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Amber Deere

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Suicide Among Farmers: Ramifications of the Culture of Agriculture

Amber Deere

University of North Dakota

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Abstract

Suicide among farmers has been on the rise for the past 19 years. Current statistics show that farmers in the United States commit suicide at a rate five times greater than other occupations. These trends are being seen world-wide across different nations and cultures. This paper is a review of the literature regarding suicide among farmers. Search terms were as follows: suicide among farmers, agriculture and suicide, U.S. farmers suicide, and farm culture. The literature search yielded many articles including literature reviews, qualitative and quantitative studies, and books. Research from industrialized nations specific to suicide or mental health difficulties among farmers were included. Rural suicide articles were used if they had sections dedicated to farmers. The literature shows that farmers are an at-risk population for suicide due to many factors such as their masculine nature, lack of control, complicated relationships, failure of the farm, health issues, access to means, and farm culture. Based on the literature there are many implications for nursing with this population including increasing knowledge and acceptance, targeted assessments and programs, and further research.

Suicide among farmers: Implications of the Culture of Agriculture

Mental health issues and suicide rates are pervasive among all walks of life globally. Mental and behavioral health issues including suicide are now receiving attention that is long overdue. One million lives are lost globally to suicide each year which is a major public health concern (Hirsch & Cukrowicz, 2014). In the United States, suicide rates have increased over 21% from 13.3 deaths per 100,000 people in 2000 to 16.1 per 100,000 in 2012. It is now the 10th leading cause of death (McIntosh et al., 2016). The financial impact of suicide on society is tremendous at an estimated loss of 50 billion dollars per year in the United States alone (Nestadt, Triplett, Fowler, & Mojtabai, 2017). It is estimated that for every suicide six people are personally affected by the loss (Cerel et al., 2016). The rural setting is likely to see a greater impact from suicide as they are close knit communities where everyone knows one another.

The agricultural world is not exempt from the current trends in suicide. Farming often conjures up stereotypical images regarding a simple lifestyle in the peace and quiet of the countryside. The idealized views held by many regarding farmers stands in stark contrast to the reality surrounding suicide rates among this group. Farmers experience a disparate rate of suicide when compared with other occupations. Individuals who work in agriculture have the highest incidence of suicide of any occupation at a rate of 84.5 per 100,000 people (McIntosh et al., 2016). According to a study by Ringgenberg et al., (2017) agricultural workers have topped this list for the past 19 consecutive years. This startling statistic begs the question of why do farmers have such an increased risk of suicide? Is it something about them as a group, the work on the farm, or a combination of both?

Purpose and Significance

Farmers are a unique population with a culture all their own. Learning more about their agrarian values and way of life can help identify risk and protective factors related to suicide in this population. The more we understand what drives farmers to suicide, the more we can customize specific prevention methods to most effectively reach them. This is prudent given the lack of resources available for mental health services in general, and especially in the rural context. A multi-faceted approach to suicide prevention among farmers will be necessary to target the issue from all angles.

Farmers are a characteristically independent group who, by the nature of their work, are quite resilient and self-reliant. Geographically there is a level of isolation that necessitates these qualities. Farm work is all encompassing and presents more of a lifestyle than a career. There are poor, if any, boundaries between the work on the farm and the personal lives of farmers (Fraser et al., 2005). Farming is physically strenuous with long hours and undesirable working conditions. It is a dangerous occupation that includes exposure to the elements, unpredictable livestock, and powerful heavy machinery (Browning, Westneat, & McKnight, 2008; Hirsch & Cukrowicz, 2014; Rayens & Reed, 2014; Sturgeon & Morrissette, 2010).

Farmers typically adhere to traditional gender roles in which they are the head of the household and financial provider for the family. Value is placed on characteristics such as masculinity, stoicism, and work ethic. Because of their role, and the pride that often accompanies it, farmers don't ask for help even in the midst of physical or emotional pain (Hirsch & Cukrowicz, 2014). The qualities that enable farmers to be successful in their work

(independence, resiliency, self-reliance, stoicism, and a strong work ethic) also present barriers to them asking for help when they need it.

Theoretical Framework

The theoretical framework utilized to guide this study is an anthropological approach. Medical anthropology is heavily influenced by the social and biological sciences as well as the humanities. Within this framework multiple aspects pertinent to the population of interest are studied including individual and collective health of communities and environments, as well as the ways they are impacted by relationships, cultural and social norms, politics, and globalization. The theory of medical anthropology is integrated from many disciplines in order to understand who people are, and what health and wellness means to them individually, and as a group. An anthropological framework brings the world of raw scientific data together with what can be gleaned from interpreting the human experience. It encompasses both a holistic approach along with evidence based science, which is the best of both worlds (Panter-Brick & Eggerman, 2017).

Anthropology seeks to study the culture of people who are linked together in less obvious ways than geography, race, or religion. The nuances that make each culture or subculture unique are considered which helps uncover what drives their decisions regarding health. Health is studied across the lifespan to identify times of change or stress pertinent to the population of interest. Studying and understanding the health and wellbeing of a particular culture can help further medical and public health practices specific to their group (Panter-Brick & Eggerman, 2017).

Suicide is a complicated phenomenon that is not fully understood. There are many factors that contribute to suicide including biologic, genetic, personal and familial experiences

and stressors, and sociocultural influences. Given all of the different variables that can contribute to suicide, it is important to research the issue with these different aspects in mind (Lamas & Kaslow, 2015). The field of medical anthropology is interdisciplinary and therefore a framework that will align well with research and interventions regarding suicide (Panter-Brick & Eggerman, 2017). The spirit of medical anthropology is inclusive and encompasses many disciplines and specialties, and this same spirit is necessary in planning and implementing strategies to reduce suicide among farmers.

Anthropologically informed medical research is an excellent way to study suicide among farmers because it takes into consideration who they are as individuals, their work on the farm, the greater farming community, and the impact of government and global policy and legislation. Medical anthropology seeks to learn how farmers, their families, healthcare workers, and the rural community view, understand, and react to mental health issues including suicide. The clinical understanding of these topics is often starkly contrasted with how farmers may understand it. When the perspectives vary so greatly it poses a barrier to seeking care. Generating research that considers the culture of farmers can help develop systems of care and suicide prevention specific to their population that will be more effective (Carpenter-Song & Snell-Rood, 2016).

