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Development of a Web-Based Agriculture Health Risk Assessment Tool for Military Veteran Farmers and Ranchers

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by

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Abstract

In the U.S., significant health disparities exist among rural populations compared to their urban counterparts. These disparities can be compounded in agricultural workers due to the dangerous and unpredictable nature of their work. Agricultural producers who are also military Veterans may experience additional health pressures that are often overlooked in the healthcare setting. Over 2.5 million Veteran Health Administration (VHA) patients reside in rural areas and the healthcare infrastructure to care for these Veterans may not include an agricultural occupational approach. To address healthcare disparities in Veteran farmers and ranchers, this study, in collaboration with AgriSafe Network, will be used to develop a health risk assessment (HRA) that is specifically designed to be used by Veterans working in agriculture. The current AgriSafe AgHRA is an efficient tool in the clinical setting and provides basic responses to individual health risks. The AgHRA does not provide diagnoses and is not meant to replace visits to healthcare provider or screening exams; rather, it alerts the user on how to take risk-appropriate prevention steps. Qualitative interviews with rural health professionals were conducted to 1) gain a better understanding, from the perspective of rural healthcare professionals, regarding the healthcare needs of Veterans working in agriculture and 2) use information gained to create questions for an HRA tool that can be used by Veteran farmers and ranchers. Analysis of the interview data revealed the overarching themes to be healthcare accessibility, mental health conditions and chronic health conditions. Using these data and information from a literature search of Veteran-specific health questionnaires, AgriSafe Network will create a tailored HRA tool that will be accessible on their website.

Introduction

Significant health disparities exist among rural populations compared to their urban counterparts in the United States including access to care and having a limited number of specialists in rural areas (Centers for Disease Control and Prevention [CDC], 2017; Office of Rural Affairs, 2020). By extension, agricultural producers are especially subject to these disparities based on the dangerous and unpredictable nature of their work. Moreover, military Veterans are vulnerable to both physical and mental health disparities resulting from their service. These may include loss of limbs, hearing loss, traumatic brain injury, and post-traumatic stress disorder (PTSD) (Kondo et al., 2017). As a result, agricultural producers who are also military Veterans represent a population with a unique set of healthcare needs. This presents a challenge to public health and healthcare professionals as to how to best prevent illness and injury in Veterans working in agriculture in the communities that they serve.

The objectives for the present study were to: 1) gain a better understanding, from the perspective of rural healthcare professionals, regarding the healthcare needs of Veterans working in agriculture and 2) use information gained to create questions for an HRA tool that can be used by Veteran farmers and ranchers. These objectives were accomplished by conducting interviews with rural healthcare professionals, analyzing the data, and compiling a list of suggested questions to add to AgriSafe Network's existing AgHRA based on the major themes extracted from qualitative interview data and from an extensive literature review of Veteran health questionnaires.

AgriSafe Network is a national nonprofit organization with the principal goal of improving the health and safety of farmers and ranchers in the U.S. AgriSafe accomplishes this goal by enhancing the competency of health and safety professionals to deliver high-quality

occupational agricultural healthcare via online learning resources as well as extension and outreach education events (AgriSafe Network, n.d). The current AgriSafe AgHRA is a powerful and efficient tool in the clinical setting. AgriSafe Network's AgHRA provides basic responses to individual health risks (AgriSafe Network, n.d.). The AgHRA does not provide a diagnosis; rather, it alerts the user on how to take risk-appropriate prevention steps. The tool is not intended to replace visits to the healthcare provider or regular screening exams but is meant to supplement information that can be discussed with the patient's care team (AgriSafe Network, n.d.).

The purpose of creating an AgHRA for Veteran farmers and ranchers is to create a risk assessment model that can transform the Veteran agricultural worker experience so they receive appropriate care recommendations based on their actual farm exposures, symptoms, and prior history. The data collected from this project will be added to the AgriSafe Network database of information gathered about Veteran farmers and ranchers.

