

PREPARING RURAL HEALTHCARE FACILITIES FOR
OBSTETRICAL EMERGENCIES

by

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ABSTRACT

Montana is a largely rural state, and many counties may or may not have healthcare facilities. Rural facilities often lack specialty healthcare providers or services, such as obstetrics; however, pregnant women still live in these areas. Women in these rural populations frequently drive a considerable distance to access obstetric care. Unfortunately, these women may experience an emergent complication requiring quick care, with the rural facility being the only available option. These healthcare facilities may not be adequately equipped to handle obstetrical emergencies. The insufficient education and training in obstetric emergencies at rural facilities will continue to contribute to the high rates of maternal morbidity and mortality. Montana's rural facilities need proper preparation to manage obstetrical emergencies with positive outcomes. Through a literature review, we researched ways to assist rural healthcare facilities in preparing for obstetric emergencies.

By collaborating with a regional healthcare facility that offers a higher level of care, including obstetric services, we can bring education and simulated training to these rural facilities to ensure proper preparedness for obstetric emergencies when they arise. This educational opportunity will include critical event team training simulations at the rural facility and incorporate obstetrics Team STEPPS to equip them to successfully treat and stabilize obstetric patients.

Preparing Rural Healthcare Facilities for Obstetrical Emergencies

Introduction

According to the Montana government, the population of Montana is forty-four percent rural (Montana State Legislature, n.d.). Montana has numerous rural areas and counties that may or may not have healthcare facilities, and these facilities may differ in what they can provide for their patients. Rural Montana facilities frequently do not have obstetric or surgical areas and might only have an emergency area or clinic. According to Donna L. Hoyert, Ph.D., in 2022, the maternal mortality rate was 22.3 women per 100,000 live births (Hoyert, 2022). The maternal death rate in the United States remains alarming for a higher-income country today. Sonnenberg, A. et al. explain that that the United States maternal death rate is, unfortunately, three times that of France, which has the second most maternal deaths (2023). The U.S. Government Accountability Office states that “the number of hospitals providing obstetric services in rural areas has declined since 2014. Over half of rural counties didn't have a hospital that provided these services, as of 2018. This is particularly prevalent in low-income areas, and is associated with problems such as premature births” (2022). For instance, the Crow Reservation Hospital and Bighorn Horn Hospital in Hardin, MT, once provided labor and delivery options. However, they stopped offering the labor and delivery portion at their facilities. According to Google Maps, Crow and Hardin, MT, are approximately sixty-one miles and forty-seven miles from the nearest hospital providing labor and delivery options in Billings, MT (2024). Montana's Rural facilities need adequate preparation to treat obstetrical emergencies with positive outcomes. This literature review will investigate how we can aid rural healthcare facilities in preparing for an obstetric emergency.

Background on Microsystem

This scholarly project aims to help rural healthcare facilities become better prepared for obstetric emergencies such as antepartum, intrapartum, or postpartum hemorrhages, precipitous

deliveries, malpresentation deliveries, and eclamptic seizures, among others. Rural healthcare facilities are essential for a population that does not live in more urban areas; however, most facilities are not prepared for an obstetric emergency when they present. Donna L. Hoyert, Ph.D., reveals that the maternal mortality rate supersedes that of all other developed countries at 22.3 per 100,000 live births (2023). Similarly, Lamb et al. (2023) provide an alarming statistic that from 2011 to 2016, the mortality ratios among pregnant women were higher rurally, 19.5-24.4 deaths per 100,000 pregnant women. These numbers highlighted those rural facilities needed to be better equipped for obstetric emergencies. Owens et al. explain that maternal morbidity and mortality rates are affected by not having obstetric services available to women in rural areas (2023). Healthcare providers in rural settings feel that they lack the simulated training needed to maneuver through an obstetric emergency such as neonatal resuscitation, precipitous deliveries, and hemorrhages (Lamb et al., 2023). Most facilities are not equipped to care for obstetric patients; moreover, many rural facilities that may have done labor and delivery at one time do not anymore. Staff may be untrained for the type of emergency when a pregnant woman presents, or their training in obstetric emergencies may not be current. The facility may not have adequate equipment to care for a pregnant woman or the infant at delivery, including resuscitation equipment, a warmer, medication, or a fetal monitor. The core staff of rural healthcare facilities have backgrounds in more generalized healthcare instead of obstetric, neonatal, and women's healthcare. "Over 1 in 3 US counties lack a single obstetric clinician, and in many parts of the country, obstetricians, gynecologists (OB-GYNs), and family physicians who deliver babies are leaving the workforce. Moreover, while midwives could supplement the obstetric workforce, 23 states have policies that inhibit them from administering the level of care they were trained to provide" (Stoneburner, A. et al., 2024, p. 3). Therefore, training for obstetric emergencies, adequate supplies and equipment to treat these emergencies, and addressing the limited number of providers in rural areas are needed to better prepare facilities for obstetric emergencies.

Purpose

Rural healthcare facilities provide essential care for those patients living in rural areas. These facilities include clinics with essential health and preventative health services and small acute or emergent areas that may stabilize patients for transport to a tertiary healthcare facility. Looking specifically at rural and pregnant populations, we can see how the lack of access to specialized healthcare can create emergencies in rural health access facilities. Specific training and creating policies and steps for obstetric emergencies will allow staff at rural healthcare facilities to successfully care for patients during these emergencies and with better outcomes.

Patients

Women of childbearing age comprise part of the rural population. Stoneburner et al. (2024) provide statistics “that in 1,104 US counties, there is not a single birthing facility or obstetric clinician. These counties are home to over 2.3 million women of reproductive age and are the resident county of women who gave birth to over 150,000 babies in 2022” (p.3). Pregnant women who live in rural towns or counties sometimes drive considerable distances to receive prenatal care. Fontenot et al. (2024) explain that pregnant women living in areas without obstetric services drive up to four times the distance than those living in a county with maternity care access. These geographical barriers, often called maternal deserts, create limitations to care. The March of Dimes defines maternity care deserts as counties with no obstetric care clinics, hospitals, or providers specializing in obstetrics (n.d.). Unfortunately, some patients receive little to no prenatal care due to how far away they are from a facility. When women lack prenatal care, they can have risks and complications with the pregnancy that are unknown. Also, women who live rurally might receive care from a provider in the community; however, that particular provider may not perform deliveries, or the closest healthcare facility does not support laboring women. This may result in a delay in treatment if presenting rurally in labor or with an

emergency, needing transport to an adequate healthcare facility, or delivering in a facility that may be ill-equipped.

Professionals

In rural settings, the pool of healthcare professionals is considerably smaller, and specialists may be lacking. The medical professionals are likely more generalized and consist of physicians, physician assistants, nurse practitioners, nurses, and possibly telemedicine. Often, the number of providers in the rural setting cannot adequately cover the number of patients and the needs these patients may have. “Maternal health outcomes are poorer, and maternal care workforce shortages are more severe in rural areas of the US. In rural areas where obstetric specialists are rare, many patients rely on family medicine physicians for maternity care. However, the number of family medicine physicians who provide maternal care services is decreasing, aggravating shortages” (Owens et al., 2023, p. 2).

Patterns

Unfortunately, without adequate rural healthcare facilities having access to obstetric care, some women do not receive sufficient care during pregnancy. Some of these women will have high-risk pregnancies that are not known. When these women present to a rural facility with an obstetrical emergency, the seriousness of that emergency will increase. A recent report from the March of Dimes regarding maternal care deserts in the United States explains that “Chronic conditions related to poor health outcomes, like pre-pregnancy obesity, hypertension, and diabetes, have increased significantly since 2015 and are most common among women living in maternity care deserts” (Stoneburner, A. et al., 2024, p. 5). The pregnant population in rural settings has an increased risk of preterm birth, which, if delivered in a rural facility, will consequently have two patients in an emergent situation. Stoneburner et al. describe that women residing in a maternal care desert or a low-access area to healthcare have a thirteen percent and eleven percent respective increase in preterm birth (2024). Inadequate access to

obstetric care consequently leads to insufficient care, unknown high-risk pregnancies, and increasing risk for comorbidities and preterm labor.