Definitions

The following terms will be defined agriculture, agrarian, farmer, and suicide. Agriculture is the science or practice of producing crops and or raising livestock. Agrarian is a term used to describe the way of life and characteristics of those who farm, or work in agriculture. A farmer is a person who grows crops or raises animals. Suicide is the intentional act of taking one's own life.

Process

The Harley French Library was used for the literature search. Databases utilized within the library included: PubMed, CINAHL, PsycINFO, and PsychiatryOnline. Search terms in initial searches were broad and included: suicide, rural suicide, rural culture, suicide prevention, suicide risk/protective factors, and suicide statistics. These terms were too generalized and yielded too many studies. Therefore, the scope of the study was narrowed to suicide among farmers rather than suicide in the rural setting. The same databases were used for the topic of suicide among farmers. Search terms included: suicide among farmers, agriculture and suicide, U.S. farmers suicide, and farm culture. The articles chosen for this study discussed suicide among farmers in industrialized nations. Articles regarding rural culture and rural suicide were used if they had content related specifically to farmers within them. Twenty five articles were used in this study and three books. Different styles of research are represented in the literature review from studies that use quantitative statistical analysis to qualitative face to face interviews. The use of articles that employed different styles of research was intentional. The variety aligns well with the theoretical framework of medical anthropology and looks at the issue of suicide among farmers from many perspectives. A poster presentation highlighting the main points of this paper will be distributed to the Pembina County Behavioral Health Coalition (see Appendix).

Literature Review-Qualitative Interviews

A qualitative study in Australia was done in a social constructivism manner in order to better understand the world and perspective of the participants, and more notably, their now deceased loved one. Interviews were conducted with 12 family members of Australian farmers who committed suicide between 2006 and 2014. The family members were a group comprised

of 7 spouses and ex-spouses, 2 brothers, 2 sisters, and 1 sister-in-law. The records of the deceased were found on the Queensland suicide register, and the family members had all consented to being part of any future suicide research (Kunde, Kolves, Kelly, Reddy, & Leo, 2018).

The interviews were completed via telephone, lasting up to 4 hours, and conducted by Lisa Kunde (LK) who is a clinical psychologist and the primary author of the article. Kunde (2018) used a semi-structured interview approach, while encouraging the participants to elaborate and use their own words when answering the questions. Participants gave consent to be recorded, and the recordings were transcribed and double checked for accuracy. Six themes emerged from the interviews and include: masculinity, uncertainty and lack of control in farming, feeling of failure in relationships and farming, escalating health problems, maladaptive coping, and access to means (Kunde et al., 2018).

Masculinity was described as a “mask” the men wore to adhere to their cultural norms, and must have been striking to Kunde et al., (2018) as this imagery was included in the title of their work. The deceased farmers were remembered by their loved ones as quiet hard-working men who didn’t readily share their emotions (Kunde et al., 2018).

Lack of control and uncertainty were discussed by the bereaved as significant sources of stress that drove the farmers to suicide and is echoed throughout the literature. The variables of weather, finances, impending foreclosure, and loss of land and animal herds that had been in the family for generations were heavy burdens carried by this group of farmers. Some farmers were forced into off farm employment to finance their farming endeavors and this was cited as a considerable source of stress by both the farmer prior to their suicide, and their family (Kunde et al., 2018).

Feelings of failure in relationships and farming contributed to the suicide represented in this cohort. The family expectations with multigenerational farms are a heavy burden to carry, and the transition of the farm from one generation to the next tests relationships. This cohort perceived a lack of support from those they were in closest relationship to and were estranged from their family in the months leading up to their suicide (Kunde et al., 2018). Whether they were truly less supported, or merely believed themselves to be, these farmers felt isolated and alone prior to their death.

Feelings of failure regarding the farm carry huge implications that go well beyond finances. There is a lack of separation between the farmer as a person, and their work on the farm, which is all encompassing and becomes their identity (Kunde et al., 2018). Farming is not merely a job or a paycheck, but rather who they are (Rayens & Reed, 2014). Fraser et al., (2005) found that the lives and work of farmers are completely integrated and cannot be separated. When considering these factors, it is easier to understand the devastation felt by farmers when they can't continue farming, or they must sell land, equipment, or livestock to pay bills. It's not that they have endured a failure, but rather they are a failure.

Emergence and escalation of mental health problems perpetuated the stress among this cohort. Communication between the farmer and their close loved ones was noted to decline in the months leading up to their death, and presumably due to the multiple stressors they were dealing with. The manifestation of their decline in mental health was viewed as more external and somatic by their loved ones. Symptoms such as irritability, anger, excessive work hours, and alcohol/drug use became common as well as abnormal sleeping patterns, fatigue, and physical pain. This cohort placed a greater importance on daily farm work than tending to their mental

health care needs, among those who did seek help there was a low level of adherence with the treatment plan (Kunde et al., 2018).

Physical health issues were a factor in the suicides among the farmers in this study. Concerns regarding the ability to work were prevalent as well as living with chronic pain, fatigue, and problematic sleep patterns. The farmers among this cohort were noted to put work above their physical health in the same fashion they put off seeking help for their mental health issues (Kunde et al., 2018).

The farmers in this cohort attempted to deal with their stress, however their coping mechanisms were largely maladaptive and included avoidance by way of longer work hours, alcohol and drug use, and anger/aggression. With strained relationships at home, the farmers in this cohort did not turn to formal or informal supports for help or counsel (Kunde et al., 2018). They simply foraged onward, attempting to work through these dark times alone.

Access to means was discussed by the cohort as a factor in the death of their loved one. Most farmers own and use guns as a functional component of their job. One farmer in this cohort had their gun license taken away due to a psychiatric diagnosis. The farmers represented in this study used firearms and hanging as a means of suicide. It was discovered that those who hung themselves had family members take away their firearms due to concerns about their mental well-being (Kunde et al., 2018).

This study offers current findings that highlight the biopsychosocial factors that contribute to suicide among farmers. The sample size is small, but the information obtained from the interviews is invaluable and brings a poignant level of humanity to the topic of suicide among farmers. This study sets the stage for the rest of the literature review as the themes uncovered are seen throughout the research in both quantitative and qualitative studies.