Background

In the U.S., farmers and ranchers represent a workforce that are at a high risk for both nonfatal and fatal injuries due to the dangerous and unpredictable nature of their work (Chari et al., 2018; National Institute for Occupational Safety and Health [NIOSH], 2019; New-Aaron et al., 2019). According to the most recent data collected by the Bureau of Labor Statistics (BLS, 2019), the estimated incidence rate of nonfatal occupational injuries and illnesses in the agriculture sector is 5.3 cases per 100 full-time workers: the highest rate among all other private industries in the United States. The fatality rate in agriculture, forestry and fishing is the highest compared to all other industries at 23.4 cases per 100,000 full-time equivalent workers (BLS, 2018).

As an additional challenge, significant health disparities exist among rural populations compared to their urban counterparts (CDC, 2017; Office of Rural Affairs, 2020). Rural populations are at a greater risk of dying from cancer, heart disease, unintentional injury, stroke, and chronic lower respiratory diseases (CDC, 2017). These health disparities are attributed to a lack of preventative healthcare resources, geographic distance barriers in receiving emergency services and preventative care, and exposure to environmental hazards (CDC, 2017; Office of Rural Health, 2020).

Nearly five million Veterans return home to rural communities after ceasing their active military careers (Office of Rural Health, 2020). Of these, approximately 370,000 Veterans are agricultural producers with over 280,000 residing on a farm operation (U.S. Department of Agriculture [USDA], 2017). Based on the most recent demographic data collected by the USDA (2017), the average age of the American agriculture producer with military service is approximately 68 years and close to 84% are over 55 years. By race, the majority of agricultural producers with military service in the U.S. are White (95%) followed by Hispanic, Latino, Spanish (3.2%), Black or African American (2%), American Indian or Alaska Native (1.6%), Asian (0.3%), and Pacific Islander (0.1%) (USDS, 2017).

The Veterans Health Administration (VHA) provides healthcare services and benefits to individuals who served in active military, naval, or air service and who did not receive a dishonorable discharge (U.S. Department of Veterans Affairs, 2020). Routine check-ups with primary care providers and appointments with specialists are covered under the standard VHA benefit packages for all eligible Veterans. A priority group is assigned to the Veteran seeking VA health benefits during the application process (U.S. Department of Veterans Affairs, 2020). Healthcare service benefit packages differ from Veteran to Veteran based on the priority group

rating they are assigned (U.S. Department of Veterans Affairs, 2020). These priority groups range from 1 (highest priority) to 8 (lowest priority) and ultimately affect how soon one can get signed up for VA healthcare benefits and how much one will pay towards services (U.S. Department of Veterans Affairs, 2020).

The VHA priority group ratings are subject to change annually and the factors that influence priority group rating assignment include military service history, disability rating, income level, Medicaid qualification, and other benefits one might be receiving (U.S. Department of Veterans Affairs, 2020). Additionally, the VA budget is an important factor that affects priority group assignments. On an annual basis, the VA determines if funds are sufficient to cover all priority groups and if appropriations are not adequate, low-priority members may lose their coverage and/or priority assignments might change (Institute of Medicine [IOM], 2013). It has been reported that Veterans who were enrolled in a low-priority group and were required to travel long distances to receive VA healthcare services were more likely to put off seeking care (IOM, 2013). The complexity of VA health benefit package eligibility and the uncertainty of health coverage year to year may contribute to increasing some health disparities seen in rural Veterans.

Although 2.5 million rural Veterans are patients of the VHA, the distance to travel to these VA medical facilities can be up to four hours one way (Brooks et al., 2016; Office of Rural Health, 2020). This long travel distance becomes a significant burden for rural Veterans seeking care which subsequently results in low utilization of VA health services (Brooks et al., 2016; Teich et al., 2017). In rural areas the healthcare infrastructure caring for these Veterans may not take into consideration the Veteran's occupation, and as such may misdiagnose or mis-treat

symptoms related to agricultural exposures such as respiratory illnesses (Linaker & Smedley, 2002).

Aside from rural settings, a significant gap in both mental and physical health has been observed in our military Veteran populations across all locations. Kondo et al. (2017) conducted a systematic literature review of studies examining health disparities affecting Veterans to compile an evidence map with the objective of identifying knowledge gaps. Researchers reviewed over 4000 abstracts while extracting data from approximately 350 studies. They found a wide variety of disparities that varied by population and outcome. Most of the studies reported health disparities by race/ethnicity, followed by gender and mental health conditions. Researchers found that the most reported health disparities affecting VHA patients living in rural areas involved utilization of healthcare services (Kondo et al., 2017).