Processes

Each rural healthcare facility may have specific processes and policies in place currently for the presentation of pregnant women in labor or presenting with an obstetric emergency. However, are these processes and policies written with current information and evidence-based practices? The current training for providers such as the doctor, physician's assistant, nurse practitioner, and nurses on duty might vary from facility to facility and how often training happens. In data from the American Hospital Association Annual Survey, Tuttle et al. found that healthcare providers need adequate training, better equipment and supplies, and adequate steps to provide safe and efficient care for an obstetric emergency (Tuttle et al., 2020). Moreover, some facilities may not have medication specific to obstetric emergencies, such as Pitocin, magnesium, and misoprostol, available. Processes such as telehealth, policies, provider access, specific training, and available medications may also differ from facility to facility.

Problem

Shutting down obstetric units in rural hospitals, not having women's health specialists, and inadequate resources in the remaining healthcare facilities can have immense consequences. Often, pregnant women who live in rural populations spend a considerable amount of time driving to the nearest facility with obstetric care or the capability to deliver babies. In order to counteract the lack of safe obstetric care in rural settings, specific training in obstetric emergencies and mapped-out policies and steps are essential for a rural facility to be prepared for these emergencies. Creating consistent, sustainable emergency kits among each rural facility may be helpful. According to Kozhimannil et al., when these services are no longer available, the incidences of preterm births, out-of-facility deliveries,

and deliveries at ill-equipped facilities increase (2021). The United States also continues to see inequity problems with race and income levels, which can often be found in rural living areas (Stoneburner, A. et al., 2024). The National Rural Health Association Policy Brief recommends what can be done to prepare for obstetric emergencies in the rural setting. These recommendations include simulation training, maintaining certifications such as ALSO and NRP, and setting up telemedicine options, policies, and emergency-related kits (Lamb et al., 2023). Thenuwara et al. describe the training in rural settings as high-risk obstetric training, which includes the fact that this situation will not happen often and that the training happens within the facility, and it may happen (2022). Unfortunately, inadequate obstetric emergency training, lack of maternity and obstetric care offered rurally, and an insufficient amount of obstetric-trained providers will continue to contribute to maternal mortality and morbidity rates in the United States, especially in rural areas.

Significance

Regrettably, consistency in the provision of obstetric care throughout the United States is lacking, and Montana is no exception. According to the March of Dimes, 56.5% of the babies born in Montana are from women who live rurally (Fontenot et al., 2023). Because of the large rural population, obstetric emergencies will continue to present unexpectedly in rural facilities. Fontenot et al. (2023) also explain that 39.4 % of women living in Montana have at least one chronic health condition or more. This is higher than the United States' percentage of women having chronic conditions, which is 37.8%. Thus, some women are entering pregnancy with chronic conditions, and their pregnancies are considered high-risk. Pregnant women living rurally will drive long distances for obstetric care often. “In addition to the financial strain and heightened stress and anxiety with increased distance to care, the risk of adverse maternal outcomes and neonatal intensive care unit (NICU) admission has been shown to increase with longer travel distances and time to care, even after adjusting for patient characteristics, pregnancy risk, rurality, neighborhood characteristics and delivery hospital NICU acuity” (Fontenot et al., 2024, p. 2).

Moreover, rural facilities do not have consistent or adequate training, medications, and equipment to treat an obstetric emergency when they present. Thenuwara et al. (2024) state, “For the non-OB trained providers in the EDs, training should focus on fundamental knowledge of OB to provide basic emergency skills, to stabilize and prepare patients for transfer to a higher care facility” (p. 938). The lack of obstetric care in rural settings, the distance pregnant women are traveling for care, and the need for adequate training for caregivers in rural facilities continue to affect maternal mortality and morbidity rates and the need for adequate training, education, and equipment in rural healthcare facilities.

Purpose/ Aim

This scholarly project aims to improve emergent obstetric preparedness in rural underserved hospital settings. “Creating regional health care networks ... in rural counties or regions could address these needs. To do so will require engagement between rural hospitals, regional hospitals that provide obstetric services, acute and primary, and local and regional public health, tribal health, and payer groups to develop innovative strategies to ensure safety for emergency births in rural US communities” (Kozhimannil et al., et al., 2021, p. 392). The Agency for Healthcare Research and Quality defines Team STEPPS as “an evidence-based set of teamwork tools aimed at optimizing patient outcomes by improving communication and teamwork skills among healthcare teams, including patients and family caregivers” (n.d.). Adequate training and clear steps will guide a rural healthcare team to navigate one when an obstetric emergency presents.

Chapter 2- Literature Review

Overview

Chapter two discusses the literature on rural healthcare facilities and how they can be better prepared for obstetric emergencies. This literature review will include a search strategy, theoretical framework, search results, literature synthesis, and summary of the findings. The search strategies were

focused heavily on rural healthcare and obstetric emergencies, which provided optimal references in this literature review. Also, the Rural Nursing Theory emerged as the theoretical framework. As the literature was synthesized, evident themes were found. These themes included that lack of maternity care in rural settings leads to adverse outcomes for these women. Furthermore, the United States continues to have a higher maternal mortality and morbidity rate among countries with higher incomes. Rural healthcare continues to shut down access to obstetric care, which has led to this higher rate. Finally, the literature revealed that training and education are needed in rural healthcare facilities for obstetric emergency preparedness.

Search Strategies

Research information for this scholarly project was gathered through a search of Montana State University's and Intermountain Healthcare's online library databases. The primary search on this database included "obstetric emergencies in rural healthcare facilities." A further search included a Montana State University librarian helping facilitate a search through the Web of Science database. The Web of Science database search resulted in twenty-three articles referencing rural healthcare and obstetric emergencies. During database searches, keywords used included "rural healthcare," "rural healthcare facilities," "obstetric emergencies," "obstetric emergencies in rural healthcare facilities," and "OB Team Steps."

The searches were narrowed by the date, including information and articles from 2019-2024. Dissertations and thesis papers were excluded from the search. Grey literature was not used in this scholarly project.

Theoretical Framework

The Rural Nursing Theory developed by Winters and Lee provides an avenue for the framework of this scholarly project. Winters and Lee established the rural nursing theory in 1989. Foli describes this

theory as highlighting the rural environment (2021). “Rural residents are self-reliant and make decisions to seek care based on self-assessment and the resources needed and available. The role of the nurse is characterized by lack of anonymity and role diffusion” (Foli, 2021, paras. 1). Residents who live rurally often do what they want regarding their health and may not seek care adequately. Often, people who live rurally experience familiarity, have relationships with providers and may be well-known in the community. Also, these healthcare providers can have the same experience in reverse. This is the lack of anonymity that the rural nursing theory describes. “As such, rural nurses need to recognize how breaking a trusting relationship will influence the ability to ensure patient privacy and confidentiality” (Winters, 2022, p.62). Healthcare providers in rural settings must balance their relationships with patients to allow that anonymity to remain intact and keep a trusting relationship so the patient feels that confidence of privacy.

The Rural Nursing Theory describes how rural nursing often lacks adequate resources to provide patients with thorough care. Specialty services are usually not supplied in rural healthcare, and educational opportunities for healthcare professionals are less prominent. Medical professionals in rural settings often function in many roles and have a more generalized background. According to the Rural nursing theory, healthcare providers who practice rurally must approach healthcare more holistically. They will need to go beyond just the medical care to help make sure patient needs are met. Moreover, these nurses and other medical professionals must advocate for their patients and communities. Often, healthcare providers may need to be community leaders to advocate for the patients they see. The theoretical framework shows that nurses and other healthcare workers must be adaptable with fewer resources. The theory highlights how rural healthcare needs specific educational opportunities to provide adequate care in the rural setting, especially in instances of obstetric emergencies. For example, in Montana, where the rural population is forty-four percent (Montana State Legislature, n.d.), healthcare providers with a more generalized healthcare background need to advocate for the necessary

training and education to adequately treat and stabilize an obstetric emergency. This will allow for increased skills of the healthcare staff in these facilities and help bridge the care for pregnant women living rurally to higher levels of care. “High-fidelity simulation can improve maternity nurses' perceived self-efficacy in managing emergency obstetric clinical situations” (Ehmke et al., 2021, p. 150).