Sturgeon & Morrissette (2010) conducted a study in which they analyzed the written accounts of 29 calls made by Manitoban farmers to a suicide crises line. There were no transcripts of the calls themselves, but rather the reports written by the counselors who worked at the hotline. Key words and terms were gleaned from the reports and major themes were identified including: coping mechanisms, financial concerns, health issues, family salvation, uncontrollable events, family stress, and farm culture (Sturgeon & Morrissette, 2010).

Coping mechanisms among this cohort were found to be non-existent, or largely unhealthy. Many reported impaired sleep, drug, and alcohol use. Psychotropic medications were the primary coping mechanism of 21% of the callers. The farmers in this study describe increased work hours to deal with the stress regarding finances and uncontrollable events which also ties into the aspect of farm culture (Sturgeon & Morrissette, 2010).

Financial concerns were a prevalent theme among callers, with 51% citing this as the primary reason for their call. Large debt load, losses from a prior year, and uncertainty were some of the worries expressed. The financial concerns were reported to have a negative impact on their most important relationships (Sturgeon & Morrissette, 2010).

Uncontrollable events were the reason behind 59% of the calls to the crises line. This source of stress among farmers is well documented throughout the literature by Kearney, Rafferty, Hendricks, Allen, & Tutor-Marcom (2014), Kunde et al., (2018), Sturgeon & Morrissette (2010), and Torske, Bjorngaard, Hilt, Glasscock, & Krokstad (2016). The uncertainty among this cohort is a pattern found in other studies and largely tied to financial concerns (Sturgeon & Morrissette, 2010).

Physical health issues such as fatigue, hypertension, and headaches which are known manifestations of long term exposure to stress were problematic for 28% of the callers. Anxiety

and depression was formally diagnosed by 34% of this cohort. Symptoms such as irritability, lack of motivation, and impaired concentration and problem solving were expressed by callers (Sturgeon & Morrissette, 2010).

Family salvation was the term given to family relationships that were protective in nature, and 38% of callers stated their family was their reason for not committing suicide. The callers most frequently referenced their children as protective factors against suicide. Only 18% of callers named their spouse or significant other as a positive support. Opposite of the family salvation theme, family stress was reported by this cohort as an issue impacting their mental health and quality of life, with 41% reporting marital issues due to lack of communication and financial stress (Sturgeon & Morrissette, 2010).

Farm culture was implicated among this group as a source of significant stress. Pride was reported as a barrier to seeking the help they needed. In addition to that, the idea held by numerous callers is that those outside of the farming community would not be able to understand their problems (Sturgeon & Morrissette, 2010). Kearney et al., (2014) found this same phenomenon among their cohort.

This study and the results align well with the other literature available regarding suicide among farmers. With that said, the researchers utilized a small sample, and the design was not ideal. The calls to the crises line were not recorded, therefore the information gathered was based on documentation by a 3rd party. These individuals who worked at the hotline were referred to as counselors in the study, but it isn't clear what sort of education or degree they held, if any. Relying on someone else's interpretation and documentation of the content to be analyzed leaves room for bias or error.

Roy, Tremblay, Robertson, and Houle (2014) conducted in-depth interviews with 32 male farmers ages 27 to 63 in rural Quebec Canada who raised livestock. This qualitative study sought to understand how these farmers dealt with stress in their lives. A salutogenic framework was used to look at the topic holistically with the goal of health promotion among this group. The interviews were conducted by the first author of the study, Philippe Roy. His lack of farming knowledge necessitated research on agrarian values and lifestyle prior to the sessions to foster rapport with the cohort. The interviews took place at the participants farms, and upon his arrival Mr. Roy asked for a tour before getting started. The interviews were all digitally recorded, and upon completion the participants were debriefed and given a list of mental health resources available locally (Roy et al., 2014). The men in this cohort discussed a variety of coping mechanisms which highlights their resourcefulness and resiliency.

Raising livestock is physically demanding and often requires a seven-day work week as this cohort described. The house and farm are in the same location, which gives the feel of always being on call. The farmers were unanimous when discussing the necessity of taking breaks to cope with the high demands and stress of their occupation. The culture of farmers is one where hard work is highly valued, therefore vacations are stigmatized. The farmers describe pressure to continue working long hours while knowing the value of taking a break for their physical and mental health. This contradiction made taking vacations something that induced shame and guilt. The older farming generation was criticized among this group for their rigid and relentless work ethic. The increases in technology were discussed by the farmers as the reason the modern farming generation can lead a more balanced life (Roy et al., 2014).

Viewing their farm with positive regard was a coping mechanism utilized by 29 members of the cohort. These farmers were noted to see immense value in their way of life and felt pride

in their role of feeding the world. The passion they felt toward agriculture is evident and was used to combat the many stressors that are associated with farming (Roy et al., 2014).

The topic of suicide was not brought up by the interviewer specifically, however five members of the cohort disclosed past feelings of hopelessness and had considered taking their own lives. The negative impact suicide would have on their family, their farm, and their community were reasons reported for them to not go through with (Roy et al., 2014).

This study had a unique design that could prove beneficial for future research and delivery of care among this population. A good rapport was easily built between the first author and the farmers likely due to the interest Roy showed regarding their way of life before getting started with the interview. The farmers were open, honest, and engaging which is likely the result of how the sessions were structured. The literature suggests that farmers feel misunderstood by those outside of their community and this study gives an example of how to eliminate that barrier.

Quantitative Studies

Researchers in North Carolina studied a cohort of 128 farmers over a 4-month period to see what issues were the most stressful for them. The participants were chosen from the North Carolina Department of Agriculture and Consumer Services' private pesticide applicators database. The cohort was asked a series of questions via telephone, and a modified version of the Farm Ranch Stress Inventory was used to measure their answers. The study was conducted between March and June 2012 (Kearney et al., 2014).

The telephone interview was comprised of 45 questions regarding demographic and socioeconomics as well as physical health conditions, followed by 28 questions that focused on the farmers perception of stress. Finances were the area given the most "very stressful" answers

by participants at 21.9% followed by farming specific factors at 16.8%. Social factors were cited as “very stressful” by only 1.6% of the cohort (Kearney et al., 2014).