The long travel time to reach VA medical services creates many challenges for rural Veterans. These problems include schedule conflicts surrounding work, school, and childcare (Brooks et al., 2016). Farming and ranching involve long days with unpredictable schedules, increasing the difficulty of having to carve out an entire day to be seen at a VA medical facility. Although utilization of these services is greatly impacted by geographic distance, other factors contribute as well such as the availability of mental health appointments, lack of knowledge of VA benefit eligibility, and difficulty enrolling in and understanding the VA healthcare system (Brooks et al., 2012; Brooks et al., 2016; Teich et al., 2017).

Farmers and ranchers are susceptible to work-related stressors that may cause anxiety, depression, and other mental health struggles due to uncertainties surrounding their farm operation. Mental health risk factors include farm debt/financial trouble, climate change/weather disasters, commodity prices, government regulations, burnout, sleep deprivation, isolation, and

time constraints (Rural Health Information [RHI] Hub, 2019; Yazd et al., 2019). Together, these risk factors create significant challenges for the rural Veteran farmer to overcome.

Mental health disparities are at the forefront of health gaps seen in Veteran and rural populations (Kondo et al., 2017). While no one is exempt from struggling with mental health disorders, military service members and Veterans in rural areas are especially susceptible to suffering from severe psychiatric conditions like PTSD and/or suicidal thoughts and tendencies from their time serving in combat (Brooks et al., 2012; RHI Hub, 2019; McDaniel et al., 2020). According to the RHI Hub (2019), suicide rates among rural residents are nearly double the rates seen in urban counties and rural Veterans are more likely to die by suicide than their urban counterparts. It has been reported that Veterans residing in urban areas were twice as likely to seek psychotherapy sessions than rural Veterans (Teich et al., 2017). This trend supports the challenge of accessibility and utilization of mental healthcare services among rural Veterans.

Rural Veterans have reported difficultly securing mental health appointments at VA medical facilities. In a qualitative study to ascertain rural women Veterans' views about healthcare access, Brooks et al. (2016) reported that many participants had difficulty scheduling an appointment to address mental health concerns through VA healthcare services because if they were not immediately suicidal, the concerns were not considered to be urgent. This highlights the limited mental health appointment availability at VA medical facilities (Brooks et al., 2012; Brooks et al., 2016).

To further complicate the issue of mental health service accessibility in rural areas, over 90% of mental health professionals work exclusively in metropolitan locations. More than 60% of rural residents live in what are deemed as "mental healthcare shortage areas" (National Institute of Mental Health [NIMH], 2018). Health insurance coverage is yet another obstacle in

relation to seeking mental healthcare services. Many farmers and ranchers are privately insured, and these private insurance plans may not cover mental health services which creates an affordability barrier in receiving these services (RHI Hub, 2019). According to the most recent data gathered by the Office of Rural Affairs (2020), 55% of rural Veterans earn less than $35,000 annually which makes affording mental healthcare services a major burden.

Social and cultural stigma surrounding mental health concerns is prominent in rural settings among Veterans and farmers. There is a sense of "self-reliance" and "pull oneself up from one's bootstraps" type of mentality in both military and farm work occupations that may hamper one's desire to receive mental healthcare services (RHI Hub, 2019; Yazd et al., 2019). Furthermore, rural communities are extremely close knit and a fear of lack of anonymity as it relates to the use of mental health services could impede one from receiving care (RHI Hub, 2019). Telehealth-based programs may serve to reduce these mental health disparities in rural settings and have the potential to remove the barriers of stigma and lack of anonymity when seeking help for mental health concerns. Unfortunately, internet connectivity, insurance coverage, and mental health provider availability are still challenges (Brooks et al., 2016; Levy et al., 2017). Approximately 35% of rural Veterans do not have internet access at home (Office of Rural Affairs, 2020).