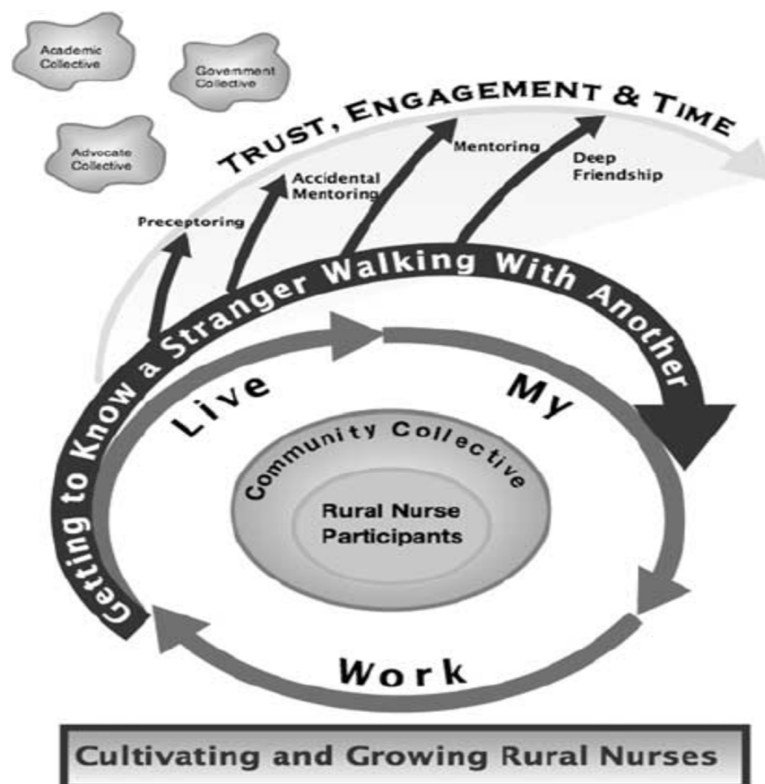


Figure 1. Rural Nursing Theory (Mills, 2009)

Synthesis of Literature

Literature relevant to this scholarly project focuses on the gaps found in rural healthcare facilities with obstetric care. Garcia et al. (2022) explain that many hospitals have closed their labor and delivery units, which has led to a lack of access to obstetric care. These gaps can lead to a lack of preparedness for obstetric emergencies in the rural healthcare setting. Moreover, the gaps found in obstetric care in

rural communities contribute to the already high rate of maternal mortality and morbidity in the United States. Different themes emerged during this literature review, including the lack of maternity care in rural areas leading to unfavorable outcomes, training needed in facilities where obstetric emergencies happen infrequently for skill base, and maternal mortality and morbidity rates being high in the United States. Unfortunately, research on the lack of maternity care in rural settings, maternity care deserts, and the training needed for rural facilities to treat obstetric emergencies successfully is limited. Current information does not include many longitudinal studies because rural facilities have shut down their obstetric access in more recent years. Also, more studies are needed to examine the intervention provided for rural healthcare facilities to help in emergent obstetric situations.

Lack of maternity care leads to adverse outcomes

Most of the literature reviewed discussed the lack of maternity or obstetric care in rural facilities, which leads to the possibility of unfavorable outcomes. “Loss of rural maternity care is associated with adverse maternal and infant health outcomes. Rural counties that have lost hospital-based obstetric services experienced higher rates of emergency department births, and in rural counties not adjacent to urban areas, increases in preterm birth, a leading cause of infant mortality” (Kozhimannil et al., 2020, p. 197). Kozhimannil et al. found that “In 2014, 54% of rural US counties had no hospital-based obstetric services” (p. 197). This study examined the number of hospitals in rural areas that lost obstetric services from 2014-2108. Rural communities throughout the United States are feeling the loss of obstetric care, and this makes rural healthcare providers less equipped when obstetric emergencies arise at their facilities.

Maternal Mortality and Morbidity Rates High in the U.S.

Another theme discovered in the literature included the high maternal and morbidity rates in the United States. Unfortunately, maternal mortality and morbidity have risen in the United States. “The

US is currently experiencing a maternal health crisis. Maternal morbidity and mortality in the US are higher than in other developed nations and continue to rise” (Owens et al., 2023, p. 1). Again, according to Donna Hoyert, Ph. D., the maternal mortality rate in 2022 was 22.3 deaths per 100,000 live births (2024). As a higher economic country, our maternal mortality rates should be lower. Owens et al. (2023) continue to explain that rural areas of the United States have higher maternal morbidity and mortality rates. One contributing factor to these high rates is the lack of obstetric care in rural areas throughout the United States. Garcia (2022) states, “The lack of maternal health care in rural America can also result in several adverse maternal and infant outcomes including premature birth, low birth weight, out of hospital births, maternal and infant morbidity and mortality, and increased risk of postpartum depression” (p. 868). According to Meredith et al. (2024), the decreasing access to maternal healthcare in rural living is one of the main reasons maternal mortality and morbidity rates remain high. The high maternal mortality and morbidity rates in rural areas continue due to the lack of obstetric care, which can lead to adverse outcomes.

Training Needed in Rural Facilities

Training and education for obstetric emergencies in the rural healthcare facility setting can be found as another emerging theme in the literature review. Minor et al. (2024) discuss in a randomized feasibility study that simulated education may provide adequate training; “Emergencies, such as postpartum hemorrhage, occur less frequently in non-teaching, rural, and urban low-birth volume hospitals. There is an urgent need for accessible, evidence based, and sustainable inter-professional education that creates the opportunity for clinical teams to practice their response to rare, but potentially devastating events” (Minor et al., 2024, p. 100357). Rural hospitals do not see obstetric emergencies regularly, and mismanagement can be catastrophic when these emergencies are present. According to Minor et al. (2024), virtual or direct simulation training improves the awareness and understanding of those involved.

The last theme revealed in the literature is the use of standardized procedures. Opportunities for training aid in developing critical thinking skills, hands-on skills, and how providers react cognitively in an obstetric emergency (Garcia et al., 2022). In-person training also gives providers time to reveal where there might be prospects for changing behaviors that need refinement. In line with training and simulations is a tool kit called Team STEPPs. The Agency for Healthcare Research and Quality states that Team STEPPS stands for “team strategies and tools to enhance performance and patient safety” (n.d). These steps provide a way for teams to enhance better communication, help to create a clear leader during an obstetric emergency, and provide clear roles to the team. “Routine use of emergency drill toolkits can improve patient safety outcomes as a result of communicating frequently through SBAR, using closed-loop communication, learning from each performance outcome, and continually striving to learn” (Goering, 2019, p. S31).

Summary

Rural living continues as a way of life throughout the United States; however, rural healthcare access continues to be a growing problem. Rural healthcare facilities are challenged to provide high quality, safe care during an obstetric emergency. The lack of access to obstetric care for many women leads to increasing rates of maternal mortality and morbidity throughout the United States. Furthermore, the gaps in maternity care for women living rurally lead to many adverse outcomes. A review of the literature reveals gaps in maternity access, and the ever-growing maternity deserts. This scholarly project will identify ways to aid in preparing rural healthcare facilities in being better prepared for the obstetric emergencies. Educational opportunities through virtual or in-person training and simulations and the introduction of obstetric-based Team STEPPS will help with facility preparedness. This will aid in the reduction of maternal mortality rates.