Factors directly associated with farming deemed most stressful by 60.2% of participants was the weather, followed by 29.7% who expressed worries regarding the future of their farm. One fourth of the farmers in this study reported increased stress related to thoughts that outsiders don’t understand the nature of farming. Problems with machinery (23.4%) and issues with livestock or crops (22.8%) finish off the most stressful farm related issues among this cohort (Kearney et al., 2014).

Social factors ranked low among this group of farmers as an area of significant stress (Kearney et al., 2014). A high percentage of participants (45.3 to 85.2) reported no stress regarding aspects of social and geographic isolation such as proximity to neighbors, shopping and recreational centers, and social activities. Lack of family leisure time was the most stressful in this category with 13.3% deeming this as “very stressful” (Kearney et al., 2014). This was also a source of stress noted by Roy et al., (2014). Many farm families live and work in the same yard, and there is a lack of boundaries between work and leisure (Fraser et al., 2005; Roy et al., 2014).

Multiple studies including the work of Bahrer-Kohler (2012), Cantrell, Valley-Gray, & Cash (2012), Lamis & Kaslow (2015), and McIntosh et al., (2016), highlight the isolation experienced by farmers as risk factors for suicide, which is contrary to what this study found. Perhaps the isolation that is most bothersome for farmers is when they become distant from their support network of family, friends, and neighbors.

This study provides valuable information from farmers in North Carolina, however it is not without flaws. The researchers chose to attempt telephone interviews during months that are

known to be busy for farmers. As a result the response rate was very low with 148 responses out of 4,817, and was further reduced to 128 after exclusion criteria was applied. It isn't clear if Kearney and his colleagues were unaware of this, or simply overlooked it. This further highlights the notion held by farmers that outsiders don't understand their way of life (Kearney et al., 2014; Sturgeon & Morrissette, 2010).

Suicide among farmers in Kentucky, North Carolina, and South Carolina was studied by taking data from the National Center for Health Statistics (NCHS) from 1990-1998. Three variables were used to determine which records to include in the study and are as follows: the person died in one of the three states and had lived there as well, suicide was the cause of death, and the deceased worked in agriculture (Browning et al., 2008).

Farmers ages 25-34 and those over 65 had higher numbers of suicide than the general white male population. Farmers age 75-84 are twice as likely, and those over 85 are two and a half times more likely to die by suicide when compared to the white male population. Older farmers are most likely take their own lives for reasons such as declining health and the ability to work (Browning et al., 2008). Other research supports this connection to health and work such as the Reed, Rayens, Conley, Westneat, & Adkins (2014) study that will be further discussed. Among all farmers in this study, firearms was the primary means used to commit suicide (Browning et al., 2008). This is a common trend seen in multiple studies and will be further discussed.

Nestadt et al., (2017) conducted a retrospective cohort analysis in the state of Maryland studying the link between firearms and suicide in rural communities. The records of all suicides recorded in MD from 2003 to 2015 were obtained, and each case was assigned to the county where the deceased had lived. The counties were assigned a number based on the US

department of Agriculture's Rural-Urban Continuum Codes (RUCCs). The RUCC were assigned 1-9 based on their population. Maryland has 24 counties which range from 1 (metro areas of more than 1 million) and 6 (population of 2500-19999 adjacent to a metro area). No counties in MD are categorized as 4, 5, 7, 8, or 9. The final sample was comprised of 6196 residents of MD who had committed suicide (Nestadt et al., 2017).

The results show the rate of rural suicides is higher in this sample than urban suicides which is expected. However, the difference is related to firearm suicides and was not present when looking at only non-firearm suicides. Estimates of major depression and other disorders associated with the risk of suicide are lower in rural communities according to this study (Nestadt et al., 2017).

Farmers tend to put off seeking help for physical and mental health conditions which contributes to poor outcomes. Poor physical health leads to depression and is a risk factor for suicide (Kavalidou, McPhedran, & De Leo, 2015). Farmers place great importance on their ability to work and be productive (Bahrer-Kohler, 2012; Reed et al., 2012). Farmers are more likely to visit their primary doctor than a mental health professional, and their complaints, even when depressed are more physical in nature (Kunde et al., 2018; Roy, Tremblay, Oliffe, Jbilou, & Robertson, 2013; Sturgeon & Morrissette, 2010).

Kavalidou et al., (2015) conducted a study on 1375 rural Australian men who had committed suicide, 212 of which were farmers. They looked at the data to see what conditions the deceased had been seen in the three months prior to their suicide. The results showed that 48% of farmers had contact with primary care in the months leading up to their suicide. Roy et al., (2013) surmises that rural males seek out care at the same rate as other men, but their

complaints are largely physical and not psychiatric in nature. Primary care is a great outlet for identification and assessment of suicidal behavior in farmers (Kavalidou et al., 2015).

One way to understand mental illness and suicide among farmers is to better understand how farmer's view their health and wellness. Researchers in Kentucky utilized a longitudinal design to collect data over a 6-month period in 2002-2003 from family farmers in Kentucky and South Carolina. The cohort consisted of 1,288 farmers over the age of 50, the majority of which were white males. The goal of the study was to determine how each participant defined their own health. The survey consisted of questions related to their personal definition of health, satisfaction with farming, physical health and medical conditions, and symptoms of depression (Reed et al., 2012).

The results of the study show that the majority of these farmers saw their health directly related with their ability to work (Reed et al., 2012). The correlation between work and health is also discussed by Bahrer-Kohler (2012), who stated farmers tend to define their health based on their level of functioning. If they are still able to work, they see themselves as healthy (Bahrer-Kohler, 2012). The participants in this sample had an average of two chronic health conditions, yet considered health to be the ability to work rather than the absence of disease (Reed et al., 2012). The importance of a holistic approach with patient education cannot be overstated in this population to keep them working and enjoying life. It would be interesting to see data from a younger sample to see if the same outcome was reached, however the average age of farmers in the US is 57.2 which is similar to 65.3 year average of the cohort (Reed et al., 2012)

There are 2.1 million farms in the United States, and 56% are owned and operated by people over the age of 55. Rayens & Reed (2014) used a cross-sectional design with data

obtained from a prior longitudinal study on work safety to look at factors that predict depressive symptoms in older rural couples. This study adds to the literature on older farmers which is lacking. They are an important group to study as increased age, especially among farmers, increases the risk for suicide (Browning et al., 2008).