Aside from the mental health struggles that Veteran farmers and ranchers face, physical stressors can be compounded by combat and/or agricultural injuries. Agricultural work is extremely dangerous with the most common nonfatal agricultural injuries being caused by tractors or other machinery, followed by slips, trips, and falls, and livestock handling (New-Aaron et al., 2019). Approximately 35% of Veterans with a combat-related injury or disability live in rural locations (Levy et al., 2017). Many of these injuries and illnesses can be

exacerbated by adding rural residency and farming to the equation. For this reason, Veteran farmers comprise a population with a unique set of healthcare needs. Through this project, we aimed to curate information that will be used to develop a confidential web-based health risk assessment tool specifically for Veteran farmers and ranchers. This tool will provide access to health and safety information, allow the Veteran to gain a better understanding of their personal health risks and assist with locating community healthcare resources.

Methodology

Study Design

Literature Review

An extensive literature review was performed to identify what is known regarding health disparities and healthcare needs of rural Veteran farmers and ranchers. Literature materials were collected via an online search. Materials included published journal articles, learning webinars from AgriSafe Network, and government websites including: U.S. Department of Veteran Affairs, U.S. Department of Agriculture, Centers for Disease Control and Prevention, U.S. Department of Labor, National Institute of Mental Health and National Institute for Occupational Safety and Health. A concise set of interview questions were formulated using information gained from the literature review

Participants

This was a cross-sectional qualitative study. Inclusion criteria for this study included the following: 1) subject is a rural healthcare professional who serves rural Veteran farmers and ranchers in their practice and 2) subject is located within the Central States Center for Agricultural Safety and Health (CS-CASH) seven state service area (i.e., Nebraska, Iowa, Minnesota, Missouri, North Dakota, and South Dakota). Study participants (N=10) were rural

healthcare professionals including Medical doctors, Physician Assistants, Nurse Practitioners, Registered Nurses, and Doctor of Osteopathic Medicine. (**See Appendix A**).

Interview Questions

Using information from the literature review and from data previously collected by AgriSafe Network, semi-structured interview questions were formulated. Topics that were covered included the provider's: demographic characteristics; experience with patients who are Veterans working in agriculture; perception of healthcare needs related to patient stress as a Veteran working in agriculture; perception of barriers to care for this population and suggestions for topics to be covered in the health risk analysis. The interview questions were reviewed by the executive director of AgriSafe Network prior to conducting the interviews.

Recruitment

Rural healthcare facilities within the CS-CASH seven state service area (i.e., Nebraska, Iowa, Minnesota, Missouri, North Dakota, and South Dakota) were identified via Google maps. Rural healthcare facilities were contacted via phone and/or email to ask for voluntary participation in the brief interview process. With participant approval, phone or Zoom meeting interviews with rural healthcare professionals were conducted and recorded.

Data Analysis

Interviews were recorded. Recorded interviews were later transcribed via Otter.ai online tool (Otter.ai, 2020) and then manually cross-checked for accuracy. After editing the transcribed interview recordings, thematic analysis techniques were used to analyze the content from the interviews, code the transcripts, and assign major themes (Braun & Clarke, 2012).

To reduce selection bias, coding, theme, and response rate data were validated by a second coder. The second coder holds a Master of Public Health degree and has experience

conducting and analyzing qualitative data for a research university. Coding agreement was 100% while agreement on theme and response rate was 92%. Changes were made to reflect the secondary coders suggestion which resulted in adding an additional two themes.

Development of AgHRA e-tool

Using the analyzed data, a health risk assessment (HRA) e-tool will be developed. This tool will be modeled after several other HRAs developed by AgriSafe Network, including a Women in Agriculture tool (https://www.agrisafe.org/ag-health-risk-assessment-tool). This tool will be specifically geared toward Veterans working in agriculture. The Veteran farmer Ag-HRA e-tool will provide basic responses to individual health risks via a web-based confidential tool. This Veteran Ag-HRA will be customized to meet the unique health and wellness needs of Veteran farmers and ranchers using the Formstack platform (Formstack, 2020). Once deployed, the Veteran AgHRA will be available to the public and housed on the AgriSafe Network website.

The AgHRA will take about 10-15 minutes to complete. Following completion of the assessment, participants will be provided with a report detailing the participants answers along with suggestions to protect their health and alert the individual to take risk-appropriate prevention steps. By addressing individual needs, Veteran farmers may be given the tools to change behaviors and consequently discuss areas of concern with their healthcare provider.