Chapter Three

Overview

This project aims to provide support to rural facilities, helping them better prepare for obstetrical emergencies, including antepartum, intrapartum, and postpartum hemorrhages, precipitous deliveries, malpresentation deliveries, and eclamptic seizures. To achieve adequate preparedness, the researcher implemented various processes to provide education and ensure the availability of proper equipment and medications in rural facilities. During an examination of the microsystem, evidence revealed that rural facilities are not adequately prepared for obstetric emergencies when they arise. In a state like Montana, the population is forty-four percent rural (Montana State Legislature, n.d.). Also, the microsystem revealed Montana to have large areas of maternity care deserts, long drives to obtain prenatal care, smaller amounts of medical professionals that provide care in rural facilities, and rural healthcare facilities that need education and equipment to treat obstetric emergencies. The researcher found during the literature review that rural healthcare facilities are often challenged by the lack of available obstetric care, leading to possible adverse outcomes and limited education opportunities for rural caregivers to navigate obstetric emergencies successfully. Virtual or in-person training opportunities and simulations, along with access to essential equipment and medications, will help the facility prepare for these obstetric emergencies.

Design of the Quality Improvement Project***Project Design***

This project will be implemented through the regional hospital in Billings, MT, and include rural facilities in neighboring counties. The project will focus initially on one facility, the Northern Cheyenne Health Clinic in Lame Deer. This facility is where obstetric transports may need to be transferred for obstetric care. The regional hospital's labor and delivery nurse educator and nurse clinical leader will facilitate the project. The project will initiate a survey and pre-quiz to determine the facility's primary

educational needs related to obstetric emergencies. The regional hospital will prepare binders with OB STEPP directions to distribute to the facility during training. Furthermore, the regional hospital educator and nurse clinical leader will facilitate training at the clinic, including critical background education for specific obstetric emergencies and team training for critical events at the facility. The Critical Events Team training is a simulated training exercise of an obstetrical emergency, presenting a case in which the team will conduct a drill-through and then reconvene for a follow-up discussion. The nurse educator and clinical lead will ensure the facility has the essential equipment for neonatal resuscitation, as well as medications such as magnesium for eclamptic seizures and Pitocin, TXA, and Cytotec, which can aid in postpartum hemorrhages.

Setting and Target Population

This educational quality improvement project will be implemented in rural facilities that lack access to obstetric care, and it will commence by trialing the project in one facility. Often, rural facilities in Montana are clinics only. They may offer a small critical access component, such as their clinic or an emergency room. Since most rural facilities do not provide maternity care, caregivers and providers often lack solid training in obstetric emergencies. In chapter one, a microsystem assessment was done, and it was determined that rural Montana includes pregnant women during the full spectrum of pregnancy. These women may or may not have adequate prenatal care. Pregnant women who live rurally have to drive several miles to get their care and also to labor and deliver in a facility that has maternity care. Unfortunately, pregnant women may develop an obstetric emergency, or labor ensues quickly before getting to a facility with adequate maternity care. They will present to the nearest rural facility during the emergency, where the staff may not have sufficient training for obstetric emergencies. These patients and caregivers are the target population for this project, serving as stakeholders. Education will enable caregivers to provide essential care during obstetric emergencies, ensuring

patients are stabilized effectively for transport to a higher level of care. Bragg et al. (2024) explain that yearly education and mapped-out instructions can improve emergency outcomes.

Stakeholders

This project will involve multiple stakeholders beyond patients and caregivers. The researcher will need to engage with the regional hospital labor and delivery unit manager to ensure that the nurse clinical leader and the nurse educator can carry out this education while maintaining their work within the hospital. After this discussion, the project information will then need to be presented to the regional hospital's appropriate leadership and then forwarded through the financial manager for approval, ensuring the project is valuable to the hospital. The researcher will need to ensure that these stakeholders understand that this project will help build a relationship with the outlying rural facilities, thereby giving these facilities confidence in transferring pregnant patients to the regional facility.

Furthermore, the rural facilities that the project hopes to reach are among the stakeholders who will need to approve of this quality improvement project. The relationship with these rural facilities will need to be built on a foundation of trust. This project will help enhance the skills they may already possess. The project is not intended to make these caregivers feel like they are not doing their job well. Still, it will help bridge the gap in the lack of education provided for obstetric emergencies, especially when the facility does not offer this specialty.

Finally, as the team enters these facilities to provide education and simulated training in the rural setting, they will need to reassure caregivers that they are there to support them and the pregnant women who may present with an obstetric emergency at their facility. Essentially, the project team will become part of the facilities team they are providing education for, and build a trusting relationship with these caregivers to ensure that the training is successful and that they will be welcomed back for further opportunities.

Planning

Problem and Intervention Statement

The large rural population in Montana can make it challenging for patients to access facilities that offer adequate maternity care throughout every stage of pregnancy. Moreover, the distance to reach maternity care facilities can be very lengthy. Pregnant women may not have the time to drive to a facility equipped for their needs. Instead, they may need to present to a rural facility in the event of an obstetric emergency. Rural facilities are often unprepared for obstetric emergencies and lack the adequate training and equipment necessary to care for these patients effectively. Thus, this quality improvement project aims to equip rural healthcare facilities with the resources needed to better prepare for obstetric emergencies when they arise. Providing simulated education through critical events training and offering an essential medication and neonatal resuscitation bundle will help these facilities during these obstetric emergencies.

Theoretical Framework

As previously discussed, the Rural Nursing Theory serves as the theoretical framework guiding this quality improvement project. This framework emphasizes the rural environment (Foli, 2021). The Rural Nursing theory encompasses several key concepts, including isolation and distance. Also, these rural facilities may feel self-reliant and independent. The Rural Nursing Theory has found that healthcare facilities in this environment lack the resources to provide the most thorough care needed. Furthermore, rural caregivers face a more challenging time accessing the proper educational opportunities for the patients in their care. Rural caregivers may need to be advocates for quality and effective care in their communities. This advocacy includes seeking educational opportunities, such as simulation training, to enhance their skills in critical situations, including obstetric emergencies. These simulation training

pieces, OB STEPPs binders, and emergency bundles will help rural caregivers effectively treat obstetric emergencies and stabilize patients until they can be transferred to a higher level of care.

This quality improvement project will empower the rural facility by enabling a more effective response to obstetric emergencies through education and simulated training. In rural nursing theory, there is a strong sense of the environment, and promoting the educational environment of healthcare facilities with this project will bring caregiver assurance. Essentially, it helps to mitigate the feeling of isolation. Moreover, the project supports the Rural Nursing Theory framework by promoting the values of independence and self-sufficiency, which it relies on. The rural nursing theory emphasizes the importance of freedom and self-sufficiency in healthcare workers by recognizing the need for autonomous decision-making and broad skillsets due to limited resources and support in rural settings. Also, the project will help bridge the gap of the lack of resources that rural facilities often face. This project exemplifies Rural Nursing Theory in action by acknowledging rural realities, including distance, resource limitations, and cultural values, and fostering sustainable, respectful partnerships between regional and rural healthcare systems. The approach recognizes the strengths of rural providers while enhancing their ability to respond to high-stakes obstetric events, ultimately improving maternal and neonatal outcomes in a manner that respects rural identity and autonomy.

Possible Challenges or Complications

Challenges may arise during the implementation of this improvement project. To gain funding, the project must be presented to hospital leadership and the financial team. There may be pushback from the regional hospital, as they may not view the project as a financial gain. The project team will need to demonstrate the importance of establishing a relationship with these rural facilities and provide them with education, medications, and supplies, ultimately benefiting the regional facility. The project will initially focus on a single facility, enabling an evaluation of its effectiveness. Focusing on a single pilot

facility for a quality improvement project in healthcare is effective because it allows for controlled implementation, close monitoring, and iterative refinement of interventions before broader scaling, thereby increasing the likelihood of success and sustainability. The project will facilitate essential collaboration between the regional hospital and the rural facility and will implement educational initiatives. The education will enable this facility to stabilize patients effectively before transfer of care. The project aims to ensure that this is a collaborative effort and will continue to offer this educational opportunity annually if found helpful.