The sample is comprised of couples 494 men and 494 women who live in Kentucky and South Carolina. The measures included demographic data, depressive symptoms, farm work, perceived stress, and diagnosed health conditions. The Center for Epidemiological Studies Depression Scale (CES-D) measured depression, and stress was measured with a Modified Perceived Stress Scale (PSS) (Rayens & Reed, 2014).

Results found men more satisfied with their work, and women more prone to higher levels of stress. The higher levels of stress perceived, the more manifestations of depression seen, such as chronic health conditions which is not unusual. Variability in results among men and women were seen, such as higher stress levels in men with depressed wives. Whereas women's stress level was not impacted by a depressed husband. Men whose wives had more health issues were actually less depressed than men whose wives had fewer (Rayens & Reed, 2014) The reason for that is unclear, and the statistic is surprising. Perhaps these men were less depressed because of their ability to continue working long hours and support their spouse suffering from multiple health conditions. That may feed into a masculine desire to provide which is common among farmers (Roy et al., 2013). Surprisingly there wasn't a strong correlation between work satisfaction, and positive mental health outcomes such as seen in the Reed et al., (2012) study (Rayens & Reed, 2014).

Pesticide exposure has been implicated as a contributing factor to depression among farmers. The Agricultural Health Study (AHS) is a prospective cohort study that was designed to

examine the associations between exposure to pesticides and a variety of health conditions including depression. In 1993-1997 private pesticide applicators in Iowa and North Carolina who were renewing their licenses were asked to participate in the AHS. The study by Beard et al., (2014) utilized information from the AHS to look at associations between pesticide use and depression in males. Telephone interviews were conducted between 2005 and 2010 on males who participated in the AHS, and questions specific to depression were further explored.

There was a total of 21,208 participants of which 1,702 (8%) received a formal depression diagnosis and 19,506 (92%) did not. Variables related to exposure were evaluated and included general exposure, personal mixing of the agent vs application only, and what agents were used. Incidence of depression was higher for past/present smokers, those who had a doctor's visit within the last year, and those who were diabetic. These increases in depression could be attributed to poor physical health since farmers place a high value on their ability to work as noted in the studies by Reed et al., (2012), Bahrer-Kohler (2012), and Browning et al., (2008). Variables cited such as smoking and diabetes might impede their work and necessitate visits to the doctor which could contribute to depressive symptoms. A positive correlation was seen between depression and days of cumulative use, a history of past poisoning, and or a high exposure event to pesticides (Beard et al., 2014).

This study had a large sample size and represented private pesticide applicators in two U.S. states. It is unclear how many among the cohort cite their primary occupation as farming which is a disadvantage. The inclusion of only those who were formally diagnosed with depression is another flaw in this study. Farmers typically delay treatment seeking as previously discussed by Fraser et al., (2005), Cantrell et al., (2012), Carpenter-Song & Snell-Rood (2016), Hirsch et al., (2014), Kavalidou et al., (2015), Kunde et al., (2018), and present with physical

complaints vs psychiatric as Roy et al., (2013) stated. Inquiring about depression and using a screening tool to rule participants in or out would have been a more accurate representation of depressed males in this cohort.

With advances in technology and agribusiness, farming is changing rapidly in industrialized nations, evidenced by higher demands for productivity and yields, larger farm sizes, and fewer farmers. Norway is no exception to this as seen in a decrease in the number of farms from 66% from 1979-2014 to 42% from 1999-2014 (Torske et al., 2016). Perhaps working in an occupation undergoing so much change contributes to the poor mental health outcomes seen among farmers.

A prospective cohort study in Norway included 76,583 participants from three waves of the Nord-Trondelag health study (HUNT study) which sends surveys to all residents in the county age 20 and older. HUNT-1 was conducted in (1984-1986), HUNT 2 in (1995-1997), and HUNT-3 in (2006-2008) with a total of 106,435 participants in all three studies (Torske et al., 2016).

Nord-Trondelag county is centralized in Norway and is primarily agricultural making it an ideal location to study farmers. In addition to that the researchers had the HUNT study data to go off of which provided a large sample size. The cohort for the current study had criteria for inclusion which included: participation in at least one of the 3 HUNT studies, were employed at the time of the study, and completed one of the measures of their mental health on the survey (Torske et al., 2016).

The cohort was grouped by occupation, and then the data was analyzed based on the answers provided in the prior HUNT studies. The HUNT study used different rating scales to quantify symptoms of mental distress. Cohorts from HUNT 1 and 2 were measured using the

Anxiety and Depression Index (ADI), and HUNT 2 and 3 were measured with the Hospital Anxiety and Depression Scale (HADS). The reason for the use of different scales in the three studies is unclear, however with the overlap of both scales used on the HUNT 2 cohort, this was perhaps the focus of further research. The scores of the farmers were compared with their siblings who were found on the National Registry. The siblings were found via the Norwegian National Registry using information on their ancestry, and confirmed with their 11 digit national identification number, similar to a SSN in the United States (Torske et al., 2016).

The study found that farmers have a higher level of depression and anxiety than those in other occupations which is consistent in trends seen in other parts of the world. The farmers in this study were also more likely to have symptoms of anxiety and depression when compared with their siblings who work in different occupations. The interesting aspect of this study is that it compares farmers to their siblings. It can be assumed that in most instances they were raised in the same household with similar experiences growing up. The fact that the farmers were more depressed and anxious says something about the nature of farming itself as well as those who choose to farm. The farms in Norway are family owned and passed on to the oldest child who is given priority to buy it (Torske et al., 2016). There might be an element of feeling “forced” into farming, however this doesn't pertain to each situation and therefore can't explain the difference seen among siblings in this study. Farming continues to be an occupation rife with mental health difficulties across many nations and cultures. Depression and high levels of stress are well documented risk factors for suicide, therefore it is important to continue to explore the topic of farmer's mental health and suicide, to learn how to intervene most effectively.