Results and Discussion

Providers were first asked what the top health concerns affecting Veteran ag workers in their rural communities were (**Table 1B**). The major themes identified were 1) chronic conditions, 2) mental health conditions, and 3) lack of access. Chronic conditions such as hypertension, diabetes, cancers, chronic obstructive pulmonary disease (COPD), and dementia

were all common responses. One provider shared that the patients who served in Vietnam had unusual cancer diagnoses to which the provider attributed to agent orange exposures.

Mental health conditions such as depression, anxiety, sleep disturbances, and PTSD were also common responses. Lack of mental health services as well as the cultural stigma surrounding mental health conditions were reasons speculated by providers concerning the frequency of these type of illnesses in their communities. Living in such a close-knit community made it difficult to maintain a certain level of privacy, which may act as a deterrent to one seeking mental health services. Discussion surrounding both the chronic and mental health conditions were often attributed to lack of healthcare access—both for general care and mental healthcare. In regard to working in a rural clinic in western Nebraska, one provider shared,

> "I had people drive 90 miles for a sinus infection, and that makes it pretty rough to take care of" [IV10]

The second question asked providers to differentiate health concerns among the older and younger Veterans. For the younger cohort, the major concerns identified were 1) mental health conditions, 2) more open to discuss, 3) musculoskeletal conditions, and 4) accident prone (**Table 2.1B)**. Several providers shared that mental health conditions might appear to be more prevalent in the younger generations because they are more likely to discuss these issues and be aware of the medications and treatments available to them compared to the older generations. There are also plenty of stressors young farmers return to after deployment. Having to travel long distances to seek care while also managing an ag operation becomes a major barrier for these populations. In response to this question, one provider replied,

> "…farming is so stressful right now because all the money that you have to pour into farming and all the money that you probably won't get back out…, especially when you're a younger farmer starting out right now…you're pouring so much in and you're doing land payments and all of that, you know, it's just stressful because you're putting everything in and not getting much out. And can you imagine doing that year after year after year and not knowing you know, what the next is going to be? Because you have no stability." [IV2]

According to participants, younger Veterans also experienced more acute type musculoskeletal injuries by taking more risks. Providers deemed this as being more "accident prone". In response, one provider shared,

> "My observations would be that the farmers are always in a hurry and not always utilizing good, safe practices or wearing seatbelts…, they're in a hurry to get things done." [IV9]

For the older cohort, the major concerns identified were 1) substance abuse, 2) chronic illness, 3) cancer, and 4) chronic pain (**Table 2.2B)**. Although mental health was not one of the major concerns for the older Veterans, providers shared that they felt that older Veterans might have delt with these issues by self-medicating. Many providers discussed alcoholism or other substance abuse as an issue seen more in the older generations. A powerful statement one provider shared was,

> "I think sometimes it's more acceptable to probably be an alcoholic than it is to say you're depressed or anxious." [IV2]

Chronic illness including cancers and other respiratory conditions were attributed to pesticide use and working on tractors without a closed cab as well as military exposures such as

agent orange in Vietnam. COPD and diabetes were two chronic illnesses discussed frequently and providers attributed this to many of the older Veterans being smokers. The physical aspect of both serving in combat and tending to agricultural work causes chronic pain in many of these aging Veteran agriculture workers.

The third question asked providers to differentiate health concerns between male and female Veterans. The major finding extracted from the interviews concerning male Veterans was that of preventable illness (**Table 3.1B**). According to several providers, females had a higher health compliance than that of their male counterpart. Females seemed to be more willing to be a part of their care and more accepting of preventative healthcare services where males might miss preventative checkups or otherwise. In response, one provider replied,

> "The major difference between the males and the females is, you know, maybe there's an issue like cancer or something that wasn't caught early enough, because preventative care wasn't taken by male versus the female" [IV8]

