(actual number)	Continuous
6. In what type of setting do you currently conduct the majority of your clinical practice?	CLPRACT	This question may have a numerical and a text answer. See the sub-questions below.	
7a	PRACTICE	1: Primary Care: Rural Health Center, Community Health Center, FQHC	Categorical (Nominal)

		2: Primary Care: Private Practice 3: Primary Care: Other 4: Acute Care 5: Other	
7b	POTHTEXT	Other: Please specify = text [string]	text
7. In which county do you currently do the majority of your clinical practice?	COUNTY	This question may have a numerical and a text answer. See the sub-questions below	
8a	COUNTYP	1: Bertie 2: Hertford 3: Northampton 4: Other	Categorical (Nominal)
8b	COUNTEXT	Other: Please specify = text ["string"]	text
8. How many years have you worked in the clinical site where you do the majority of your current clinical practice?	SITEYRS	(actual number)	Continuous
9. What percentage of your patient population would you estimate are farmers?	FARMER%	(actual number as %)	Continuous
10. What experience do you have with farmers or farming? (choose all that apply)	FARMEXP	This question may have multiple answers.	
11a I have little or no experience with farmers or farming	NOFE	1	Categorical (ordinal)
11b I have taken courses that provided information about unique stressors of farmers	FE-COURS	2	Categorical (ordinal)
11c I grew up on a farm	FE-GREW	3	Categorical (ordinal)
11d I have family or close friends who are farmers	FE-FF	4	Categorical (ordinal)
11e I have worked in rural, farm communities for many years	FE-WORK	5	Categorical (ordinal)
11f I live on a farm now	FE-LIVE	6	Categorical (ordinal)
11g I work on a farm in addition to my clinical practice	FE-FARM	7	

11h Sum total of farm experience	SUMFE	# = Sum of all numbers in items 11a through 11g	CONTINUOUS
11. How knowledgeable do you think you are about the unique stressors that farmers experience?	PERCEIVK	0 (no knowledge) 1 2 3 4 5 6 7 8 9 10 (very high level of knowledge)	Categorical (ordinal)
Section 2: TRUE/FALSE – Farmer Stressors & Farm Culture			
12. T/F Question 1	TFQ1	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
13. T/F Question 2	TFQ2	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
14. T/F Question 3	TFQ3	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
15. T/F Question 4	TFQ4	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
16. T/F Question 5	TFQ5	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
17. T/F Question 6	TFQ6	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
18. T/F Question 7	TFQ7	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
19. T/F Question 8	TFQ8	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
20. T/F Question 9	TFQ9	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
21. T/F Question 10	TFQ10	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
22. T/F Question 11	TFQ11	1: correct -1: incorrect	Categorical (Nominal)

		0: IDK	
23. T/F Question 12	TFQ12	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
24. T/F Question 13	TFQ13	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
25. T/F Question 14	TFQ14	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
26. T/F Question 15	TFQ15	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
27. T/F Question 16	TFQ16	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
28. T/F Question 17	TFQ17	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
29. T/F Question 18	TFQ18	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
30. T/F Question 19	TFQ19	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
31. T/F Question 20	TFQ20	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
32. T/F Question 21	TFQ21	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
33. T/F Question 22	TFQ22	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
34. T/F Question 23	TFQ23	1: correct -1: incorrect 0: IDK	Categorical (Nominal)
35. Total Score for Knowledge	KNOWLEDG	# = Sum of all numbers in items 13 through 35	Continuous
Section 3: CONFIDENCE Questions			
36. Confidence Question 1	CQ1TRUST	0 (not at all confident) 1 2 3 4 5 6	Categorical (Ordinal)

		7 8 9 10 (extremely confident)	
37. Confidence Question 2	CQ2COMM	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
38. Confidence Question 3	CQ3CUES	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
39. Confidence Question 4	CQ4ASSE	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
40. Confidence Question 5	CQ5ASSUC	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)

41. Confidence Question 6	CQ6DX	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
42. Confidence Question 7	CQ7DEVPL	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
43. Confidence Question 8	CQ8EXRX	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
44. Confidence Question 9	CQ9INVOL	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
45. Confidence Question 10	CQ10COMT	0 (not at all confident) 1 2 3	Categorical (Ordinal)

		4 5 6 7 8 9 10 (extremely confident)	
46. Confidence Question 11	CQ11URES	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
47. Confidence Question 12	CQ12EDU	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
48. Confidence Question 13	CQ13EVAL	0 (not at all confident) 1 2 3 4 5 6 7 8 9 10 (extremely confident)	Categorical (Ordinal)
49. Confidence Question 14	CQ14COMP	0 (not at all confident) 1 2 3 4 5 6 7	Categorical (Ordinal)

		8 9 10 (extremely confident)	
50. Average Score for Confidence	CONFIDEN	(Sum of 37 through 50)/14	Continuous