Cerel et al., (2016) conducted a retrospective analysis in Kentucky with a random cohort to study the impact of suicide in the community. Participants were asked if they knew anyone

who died by suicide, and then were asked to rate their closeness to the deceased. The participants were then assessed for anxiety and depression using PHQ-9 and GAD-7 diagnostic tools as well as the PTSD screening scale. Almost half of the participants (48%) had an exposure to suicide. Depression and anxiety scores among the exposed and non-exposed were compared. Not surprisingly, levels of anxiety and depression were higher in those exposed to suicide. On average, the suicide exposed participants knew three people who died by suicide. Those who were exposed were further questioned about PTSD symptoms, of which 11% met criteria for. The issue of suicide exposure is far reaching. We live in a world where even rural and remote areas can be connected via the internet. This is pertinent to rural areas where everyone literally knows everyone. When someone dies by suicide it devastates the entire community.

Pertinent Programs

The literature shows us that farmers are a group that prides themselves on independence and self-reliance. They don't trust outsiders, and feel like those not involved in agriculture don't understand them and their way of life. These facts pose a significant challenge in planning interventions to decrease suicide and maximize mental health a challenge in this population.

AgrAbility is a program that was initiated in 1990 and is funded by the USDA as a resource providing education, assistance, and support for farmers who are disabled. There have been multiple studies focusing on the enhanced quality of life for participants in regard to their physical health, but none that specifically looked at both physical and mental benefits of this program (Fetsch, 2018). As discussed earlier, research shows that farmers directly link their health with the ability to work and be productive (Bahrer-Kohler, 2012; Browning et al., 2008; and Reed et al., 2012). The more advanced age of farmers on average equates to more chronic

health conditions that may be poorly managed due to their reluctance to seek care. Poor physical health leads to mental health stress which can lead to depression and even suicide.

AgrAbility conducts in home and on the farm site visits to assess individual concerns, needs, and goals for treatment (Fetsch, 2018).

This study by Fetsch (2018) included 273 farmers and ranchers who reached out to their state AgrAbility project for assistance. The group was compared with 100 farmers and ranchers who did not receive services from AgrAbility. Those who were part of the program reported decreases in levels of depression and anxiety. Their independent living and working levels (ILW) and quality of life (QOL) were both improved (Fetsch, 2018).

The cohort might represent individuals who are more proactive about their health in general given the fact they were able to ask for help which is not always the case among this population. However, it is more likely the participants were inclined to ask for help from this organization because it is specific to farmers and they feel like their lifestyle and problems would be understood (Kearney et al., 2014; Sturgeon & Morrissette 2010).

Mental Health First Aid (MHFA) is an evidence based early intervention training for the general public. Participants of these trainings are equipped with basic skills to identify, assist, and refer their peers who are struggling with mental health issues. The course also educates on how to decrease stigma in one's own self as well as others. The organization was started in 2008, and in 2012 rural specific supplemental resources were created (Talbot, Ziller, & Szlosek, 2017).

Talbot, Ziller, & Szlosek (2017) studied the outcomes of MHFA in the rural setting. They utilized a mixed method approach whereby both quantitative and qualitative data were obtained and analyzed from November 2012 through September 2013. Quantitative data was

taken from post training questionnaires from MHFA participants, and qualitative data was gathered from interviews with 16 Key Informants (KI). The key informants were comprised of MHFA graduates, instructors, and staff from entities that supported the trainings in rural communities (Talbot et al., 2017).

The quantitative findings showed that rural residents were 2.6 to 39% less likely to express a mastery of skills learned in MHFA when compared to their urban counterparts. Three themes emerged from the interviews with rural KI's and include a need for basic information, stigma reduction, and a need for better behavioral health infrastructure and resources in the rural setting (Talbot et al., 2017).

The research supports the use of MHFA in the rural setting. The simplicity of this program as well as the theory of helping your neighbor aligns well with rural values and ideals. Considering the rate of suicide among farmers and lack of specific resources to combat the issue, MHFA may be a tool that can be used to target this population. As discussed prior farmers are unlikely to desire help from outsiders that don't understand their way of life. By training stakeholders within the agricultural community, farmers will be empowered to help their fellow man which aligns well with their beliefs.

Common themes among studies

The seven themes uncovered in the Kunde et al., (2018) study were found throughout the literature and are as follows: masculinity, lack of control, failing relationships, failure of the farm, health issues, maladaptive coping, and access to means. Each theme and the links among studies will be discussed.

Masculinity among farmers is discussed throughout the literature with an element of ambivalence as it is noted to serve as both a risk factor, as well as a protective factor against

suicide. Farmers struggle with this dichotomy where on one hand they are the strong, independent family leader, and at the same time they themselves need help.

Masculine characteristics have the propensity to create maladaptive coping mechanisms as discussed by Kunde et al, (2018) and Sturgeon & Morrissette (2010). When they feel stressed or overwhelmed farmers tend to immerse themselves in their work, have notable increases in anger and aggression, turn to alcohol or drugs, and isolate (Kunde et al., 2018; Roy et al., 2013; and Sturgeon & Morrissette, 2010).

There are many positive attributes of masculinity such as work ethic, pride, and resiliency. These should be targeted to enhance positive coping mechanisms among this population. Studies by Sturgeon & Morrissette (2010), and Roy et al., (2014) highlighted these positive aspects of masculinity. The focus on negative qualities of masculinity far outweigh the positive in the literature and represent a gap in research. Further study in this area could prove beneficial for health promotion and interventions targeted at farmers.

Woven into the theme of masculinity are other related characteristics discussed by Bahrer-Kohler (2012), Carpenter-Song & Snell-Rood (2016), Roy et al., (2013), (2014), (2017), and Kunde (2018) such as independence, stoicism, self-reliance, and resiliency. Warren and Smalley (2014) cite farmers work ethic as part of farm culture. Lamis and Kaslow (2015) along with Roy (2014) make the connection between traditional gender roles and agrarian values.

Farming is an extremely stressful career for many reasons, but namely the lack of control over most aspects that determine whether the farmer has success or not (Kearney et al., 2014; Kunde et al., 2018; Sturgeon & Morrissette, 2010; Torske et al., 2016). The many variables that can make or break a farm include weather extremes, crop yields, government legislation and

foreign policy, and finances (Hirsch & Cukrowicz, 2014; Kearney et al., 2014; Roy, Tremblay, & Robertson, 2014; Sturgeon & Morrissette, 2010).