Further challenges of this project include persuading the rural facility to accept the education and training provided. Oftentimes, rural facilities have a sense of independence. They are used to working with what they have. There may be some initial struggle with buy-in and the changes that come with this project. The rural facility may need to change practice and the policies and procedures they have after the training is done, which can be time-consuming. Therefore, the regional facility project coordinators will need to provide sufficient documentation to demonstrate the effectiveness of this education and training for them. Financial gains will be calculated and outlined as a form of persuasion, highlighting that the facility with this intervention will realize cost savings on patient care. This quality improvement project will allow the facility to stabilize the patient before transport, effectively reducing the use of excess items during the emergency. Thus, the regional facility may not need to provide those initial stabilization steps, and reduce costs for them. Also, the facility in Lane Deer is part of the Indian Health Services. This may require a longer process to obtain all the necessary components, enabling our staff to provide education in that facility. This, in turn, may alter the timeline of the project's implementation. Indian Health Service facilities often take longer to allow outside caregivers access due to a combination of regulatory, federal, and even cultural considerations.

Implementation

Step-by-step Plan, Data Analysis, Timeline, and Budget

The project's facilitator will contact the Lane Deer Clinic to explain the project's details. This will allow the rural facility to understand the project first, and then they can determine if they are interested in moving forward with this opportunity. The implementation process of this project will begin by sending a letter and a pre-quiz/survey (see Appendix C) to the chosen facility to initiate this program. The letter will include the facility's return of the pre-quiz/survey within a month. Evaluating the preparedness of a rural healthcare facility in Montana for obstetric emergencies is crucial for ensuring the safety of both mothers and newborns. This information will assess the knowledge and preparedness of rural facilities for obstetric emergencies.

Next, after receiving the information, the nurse educator will outline an agenda for the all-day training session. The timeline includes completing the training at each facility within a six-month period, as outlined in Appendix E. OB STEPPS binders are available in every labor room at the regional hospital, making this step straightforward, as binders will be created based on the existing materials. Similarly, the regional hospital conducts annual critical events training for its staff. This educational, simulated training can be easily adapted for use in a rural facility. Each facility will be provided with three OB STEPPS binders, which reference the critical steps required for specific obstetric emergencies.

Following the STEPPS training, a kit will be provided to each facility, which includes the medication magnesium, which is used for seizure prevention in pregnant women with preeclampsia, women who have already had an eclamptic seizure, or for neuroprotection of a fetus less than thirty-two weeks. Oxytocin (Pitocin), misoprostol (Cytotec), and Tranexamic acid (TXA) will be provided, as these are medications used to combat postpartum hemorrhage. A bag-valve mask, bulb suction, umbilical cord clamps, and thermal blankets will also be included in the kit. The total cost per facility for the regional hospital to budget the quality improvement project will be approximately \$2,143.00 (Appendix F).

Finally, after the initial session is completed at the facility in Lame Deer, the use of the medications and equipment provided will be evaluated during the six-month follow-up. This will help project facilitators determine if this is a necessary component for the project before proceeding to other facilities.

Evaluation and Outcome Measures

At the end of each training session, a post-quiz and evaluation tool (see Appendix D) will be provided and collected to gauge the effectiveness of this quality improvement project. This will enable educators to assess the effectiveness of the sessions and identify any topics that may need to be included in future training sessions. The post-quiz will allow project coordinators to assess the effectiveness of the education by showing an improvement in correct answer scores. An improvement in the scores will enable facilitators to enhance their education and simulation process, thereby providing rural caregivers with adequate education and skills. Additionally, the evaluation tool that rural facility staff complete will help identify the project's strengths and areas for improvement. Six months after the training is completed, the nurse educator will contact the facility's designated person to assess progress and determine if there have been opportunities to apply the training.

Measure relation to goal/aim and Expected Results with Improvement

The evaluation tools and post-quiz demonstrating increasing results will prove the practicality of the simulation sessions. The project facilitators will aim to see an increase in the accuracy of answers during the post-quiz by at least 20 percent. Additionally, the evaluation tool enables the team to identify the qualitative aspects of the education. This tool will highlight the strengths and weaknesses of various aspects of education, including whether caregivers felt the education was relevant to the facility, whether it enhanced their confidence, and whether it improved their communication skills. Furthermore, the follow-up phone call will provide each facility with another opportunity to discuss the effectiveness of this education in preparation for obstetric emergencies. The pre-quiz and post-quiz will

show that the educational components of the training sessions are practical. The evaluation tool will also enable educators to assess whether their teaching is effective.

Summary

Chapter three illustrates that, after reviewing the microsystem assessment and using the Rural Nursing Theory as the framework, virtual or in-person training opportunities and simulations, along with access to essential equipment and medications, will help the facility prepare for these obstetric emergencies. “High-fidelity simulation supports nurses' knowledge, thinking, psychomotor abilities, and personal self-efficacy development.” (Ehmke et al., 2021, p. 151). The Rural Nursing Theory suggests that caregivers need to advocate for this educational opportunity to gain knowledge and provide patients with optimal care, especially during obstetric emergencies. Chapter Four will illuminate the effectiveness of this quality improvement project and how rural facilities will feel better prepared for their next obstetric emergency.

Chapter Four

The purpose of this project was to assist rural facilities in enhancing their preparedness for obstetric emergencies when they present to their facilities. According to the March of Dimes, “more than 2 million women of childbearing age live in maternity care deserts, areas without access to birthing facilities or maternity care providers. Access to maternity care is essential for preventing poor health outcomes and eliminating health disparities” (Fontenot et al., 2023, p. 1). The increasing number of maternity care deserts highlights the foundational need for rural facilities to be prepared for obstetric emergencies. This quality improvement project aims to provide support to rural facilities in Montana

through education and simulated training, enabling them to be better prepared for obstetric emergencies. Chapter four will provide a summary of the project's key aspects, including significant findings from the literature review, the application of Rural Nursing Theory as the framework, challenges that may impact the implementation and evaluation process, and the project's anticipated impact on stakeholders and rural facilities utilizing the education. Moreover, the clinical nurse leader's (CNL) role will be examined, including how it correlates to this project's development and the project's relation to the CNL's competencies.

QI Project Summary

During the microsystem assessment, the investigator found that rural healthcare facilities are essential to Montana's rural population. Once again, the investigator revealed that Montana is largely rural, with 44% of the population residing in rural areas (Montana State Legislature, n.d.). Due to the vital care that rural healthcare facilities provide, it is crucial for their caregivers to be equipped with the necessary knowledge, medications, and equipment to treat obstetrical emergencies. The microsystem assessment revealed that most rural facilities were not adequately prepared for an obstetric emergency upon arrival. Evidence from Donna L. Hoyert, PhD. (2022) shows in the microsystem assessment that the United States has an alarmingly high maternal mortality rate of 22.3 per 100,000 live births, and this rate is the highest of developed countries in the world. Furthermore, Lamb et al. (2023) revealed that from 2011 to 2016, mortality ratios were higher in rural areas. These alarming statistics drove the investigator to propose that rural facilities need aid in providing preparation through educational training to become better prepared for women who arrive at their facility with an obstetrical emergency. The research supported providing this training and education through simulation at the facility.

The investigator's literature review revealed that the lack of maternity care in rural populations is associated with adverse outcomes. Rural facilities often lack providers who are explicitly trained in

obstetric care, leaving them less equipped to handle obstetric emergencies. Kozhimannil et al. (2020) discussed how the loss of obstetric care in rural facilities has increased adverse maternal and infant outcomes. The lack of maternity care and healthcare providers being ill-equipped also contributes to the high rate of maternal mortality and morbidity in the United States, as the research revealed in the literature review. Owens et al. (2023) revealed that there is a crisis in maternal health in our country. The increase in maternity care deserts in the United States will continue to contribute to the already high rates of maternal mortality and morbidity.

Lastly, the literature echoed an emerging theme: training is needed in rural facilities for obstetric emergencies. Since caregivers in these rural facilities do not frequently encounter obstetric emergencies, simulated education can be beneficial. Additionally, the Rural Nursing Theory, which serves as the theoretical framework, explains that rural healthcare requires specific educational opportunities to provide adequate training in rural settings. Moreover, this theory suggests that nurses and other medical professionals may need to become advocates in their communities, thereby advocating for educational opportunities and enhanced training. Minor et al. (2024) describe how in-person simulation training enhances awareness and understanding of the emergencies in which they may be involved. The education and training will also allow the caregivers to refine their practice. Learning through simulated training and implementing Team STEPPS will help the facility achieve standardized practice, establish clear roles, and foster effective communication. Additionally, this quality improvement project will empower the rural facility by enabling a more effective response to obstetric emergencies through education and simulated training, allowing them to continue enhancing their values of independence and self-sufficiency, which are cornerstones of the Rural Nursing Theory.