The major concerns identified for the female cohort were 1) fewer female patients, 2) musculoskeletal injuries, and 3) home and work stresses (**Table 3.2B)**. A few providers shared that they do not see many female Veterans who are also ag workers. Others mentioned females are more prone to musculoskeletal injuries compared to males because females are performing the same type of ag work tasks as the males but due to the ergonomic differences between the two genders, females tend to be at a higher risk for injuries. Providers also mentioned that balancing outside-the-farm-work, family, home, and farm work contributes to high stress levels in the female cohort. To share one provider's response,

"I think it just comes back again to access. So, your female veterans probably are still thinking about having kids. And then you know, you're working on a farm, you know, 80 to 100 miles from the closest medical facility" [IV10]

Question four asked providers to describe any combat-related injuries or illnesses that Veteran ag workers suffer from that may become aggravated by performing ag work tasks (**Table 4B**). The major themes identified were 1) physical injuries, 2) mental health conditions, and 3) chronic illness. Physical injuries such as back injuries and other musculoskeletal strains were common responses. Regarding mental health, issues such as PTSD, stress, anxiety, and depression were all mentioned.

In addition to the trauma and stress experienced in combat, these military folks are coming home to either start or continue their farm or ranch operation in a shaky economy and to top it off, they have little control over profits as yields are often dependent upon current economic and climatic factors. To quote one providers response to this question,

"You can't control the floods last year. You can't control the drought this year. You can't control the economy that shut down for COVID." [IV6]

These work and financial stressors compound and can exacerbate mental health conditions in these Veterans.

Chronic illnesses such as hearing issues, cancer, COPD, and other respiratory illnesses were all common responses provided. Chronic respiratory issues attributed to chemical exposures in Vietnam, green dust and/or burn pit smoke exposure in Iraq and Afghanistan were mentioned in the majority of provider responses. One provider shared,

> "I definitely feel like they have more respiratory issues after being deployed, being in the green dust, being out in the field and just being in the dust in general…then it gets exasperated. Hearing issues due to being around things that are exploding and practicing with guns and then being around loud equipment" [IV9]

Question five asked providers if there is a demand for a particular healthcare service in their community that their facility might be lacking (**Table 5B**). The major themes identified were 1) improve healthcare access, 2) mental health services and facilities, 3) specialty health services and facilities, and 4) nonhealthcare meeting space for Veterans/education/outreach events. To be expected, healthcare access and lack of mental health services were major themes. Regarding these concerns, one provider stated,

> "The area that we serve is so very rural, and the resources are very lacking, it's not uncommon for people to have to travel an hour and a half or two hours one way to receive any type of service" [IV7]

Regarding treating patients with mental health concerns another provider replied,

> "The most problematic thing for us to get is mental health providers. I'm forced to do things in my practice that I don't necessarily always feel comfortable with." [IV6]

Specialty health services and facilities such as: cardiac facilities, surgical services, obstetrics and gynecology services, orthopedic facilities, and gastrointestinal facilities were all mentioned in provider responses. A few providers thought that a safe, non-healthcare related meeting space for Veterans and education/outreach events would be beneficial. Providers shared

that the common meeting space in their communities were often times the local bar so having a separate meeting space to host events and promote a healthy home would be more ideal.

Question six asked providers what programs and/or resources are in place in their community to promote Veteran ag worker health and safety (**Table 6B**). The major themes identified were 1) community support services and 2) VA services and facilities. The community support services that providers mentioned in their responses included: local voluntary emergency medical services, extension education agent, affiliations with state universities, annual health fairs, public health district, and monthly health newsletters. Regarding VA services and facilities, some communities had their own VA clinic or VA assisted home. Some communities had volunteers that would drive Veterans to and from appointments as well as help these folks navigate the VA healthcare system.

Question seven asked providers what community support resources or programs were available to ag workers returning home from deployment to ease the transition to civilian life (**Table 7B**). The major themes identified were 1) community support system and 2) VA services. Provider responses to this question were similar to the previous question. Most providers maintained that the community itself was the major resource in place to ease Veterans into civilian life. Rural communities are extremely close knit. One provider shared,

> "Definitely just the community itself and the fact that they know that people are watching over their family and that helps them transition." [IV6]

Another provider's response was,

> "Rural communities are pretty close knit so I think inherently support systems are there because they all know who their military folks are and if/when they are deployed and if/when they come back." [IV1]

Some communities had volunteer groups that specifically help Veterans when they return home—whether that be helping find employment or helping them navigate the healthcare system. Other VA services mentioned were VA clinics or facilities but most of the time these were out of town and required a decent amount of travel to reach.