A study by Rayens & Reed (2014) reported that farmers were more concerned with the continuation of their farm rather than their income. The cohort in the Kearney et al., (2014) study were most impacted by stressful financial situations followed by farm specific issues. While not explicitly stated, the stress of uncertainty, finances, and farm specific issues are one in the same because at the heart of it the prospect of not being able to continue farming is what is most alarming to these individuals. Extremes of weather and machinery breakdown impact the bottom line which is what determines if the farm will be viable for another year. Sturgeon and Morrissette (2010) found this same theme of financial stress among their cohort. Fraser et al., (2005) and Rayens & Reed (2014) both discussed how the identity of the farmer is in the farm itself, and the work being done there. Any failure to sustain the farming endeavor are a failure of the person and can have devastating effects.

Relationships between farmers and those closest to them are often complicated. Most (98%) U.S. farms are family owned and operated (Reed et al., 2012). Due to the nature of these farms, relationships between parents and adult children are very close, and can easily become strained over differences in farming practices or lack of communication (Fraser et al., 2005; Kunde et al., 2018). Depending on the structure and size of the farm, more distant relatives may work together, which brings a different dynamic of family stress to the table (Fraser et al., 2005).

Marital difficulties were identified as a source of stress among Manitoban farmers, while children were a protective factor against suicide (Sturgeon & Morrissette, 2010). Roy et al., (2014) discovered the protective factor of family among their cohort. A lack of close

relationships has been shown to be stressful for farmers, and a risk factor for suicide (Kunde et al., 2018; Onwuameze, Paradiso, Peek-Asa, Donham, & Rautiainen, 2013). Poor if any boundaries exist between the personal and professional lives of farmers (Fraser et al., 2005; Roy et al., 2014). Many farming families live, work, and play all in the same yard, which makes getting away from the work difficult, if not impossible (Fraser et al., 2005; Roy et al., 2014).

The topic of health issues among farmers is broad. Kunde et al., (2018), Roy et al., (2013), and Sturgeon & Morrissette (2010) all discussed the physical depressive symptoms that are common among farmers. Because of their masculine nature the manifestation of depression looks different in farmers than other populations and are largely somatic (Kunde et al., 2018; Roy et al., 2013; and Sturgeon & Morrissette, 2010). These symptoms are not easily picked up using most diagnostic tools to screen for depression (Roy et al., 2013). Bahrer-Kohler (2012) and Reed et al., (2012) found that farmers correlate health as the ability to work. The study by Browning et al., (2008) saw an increase in suicide among farmers who were not able to continue working.

Torske et al., (2016) found that farmers were more depressed and anxious when compared with other occupations. Thirty four percent of the cohort in the Sturgeon & Morrissette (2010) study had depression and anxiety. Nestadt et al., (2017) found the contrary and reported rates of anxiety and depression were lower in the rural context. This can be explained by a multitude of studies that show farmers often delay or avoid seeking care especially for mental health issues (Carpenter Song & Snell-Rood, 2016; Cantrell Valley-Gray & Cash, 2012; Fraser et al., 2005; Hirsch & Cukrowicz, 2014; Kavalidou et al., 2015; Kunde et al., 2018 and Rayens & Reed, 2014). A variety of reasons for this exist including availability of resources, accessibility of resources, and acceptability of resources (Lamas & Kaslow, 2015).

Access to means is implicated as a risk factor for suicide in the rural population by Bahrer-Kohler (2012), Browning et al., (2008), Cantrell, Valley-Gray, & Cash (2012), Lamis & Kaslow (2015), and Nestadt (2017). Fraser et al., (2005), Kunde et al., (2018), and Roy et al., (2014) discussed the topic specific to farmers. The farmers who had their guns taken away for various reasons in the Kunde et al., (2018) study ended up hanging themselves. The problem of suicide among farmers will not be solved by restricting gun use and ownership and would likely cause a larger wedge between their population and those they perceive as outsiders.

Interpretation

The uncertainty and variables that impact the mental health and quality of life of farmers is pervasive and seen throughout the literature. Farming is a gamble, and no amount of strategic planning and targeted interventions can change that. The culture of farmers further perpetuates the inherent stress in their occupation and is a vicious cycle. Farmers often feel misunderstood and isolated from the help that they need. Therefore, it is of utmost importance for primary care and mental health professionals to be knowledgeable and aware of this at risk population. Accepting the nature of farming, and the culture of those who work in agriculture, is the first step in providing the best care for them.

Primary care providers (PCP) are poised to meet the issue of suicide among the farming population on the front lines. Farmers are most likely to utilize their PCP for mental health complaints due to a lack of psychiatric services available in the rural setting. They also tend to trust their primary care provider and may not associate their physical symptoms with a mental health diagnoses as discussed earlier. Implementing the use of a male specific depression screening tool in the primary care setting would be a simple way to more thoroughly assess for depression among farmers. The Gotland Male Depression Scale (GMDS) and the Masculine

Depression Scale (MDS) are both evidence based depression screening tools that are available (Martin, Neighbors, & Griffith, 2013). Best practices regarding first line treatments of mental health diagnoses should be education points directed at primary care providers in the rural setting.

Another area pertinent to primary care is the ownership, use, and storage practices of firearms among farmers. Many farmers consider firearms to be one of the tools of their trade, and are fiercely loyal to their 2nd amendment rights. Making firearm assessment a routine part of healthcare visits will increase farmer's comfort when discussing this topic that might feel controversial to them.

Discussing firearms can be a segue into the topic of suicide among farmers. Knowledge is power, and educating farmers about suicide rates, risks, and prevention is key. Assessing for suicide should be part of routine health visits. Asking about exposure to suicide in addition to family history is important, especially in rural communities where everyone knows everyone. In addition to assessing for exposure talking about thoughts and feelings regarding suicide can yield useful information. These assessments and conversations will normalize hopelessness and suicidal thoughts which can help reduce the shame and stigma surrounding them.

Farm or agrarian culture has strong threads of masculinity running throughout it. Masculinity comes with many negative connotations, however that doesn't have to be the case. Instead of trying to change the nature of farmers it is more reasonable to target interventions that capitalize on the inherent strengths they possess, such as resiliency. Farmers who have struggled with mental health issues and are willing to share their story would be useful to raise awareness and reduce stigma among this population.