Discussion

The literature review revealed supportive evidence that rural facilities need increased educational opportunities to improve their preparedness for obstetric emergencies. Unfortunately, obstetric units in rural facilities are being shut down throughout the United States, leaving these facilities lacking in this specialty and the necessary education to care for patients when they arrive. Kozhimannil et al. (2021) explain that the number of preterm births, out-of-facility deliveries, and deliveries at ill-equipped rural facilities increases when the services are no longer available. Furthermore, Garcia et al. (2022) note that inadequate access to obstetric care has increased due to the closure of many labor and delivery units. These growing gaps lead to a lack of obstetric emergency preparedness.

The literature did not reveal conflict about rural facilities needing educational opportunities to increase their preparedness for obstetric emergencies. However, the review did reveal whether virtual versus in-person training would differ in effectiveness. The review found that “there is an urgent need for accessible, evidence-based, and sustainable inter-professional education that creates the opportunity for clinical teams to practice their response to rare but potentially devastating events” (Minor et al., 2024, p.2). This urgent need for educational opportunities aligns with the Rural Nursing Theory’s description of the need for more educational resources in rural settings, which often lack specialty services. The literature review prompted the investigator to initiate this quality improvement project to implement simulated training and education at the facility. This will allow the facility to know what an emergency may be like in their environment. However, the Rural Nursing Theory also acknowledges the cultural values of rural communities, such as independence and self-reliance, which may present initial resistance to external educational initiatives. This highlights a potential challenge: while the theory supports the need for such education, it also calls attention to the importance of delivering it in a manner that respects rural values and fosters trust, to promote acceptance and long-term impact.

Implications and Recommendations

Skill-based education and simulation are crucial for ensuring that healthcare facility staff can provide adequate patient care. In rural healthcare facilities, caregivers may need this education for patients and emergencies they do not typically see. Due to the increasing size of maternity care deserts in the United States, particularly in Montana, rural facilities require adequate education and training on obstetric emergencies. This project focuses on facilitating a simulated educational opportunity, including obstetric-based TEAM STEPPS, crucial obstetric-based medications, and supplies to help rural facilities better prepare for obstetrical emergencies. The success of this project at the proposed facility will allow the educational process to be replicated in other rural facilities. This education and simulated training will enable the rural facility to succeed during obstetric emergencies and stabilize patients more effectively for transfer.

Gaps in implementing education regarding obstetric emergencies in rural facilities include the limited amount of literature discussing the type of education that may be most effective to implement and how to deliver it. Further research should focus on the advantages of in-person education versus virtual education. Also, each rural facility may have different educational needs. Recommendations will include a thorough intake of each facility for focused-based learning. Finally, piloting this quality improvement project in one facility initially will allow the project coordinators to dedicate time and effort to understanding the effectiveness of the education, simulated training, and medication and equipment bundle.

As previously discussed, potential barriers include obtaining the stakeholders' buy-in to this project. The stakeholders include the facility providing education and offering medications and equipment. These stakeholders want to ensure this will be a successful endeavor because they will provide the funds to facilitate the project. An adequate evaluation tool and follow-up will be necessary. Additionally, the rural facilities will need to invest in the project. These stakeholders may need to adjust

practices, change policies, and procedures once the education is done. There may be resistance to change.

CNL Roles

The American Association of Colleges of Nursing (AACN) describes the clinical nurse leader as accountable for patient outcomes through practice that will vary from setting to setting (2013). Their role involves using evidence-based practice to manage patient care, create quality improvement projects, and use precise data to help achieve essential outcomes (AACN, 2013). The AACN provides core competencies for the CNL role. This project has used several core competencies explained in the competency expectation the AACN provides. First, an essential skill the CNL must have is organizational and systems leadership. Within this competency, the CNL will “evaluate the efficacy and utility of evidence-based care delivery approaches and their outcomes at the microsystem level” (AACN, 2013, p. 11). Furthermore, quality improvement and safety are among the nine core competencies for the CNL role. This competency applies to this project in many ways, such as an in-depth look into the microsystem. The clinical nurse leader will be driven by evidence-based research to improve the education and training in rural facilities for obstetric emergencies with this competency's components. The CNL will encourage continuous quality improvement through each facility where the training happens and enable the facility to promote its own improvement. Finally, this project allows the CNL to show how interprofessional collaboration is essential for success. This collaboration must happen within their home healthcare environment and the rural facilities they are assisting. The goal for this project is the base of this competency of improving patient and population outcomes. This quality improvement project will equip the rural facility team with essential training, education, and resources to treat obstetrical emergencies adequately.

Conclusion

This quality improvement project aimed to help rural facilities better prepare for obstetric emergencies. Throughout the project, the significant rates of maternal mortality and morbidity within the United States were discussed, highlighting the need for better preparation in the rural setting. Moreover, the project showed the growing number of maternity care deserts found in the U.S., specifically in Montana. The high rate of maternal mortality and morbidity and the increased lack of obstetric care in rural areas highlight the need for simulated education and the implementation of TEAM STEPPS in rural facilities. The education and simulated training provided within each facility will enable rural caregivers to tailor the training to their specific environment, resulting in improved outcomes. Furthermore, the medication and equipment bundle offer the necessary components to aid in obstetric emergencies, such as seizure prevention and helping to slow or stop a postpartum hemorrhage. This project enables rural facilities to be adequately prepared for obstetric emergencies that may arise at their location. The project also fosters a meaningful relationship with the facility to which the patient will be transferred when stabilized for a higher level of care.

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Appendices

Appendix A

Definition of Terms

- ALSO- Advanced Life Support in Obstetrics (Lamb et al, 2023)
- NRP- Neonatal Resuscitation Program (Lamb et al., 2023)

Appendix B**Evidence Table**

Full Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
Fontenot, J., Brigance, C., Lucas, R., & Stoneburner, A. (2024). Navigating geographical disparities: access to obstetric hospitals in maternity care deserts and across the United States. <i>BMC Pregnancy and Childbirth</i> , 24(1). https://doi.org/1		Retrospective analysis	5 yr. fertility estimate U.S. Census Bureau 2017-2021 American Community Survey	Travel distances geographically, per miles, drive time, drive time by maternity care desert designation, rurality, race, and ethnicity	Spatial analysis techniques	Mapping travel distances and time to reach obstetric care hospital, 3,991, 060 birthing people identified among 85, 396 census tracts. Obstetric hospitals geocoded with a match score of 99%		Strengths included validated data sets. Population-weighted centroid locations, and transport network analysis, allowed real-time information. Limitations- some info on distances was not exact representations of certain ethnic groups, underestimated distances due to not exact addresses

0.1186/s12884-024-06535-7								
Garcia, K. K., & Hunter, S. K. (2022). Proposed Solutions for Improving Maternal Health Care in Rural America. <i>Clinical Obstetrics & Gynecology</i> , 65(4), 868–876. https://doi.org/10.1097/GRF.000000000754	N/A`	Proposed solutions	N/A	N/A	N/A	N/A	N/A	Article presents proposed solutions to improve maternal healthcare in rural settings • Workforce • Models of care • Technology utilization • Adopting evidence-based improvement measures • Perinatal quality collaboratives • Maternal and mortality review committees • Simulation-based training
Hoyert DL. Maternal mortality rates in the United States, 2022. NCHS Health E-Stats. 2024. DOI: https://dx.doi.org/10.15620/cdc/152992	N/A	National Vital Statistics	Data collected from National Vital Statistics	Death while pregnant or within 42 days of end of pregnancy	817 women died in 2022	Mortality rates figured per 100,000 live births	22.3% maternal mortality rate in 2022	Based on actual statistics through the National Vital Statistics