The final interview question asked providers to share what new ideas or innovations public health practitioners should consider when designing healthcare services for Veteran ag workers (**Table 8B**). The major themes identified were 1) educational resources and 2) healthcare accessibility. Educational resources for Veterans and their family members to increase overall healthcare awareness as it relates to preventative health, risk factors, military exposure health consequences, and how patients can better communicate their health to their healthcare provider were all responses providers shared. One provider shared,

> "If you don't tell me what's wrong, or you don't tell me you're out of a medication or otherwise, I can't help." [IV4]

Another response was,

> "I think there's such a lack of knowledge in general, as far as healthcare goes. From how they know their military service affected their health, and maybe you know, how they've had maybe some hearing loss from using guns to working on the farm and how chemicals affect your body. I think there's a lot of lack of understanding on how those things affect their health." [IV7]

Increasing VA healthcare accessibility by increasing VA partnerships with rural clinics and VA reimbursement were responses relating to healthcare accessibility. Mental health and telehealth service expansion were also mentioned.

"Seeing that the Veteran can receive healthcare services in their area and the VA will help with reimbursement and accessibility" [IV3]

In an effort to improve care coordination with community providers and streamline their many healthcare programs, the VA has recently established what is called a Community Care Network (CCN) (U.S. Department of Veterans Affairs, 2020). The CCN includes six regional networks that covers all of the United States and territories. Improvements regarding scheduling, referrals, healthcare coverage/services, and health informational exchange between provider and the VA are all key features of the newly developed CCN. In order for a community provider to join the CCN, they must contact and sign up with their regional third-party administrator (U.S. Department of Veterans Affairs, 2020). The CCN offers the opportunity for community providers the opportunity to better serve their Veteran patients.

Conclusion and Recommendations

This study has reported on the health concerns and specific healthcare needs of Veteran farmers and ranchers from the perspective of rural healthcare professionals who serve this population. Major themes extracted from interview transcript data included: lack of healthcare access, mental health conditions, chronic conditions, preventable illness, musculoskeletal conditions, health compliance, home/work stresses, physical injuries, mental health services, specialty health services, community support system, and VA services. The topics of healthcare accessibility and mental health services were the focal point of interview discussions. Provider responses were consistent with what has been reported on in the literature regarding these topics. These main themes act as systematic risk factors that stimulate and perpetuate the health disparities observed in rural communities. There is still much work to be done in order to bridge

the gap of health disparities affecting this unique population. Future work and incentives should put emphasis on healthcare education, communication, accessibility, and mental health services.

Recommendations

When designing the AgHRA tool for Veteran farmers and ranchers, AgriSafe Network should consider adding questions to their existing AgHRA that address the following topics:

1. Military era served
2. Country and/or region stationed
3. Duration of deployment
4. Military exposures (chemical, respiratory, physical, mental)
5. VA healthcare system enrollment status and distance to nearest VA healthcare facility
6. Emphasis on mental health (substance use, sleep quality, depression/anxiety/PTSD symptoms)

Limitations

There may be selection bias present in the sample based on self-selection of healthcare providers choosing to participate in the interviews. Invited participants were from the three Midwestern states (Nebraska, Kansas, and Iowa); therefore, results may not be applicable to all Veteran farmers from across the United States. Also, the small sample may not have generated comprehensive information on the health risks faced by Veteran farmers. The thorough literature review, continuous communication with AgriSafe Network, and member checking assisted in mitigating the influence of these limitations.

Abbreviations

IV: Interview; Ag: Agriculture; VA: Veterans Affairs; HRA: Health Risk Assessment

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Appendix A

Participant Demographics

Credentials	Location	Gender
PA-C	Lincoln, NE	Female
APRN	Cunningham, KS	Female
MD	Oberlin, KS	Male
PA-C	Cottonwood Falls, KS	Female
RN	Fort Dodge, IA	Female
MD	St. Paul, NE	Male
APRN	Fort Dodge, IA	Female
APRN	Grand Island, NE	Female
RN	Norfolk, NE	Female
DO	Ogallala, NE	Female

Appendix B

Thematic Analysis Results

Table 1

Q1 – What are the top health concerns affecting Veteran agricultural workers?