Mental health professionals are a much needed resource in rural areas. Programs that offer incentives to individuals serving rural communities should be funded at the state and federal level to fill in these gaps. Professionals who relocate to rural communities should be receive education on local and farm culture in order to best serve this population. Knowing what is important to the population they are serving will develop the skills necessary to build rapport during subsequent encounters. Offering Mental Health First Aid (MHFA) training in the community would serve the dual purpose of integrating the professional into the community while teaching vital skills to the local population. Mental health professionals and primary care providers should know resources available for farmers who are in crises such as the AgrAbility program. Partnering with entities that farmers utilize such as extension services, banks, and insurance agencies will help build relationships across disciplines and within the community for optimal outcomes.

North Dakota is home to 29,900 farms that encompass 39,100,000 acres ("USDA North Dakota statistics," 2017). North Dakota ranks 6th in the United States in value of crops and 11th in market value of agricultural products sold ("USDA North Dakota statistics," 2017). In addition to that, they are 34th in the U.S. in terms of livestock and poultry value ("USDA North Dakota statistics," 2017). Agriculture is the backbone of the economy in North Dakota, and the culture and values held by farmers is seen in every community across the state. Therefore, it is surprising that farmers were not identified as a high risk population in the North Dakota Suicide Prevention Plan. Farmers represent an at risk population in North Dakota and deserve a spot in the state's prevention plan. Given the high suicide rate among farmers, and the lack of mental health resources available in the rural communities, it is important to educate health care

providers and the general public regarding this group. Inclusion in the suicide prevention plan would raise more awareness regarding the vulnerabilities that exist among farmers.

The topic of suicide among farmers has been well studied as a whole. The suicides among farmers in India is a hot topic and has generated a lot of research in recent years. Australian farmers represent the most studied group in the industrialized world with a multitude of timely articles specific to their country. There is always something to learn on a specific topic regardless of where the study was conducted. However, it is unfortunate that farmers in the United States are so underrepresented in the literature regarding suicide, especially in midwestern states.

Significant gaps were identified among research specific to United States farmers when compared to other countries. Rural mental health and suicide in the United States are better studied topics. This information is useful, but cannot replace research that is specific to farmers. Studies that compare the difference in suicide rates among United States farmers compared to other rural men in the U.S. would be useful. There is overlap seen in rural culture vs farm culture, but they are not one in the same and should not be treated as such. Stress is a part of farming that cannot be avoided. Studies that look at how farmers successfully cope with stress vs those who do not would be useful for educational purposes and targeted interventions.

Summary

Suicide is emerging as a major public health concern, especially in the rural setting. Farmers are at an increased risk for suicide and have been for nearly two decades. Farming is a noble profession and those who choose to pursue it become enveloped in the lifestyle and culture. Most farmers share characteristics such as independence, pride, resiliency, resourcefulness, and a strong work ethic. These deeply engrained values are simultaneously risk

factors for suicide, and protective factors against suicide which presents significant challenges in formulating interventions. Capitalizing on the strengths inherent to farmers will be more useful than trying to change their natural proclivities.

Rural health care workers should consider farm culture to allow better understanding of this group and foster therapeutic alliances during encounters. Conversations that normalize mental health challenges, gun ownership, and suicide are necessary to help reduce stigma that is prevalent among farmers and in their rural communities. Mental health resources are scarce in these areas. The prudent practitioner will know what is available locally for those who may need referrals or a higher level of care. Programs specific to farmers and or rural communities are proven to be effective for better outcomes in this population.

Agriculture, like most things in our society, is rapidly evolving with the times; yet it continues to be the backbone of rural America. Investing in the health and wellness of farmers equates to investing in rural communities in general. This is an important population to target as many health disparities exist. The holistic approach of nursing is well suited to meet the complex biopsychosocial needs of farmers who are experiencing mental health difficulties. Implications for nursing include changes in practice, increased workforce in rural communities, and further research to guide evidence-based care.

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Appendix

Suicide Among Farmers: Ramifications of the Culture of Agriculture

Amber Deere
 Department of Nursing, University of North Dakota College of Nursing and Professional Disciplines
 Grand Forks, ND 58202-9025 <http://nursing.und.edu/>

Background	Risk Factors	Discussion	Implementation
<ul style="list-style-type: none"> • Suicide is on the rise across the globe and represents a major public health concern. • It is currently the 10th leading cause of death in the United States. • Agricultural workers have the highest incidence of suicide among all occupations. • Farmers are five times more likely to commit suicide than those employed in other trades. • The rate of suicide among farmers has been on the rise for nearly two decades. 	<ul style="list-style-type: none"> • Stress, uncertainty, and lack of control related to most aspects of the job. • Masculine values and farm culture i.e. independence, stoicism, self reliance, and pride • Attitude that “outsiders” won’t understand them and their way of life • Identity is intertwined with the work on the farm • Complicated relationships with those closest to them • Access to firearms • Atypical presentation of depression • Physical health, ability to work, and quality of life are closely related • Stigma regarding mental illness is prevalent among this group and the rural community in general. • Lack of mental health professionals in the rural setting. 	<ul style="list-style-type: none"> • Inherent masculine qualities and farm culture are both risk and protective factors for this group. • Farmers are most likely to present to primary care with physical symptoms of depression. • Acceptance of the culture of farmers will build therapeutic alliances. • Poor farming outcomes manifest as feelings of failure in the farmer. • Capitalize on the strengths that farmers possess such as resiliency. • Aging farmers and those who have sustained injuries on the job are at risk for mental health challenges. • Farmers often use guns as a tool of their trade and are loyal to their 2nd amendment rights. • Rural healthcare professionals should be knowledgeable of the local and farm culture as well as resources available to those who need additional care. 	<ul style="list-style-type: none"> • Educate primary care as they are the first line providers for this population. • Use male specific screening tools for depression. • Routinely discuss mental health challenges, hopelessness, suicidal thoughts and or exposure to suicide, and gun ownership/safe gun storage during encounters to normalize these difficult conversations • Lobby for funding at the state and federal level to support rural mental health programs and research. • Recruit mental health professionals to rural communities. • Refer at risk individuals to local resources and farm specific programs when appropriate.