James, J., Schultze, S. R., Lee, A., Perkins, A., & Daniel, C. L. (2024). Proximity to Hospital-Based Obstetric Care in a Maternity Desert in the Deep South. <i>American Journal of Public Health.</i> , 114(S4), S330– S333. https://doi.org/10.2105/AJPH.2024.307692		Statistics collected from the Alaba ma Public Health Center	Data collected from Alabama Public Health Center and Health Statistics	Driving distance from maternal address in Alabama county to hospital, type of insurance, facility births, out-of- hospital planned or unplanned	Number of variable per the 370 births.	2019-2021, 370 births for women in a specific county	Found that median driving distance was 23 miles, however 18% drove 70+ miles, 70% of women had insurance, 81% of the deliveries were in 3 different hospitals	Strengths: showed that women in this county experienced significant problems getting to prenatal care Limitations: specific addresses were not used for exact measurements
Kozhimanni I, K. B., Interrante, J. D., Tuttle, M. S., Henning-	N/A	Used 2027 American Hospital Associatio n statistics	2017 Annual Hospital survey results	Hospitals were identified as having one obstetric bed or greater vs none	Number found per variable/ number of hospitals identified	P for all comparison s < .001	51% of rural hospitals do not provide obstetric services	Strengths: data provided critical knowledge on rural hospital status and obstetric care Limitations: there could be respondent bias, data was only for one year, data not reflective of hospital capacity

Smith, C., & Admon, L. (2020). Characterist ics of US Rural Hospitals by Obstetric Service Availability, 2017. <i>American Journal of Public Health., 110(9), 1315–1317. https://doi. org/10.210</i>								
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Kozhimanni I, K. B., Interrante, J. D., Tuttle, M. K. S., & Henning-Smith, C. (2020). Changes in Hospital-Based Obstetric Services in Rural US Counties, 2014-2018. <i>JAMA : The</i>	N/A	Data collected from survey	2014-2018 American Hospital Association (AHA) annual survey, the Centers for Medicare & Medicaid Services' Provider of Services File, and the Area Health Resources File	Hospitals having obstetric care with at least 10 births/yr vs none	6233 hospitals (2041 rural and 4192 urban hospitals) in all 3145 US counties (1976 rural and 1169 urban counties)		Least populated areas surrounding urban areas losses of OB services were more.	Limitations: using a county as a unit of analysis. Also, lack of clinical data on outcomes of service loss and sociodemographic and community data.

<i>Journal of the American Medical Association.</i> , 324(2), 197–199. https://doi.org/10.1001/jama.2020.5662								
Lamb, E., Merwin, M., Mumford, Q., Thach, S., Fritz, A., & Henning-Smith, C.	N/A	Rural health policy document	n/a	n/a	n/a	n/a	n/a	Obstetric readiness in the rural community without labor and delivery in their hospital

(2023, February). <i>Rural Health Policy Documents: Obstetric readiness in rural communitie s lacking hospital labor and delivery unit: National Rural Health Association - NRHA: NRHA.</i>								
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Meredith, M. E., Steimle, L. N., & Radke, S. M. (2024). The implications of using maternity	N/A	Optimization models, data collection	Information gathered from data collected from Georgia Department of Public health reports	Location of hospital providing obstetric care, location and distance to obstetric care, maternity care desert,	Population numbers in Georgia counties of reproductive age women, numbers of women per major variable	.5% of reproductive age women in Georgia live in maternity care desert areas, 7.9% have a 50 mile or greater	5.5% of reproductive age women in Georgia live in maternity care desert areas, 7.9% have a 50 mile or greater drive to critical care access	Strengths: was able to show percentage data related to number of reproductive aged women living in rural or maternity desert areas and how far they live from facilities Limitations includes the age of the data being from 2017- more facilities could have closed. Geographical barriers and traffic not

care deserts to measure progress in access to obstetric care: a mixed- integer optimizatio n analysis. <i>BMC Health Services Research.</i> , 24(1). https://doi. org/10.118 6/s12913- 024-11135- 4								
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Minor, K. C., Bianco, K., Mayo, J. A., Abir, G., Judy, A. E., Lee, H. C., Leonard, S. A., Ayotte, S., Hedli, L. C., Schaffer, K., Sie, L., & Daniels, K. (2024). Virtual simulation training for postpartum hemorrhage in low-to-		Randomized feasibility study	8 nonacademic hospitals from Dec. 2021 to Mar. 2022	Direct simulation models train the trainer simulation models of teaching	Multiple-choice questionnaires were given to participants at 1 and 3 months, as well as a survey on confidence levels	Direct-79%+/-13 versus 75%+/-14, respectively, P-value=.45) Train the trainer-79%+/-13 versus 75%+/-14, respectively, P-value=.45)	The direct simulation had greater scores than train the trainer	Strengths- virtual training was a feasible education process. Direct simulation was the optimal training process.

moderate- volume hospitals in the US. <i>AJOG</i> <i>Global</i> <i>Reports,</i> 4(3), 100357-. https://doi. org/10.101 6/j.xagr.202 4.100357								

Appendix C

Pre-Quiz: Obstetric Emergency Preparedness in Rural Healthcare Facilities

Please complete this quiz and return it to our outreach team in the provided envelope. We will get back to you and arrange a time for educational outreach, including simulated drills for obstetric emergencies at your facility.

1. Emergency Protocols and Training

Does your facility have up-to-date protocols for managing obstetric emergencies such as postpartum hemorrhage, eclampsia, precipitous deliveries, and shoulder dystocia?

- ☐ A) Yes, for all mentioned emergencies
- ☐ B) Yes, but only for some
- ☐ C) No, protocols are outdated or nonexistent

How frequently does your staff participate in obstetric emergency drills or simulations?

- ☐ A) Quarterly
- ☐ B) Biannually
- ☐ C) Annually
- ☐ D) Rarely or never

2. Staffing and Expertise

Is a certified obstetrician or a healthcare provider with specialized obstetric training available on-site or on-call 24/7?

- ☐ A) Yes, on-site
- ☐ B) Yes, on-call
- ☐ C) No

Are nursing staff trained in advanced obstetric care and neonatal resuscitation?

- ☐ A) Yes, all nursing staff
- ☐ B) Yes, but only a subset
- ☐ C) No

3. Equipment and Resources

Does your facility have immediate access to essential obstetric equipment, such as fetal monitors, ultrasound machines, and emergency surgical instruments?

- ☐ A) Yes, all essential equipment is available
- ☐ B) Some equipment is available
- ☐ C) Equipment is outdated or insufficient

Are blood products readily available for transfusion in the event of obstetric hemorrhage?

- ☐ A) Yes, on-site
- ☐ B) Yes, but from an external source

- C) No

4. **Transportation and Referral Systems**

Do you already have an arrangement with a tertiary hospital to transfer patients requiring a higher level of obstetric care?

- A) Yes, with a straightforward protocol
- B) Yes, but protocols are informal
- C) No

How long does it typically take to transfer a patient to a tertiary center?

- A) Less than 1 hour
- B) 1–2 hours
- C) More than 2 hours

Scoring and Interpretation:

- Assign points for each response (e.g., A = 3 points, B = 2 points, C = 1 point, D = 0 points).
- Calculate the total score to assess the facility's preparedness level.
 - **17–24 points:** High preparedness
 - **9–16 points:** Moderate preparedness
 - **0–8 points:** Low preparedness

This quiz helps us identify our strengths and areas for improvement. It will also allow us to see what areas of obstetric emergencies we may provide simulations for to suit your facility's needs better. If you have any areas of obstetric emergencies that your facility sees more frequently or that you may want to focus on, please use the area below to share those ideas. Thank you.

Sincerely,

The Regional Hospital Labor and Delivery Outreach Team

Appendix D

Pre- and Post-Quiz and Evaluation Tool

Pre- and Post-Training Quiz: Obstetric Emergency Management

1. Recognition and Initial Response

A pregnant patient presents with severe range blood pressures and proteinuria. What is considered the first-line medication for managing this condition?