Codes	Themes	No. of Responses
Healthcare Access	Lack of Access	N= 6
Chronic Conditions	Chronic Conditions	N= 8
Mental Health	Mental Health	N= 4
Clinic Resources		
Military Service Exposures		
Respiratory Conditions		
Unsafe Practices		

Table 2.1

Q2 – What health concern differences exist amongst the older and younger Veteran?

Codes (Younger)	Themes (Younger)	No. of Responses
Mental Health	Mental Health Conditions	N=3
More Open to Discuss	More Open to Discuss	N=4
Financial Strain	Accident Prone	N=1
Accident Prone Injuries	Musculoskeletal	N=1
Musculoskeletal Injuries		
More Aware of Health		
Offered More Support		

Table 2.2

Q2 – What health concern differences exist amongst the older and younger Veteran?

Codes (Older)	Themes (Older)	No. of Responses
Hearing Loss	Chronic Illness	N=8
Respiratory Illness	Substance Abuse	N=2
Chemical Exposures	Cancer	N=1
Stubborn	Chronic Pain	N=1
Cancer		
Smokers		
Substance Abuse		

Table 3.1

Q3 – What health concern differences exist amongst male and female Veterans?

Codes (Male)	Themes (Male)	No. of Responses
Preventable Illness	Preventable Illness	N=2
Ag Workers “Tough it out”		

Table 3.2

Q3 – What health concern differences exist amongst male and female Veterans?

Codes (Female)	Themes (Female)	No. of Responses
Higher Health Compliance	Higher Health Compliance	N=4
Higher risk for musculoskeletal injury	Home Stress	N=1
Stress related to home, work, family, etc.	Musculoskeletal	N=1
Fewer Female Patients	Fewer Female Patients	N=2

Table 4

Q4 – What are some common combat-related injuries and illnesses that Veteran agricultural workers suffer from than might become aggravated by performing agriculture work tasks?

Codes	Themes	No. of Responses
Trauma	Mental Health Conditions	N=6
Mental Health	Physical Injuries	N=6
Respiratory Conditions	Chronic Illness	N=6
Hearing Loss		
Chemical Exposures		
Substance Abuse		
Overworked		

Table 5

Q5 – Is there a demand for a particular healthcare service in the community in which your facility might be lacking? If so, what is this service?

Codes	Themes	No. of Responses
Recreation Facility	Improve Healthcare Access	N=3
Specialty health facilities	Mental Health Services and Facilities	N=6
VA partnerships	Specialty Health Services and Facilities	N=5
Education Outreach	Nonhealthcare Meeting Space for Veterans, Education, and Outreach Events	N=2
VA Clinic Services		
Psychiatric Services		

Table 6

Q6 – What are some programs and/or resources in place in your community to promote Veteran agriculture worker health and safety?

Codes	Themes	No. of Responses
VA Assisted Living	VA Services and Facilities	N=4
EMS Services	Community Support Services	N=4
Extension Education		
Health Fairs		
VA Clinics/facilities		
Monthly Health Newsletter		
VA Driver		
Public Health Department		
Traveling Psychiatrists		
Preventative Health Focus		

Table 7

Q7 – What community support resources and/or programs are available to agriculture workers returning home from deployment to ease the transition to civilian life?

Codes	Themes	No. of Responses
VA clinics/services	Community Support System	N=4
Weekly Mental Health Worker Visits	VA Services	N=6
Veteran's Affairs Officer		
Veteran Group Volunteers		
Home Healthcare		
Close-knit		

Table 8

Q8 – Are there any new ideas or innovations we should consider when designing healthcare services for Veteran agriculture workers?

Codes	Themes	No. of Responses
Telehealth Services	Education Resources	N=4
Understanding Risk Factors	Healthcare Accessibility	N=4
Veteran Health Services		
Military Exposure Health Consequences		
Help Navigate Healthcare System		
Creative Approaches		
Expanding Resources		
Communication of Health concerns		