- ☐ A) Labetalol
- ☐ B) Nifedipine
- ☐ C) Magnesium sulfate
- ☐ D) Hydralazine

2. Team Communication and Roles

During an obstetric emergency, which communication technique ensures that critical information is accurately exchanged among team members?

- ☐ A) Closed-loop communication
- ☐ B) SBAR (Situation, Background, Assessment, Recommendation)
- ☐ C) Call-out
- ☐ D) Check-back

3. Management of Postpartum Hemorrhage

What is the recommended initial step in the management of postpartum hemorrhage?

- ☐ A) Administration of uterotonic agents
- ☐ B) Bimanual uterine massage
- ☐ C) Establishing intravenous access
- ☐ D) Transfusion of blood products

4. Shoulder Dystocia Maneuvers

Which maneuver is commonly employed first to resolve shoulder dystocia during delivery?

- ☐ A) McRoberts maneuver
- ☐ B) Suprapubic pressure
- ☐ C) Rubin maneuver
- ☐ D) Wood's screw maneuver

5. Eclampsia Management

In a patient experiencing eclamptic seizures, what is the primary medication used for seizure control?

- ☐ A) Diazepam
- ☐ B) Phenytoin

- o C) Magnesium sulfate
- o D) Lorazepam

6. **Neonatal Resuscitation**

What is the recommended initial intervention for a newborn with a heart rate less than 100 beats per minute?

- o A) Chest compressions
- o B) Positive pressure ventilation
- o C) Administration of epinephrine
- o D) Suctioning of the airway

7. **Documentation and Debriefing**

After managing an obstetric emergency, what is the recommended practice regarding team debriefing?

- o A) Debriefing should occur as soon as possible within that day
- o B) Debriefing is optional and can be skipped if the team is busy
- o C) Debriefing should be conducted only if there are complications
- o D) Debriefing should be delayed until the patient is discharged

After taking the quiz, please fill out the evaluation form below. This will help us with future educational simulation sessions and what you would like to focus on.

Obstetric Emergency Simulation Training Evaluation Form**Facility:** _____**Role:** (e.g., Physician, Nurse, etc.) _____

- The simulation scenarios reflected real-life obstetric emergencies pertinent to our facility.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
- The difficulty of the scenarios was appropriate for my level of experience.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
- The tools and equipment used were similar to those available in our facility.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
- The facilitators demonstrated expertise and provided clear guidance throughout the simulation.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
- The debriefing sessions offered constructive feedback that enhanced my learning experience.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
- The simulation improved our team's communication skills during obstetric emergencies.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree

- o Strongly Disagree
- The training clarified each team member's responsibilities during an obstetric emergency.
 - o Strongly Agree
 - o Agree
 - o Neutral
 - o Disagree
 - o Strongly Disagree
- This simulation training has enhanced my confidence and competence in managing obstetric emergencies.
 - o Strongly Agree
 - o Agree
 - o Neutral
 - o Disagree
 - o Strongly Disagree
- I would recommend this simulation training to my colleagues.
 - o Strongly Agree
 - o Agree
 - o Neutral
 - o Disagree
 - o Strongly Disagree

6. Open-Ended Feedback

- What aspects of the simulation training did you find most beneficial?

- How could the training be improved?

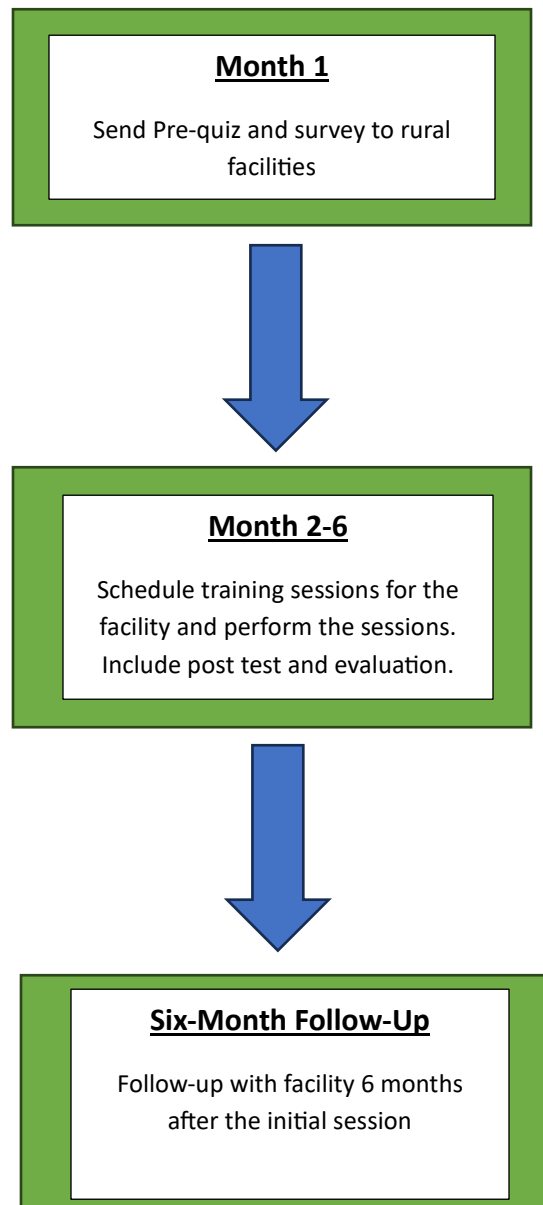
- Please provide any other feedback or suggestions.

Answer Key:

1. C) Magnesium sulfate
2. A) Closed-loop communication
3. B) Bimanual uterine massage
4. A) McRoberts maneuver
5. C) Magnesium sulfate
6. B) Positive pressure ventilation
7. A) Debriefing should occur as soon as possible within that day

Appendix E

Time Line



Appendix F

Budget Proposal for Education Outreach Program for Obstetric Emergencies in Rural Facilities

Objective:

To provide educational opportunities, including simulated obstetric emergency training at rural healthcare facilities in Montana. This training will improve preparedness for obstetric emergencies through hands-on simulation training and resource distribution.

Personnel Costs:

- **Labor & Delivery Nurse Educator**
 - Hourly Wage: \$50/hr
 - Training & Travel Time: 10 hours per facility
 - Total Cost per Facility: \$500
- **Nurse Clinical Leader for Labor & Delivery**
 - Hourly Wage: \$55/hr
 - Training & Travel Time: 10 hours per facility
 - Total Cost per Facility: \$550
- **Total Personnel Cost per Facility: \$1050**

Travel Costs:

- **Mileage Reimbursement (Billings, MT to Rural Facilities)**
 - Estimated Distance: 200 miles round trip (average)
 - IRS Standard Rate: \$0.67/mile
 - Total Per Trip: \$134
- **Lodging (if needed for overnight stays)**
 - \$150 per night
 - Estimated 1-night stay per visit: \$150

- **Meals & Incidentals**
 - Per diem rate: \$59/day
- **Total Estimated Travel Cost per Facility: \$343**

Equipment & Supply Costs (Per Facility):

- **Neonatal Resuscitation Bundle (\$300)**
 - Bag-valve mask
 - Neonatal suction bulb
 - Umbilical cord clamps
 - Thermal blankets
- **Postpartum Hemorrhage Medication Kit (\$300)**
 - Oxytocin (Pitocin)
 - Misoprostol (Cytotec)
 - Tranexamic Acid (TXA)
- **OB Team STEPPS Binders (\$150)**
 - 3 Binders per Facility
 - Includes training materials and guidelines
- **Total Equipment & Supply Cost per Facility: \$750**

Total Cost per Facility:

Category	Cost
Nursing Staff	\$1050
Travel	\$343

Equipment & Supplies \$750

Total \$2,143

Annual Budget Projection (for Rural Pilot Facility):

- **Total Per Facility: \$2,143**

Conclusion:

This budget proposal outlines the financial requirements to train rural healthcare teams in obstetric emergencies. The investment will enhance patient outcomes, reduce maternal and neonatal complications, and strengthen regional healthcare collaboration. Approval of this budget will ensure sustainable and impactful training efforts across Montana's rural hospitals.

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