Applied Human Factors and Ergonomics (AHFE2025), Vol. 199, 2025, 1662–1669
https://doi.org/10.54941/ahfe1006977

Using the SEIPS Model to Understand the Challenges of Maternity Health in Rural Areas: A Focus Group Study in Rural Counties of New York

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ABSTRACT

Understanding the needs of rural women in maternity health is significantly important to develop effective policies and initiatives and to sustain care of rural communities. This study aims to understand these needs from a healthcare providers' perspective. We conducted a semi-structured qualitative focus group involving 13 people working in different positions in a rural healthcare system in New York. Our thematic analysis was guided by the SEIPS model. Our study identified several interconnected barriers to maternity care engagement in this rural county, mainly related to the system and people components of the SEIPS. To overcome these challenges, providers and management members highlighted that it would be important to provide multilevel interventions that would help expand the transportation and childcare infrastructure and improve outreach and translation material in order to address misinformation and design tailored inclusive culturally targeted education and support systems.

Keywords: Human factors, Systems engineering, Maternity care, Health management, Rural health

INTRODUCTION

Lung It is challenging for women living in rural and remote areas to have access to high-quality care during pregnancy and childbirth (Kozhimannil et al., 2016). Up to 40% of all U.S. counties most of them rural lack a qualified childbirth provider. These are places where there is not one obstetrician, midwife, or family physician attending births in the entire county (American College of Obstetricians and Gynecologists) (Kozhimannil et al., 2016). Approximately 1 in 7 births in the United States occurred in a rural community in 2021, totaling more than half a million births (Prevention, 2024).

Although the annual number of rural births has not changed substantially over the last 2 decades, more than 400 hospital-based maternity units in the United States have closed since 2004 (Hung et al., 2017; Kozhimannil et al., 2020), leaving more than half of rural counties without a hospital-based maternity unit (Kozhimannil et al., 2020). Prior research suggests that health care workforce shortages, coupled with other financial and safety challenges

to operating low-volume maternity units, contribute to the decline in access to care for rural residents during pregnancy and childbirth (Kozhimannil et al., 2015). Such workforce shortages impact rural residents throughout the perinatal period; rural birthing people also face barriers to accessing prenatal and postpartum care in addition to challenges accessing labor and birth services at the time of childbirth (Robbins & Martocci, 2020).

Policy interventions at the local, state, and federal levels could help to address maternity care workforce shortages and improve quality of care available to the one-half million rural U.S. women who give birth each year. However, it remains important to look at the issues in maternity health from a systematic perspective and cluster the problems into different categories to facilitate correction initiatives.

In this study, we conduct a qualitative focus group involving different levels of administration in a healthcare system of a rural county in New York to explore the factors that are impacting access to maternity health.

METHODS

We conducted a semi-structured qualitative focus group involving 13 people working in different positions in UHS Chenango, New York (associates, professors, directors, healthcare providers, etc.). The hospital is providing rural maternity health services. The focus group was conducted over Zoom. We recorded the full session and transcribed it verbally. The study was approved by the IRB of Binghamton University. Two reviewers separately reviewed the transcripts, and the discrepancies were resolved using consensus. Our thematic analysis was guided by the SEIPS model. The SEIPS (Systems Engineering Initiative for Patient Safety) model is a framework used in healthcare to improve patient outcomes by analyzing how the work system processes and components interact (Holden & Carayon, 2021).

RESULTS

Challenges Faced in Accessing and Engaging in Maternity Care

System-Level Challenges

Transportation, Infrastructure, and Workforce Deficits: Providers consistently described limited transportation infrastructure as a dominant system-level barrier to maternity care. The scarcity of public transit and lack of local options led to missed appointments and poor follow-up.

> *"Transportation is one area that we struggle with. Our community lacks a lot of transportation options because there's not a lot of public transportation available." [Provider 3]*

> *"Transportation is probably the biggest factor." [Provider 6]*

In addition to transportation, participants cited workforce shortages and the absence of specialty providers as major constraints.

> *"Staffing is also a challenge, we're short on staff as well." [Provider 7]*

> *"We also have a lack of specialty providers throughout the county." [Provider 4]*

These infrastructure and workforce gaps were further compounded by economic hardship and insufficient insurance coverage, limiting patients' ability to sustain consistent care.

Insurance and Programmatic Barriers: Providers noted persistent challenges related to insurance eligibility and underuse of available funding streams such as maternal health grants.

> *"We still run into transportation and insurance barriers… it's not easy for women to get here if they don't live in the city." [Provider 4]*

> *"Are we taking advantage of the maternal grants for patients who screen positive for substance use issues?" [Provider 9]*

Resource and Continuity Gaps: Addiction and mental health services were described as insufficiently integrated into maternal care, leading to fragmented follow-up and missed opportunities for support.

> *"We have a couple of providers trained in medication-assisted treatment, but we don't really have much in the way of ongoing support." [Provider 3]*

> *"Once they deliver and go home, we lose contact with them." [Provider 4]*

Patient-Level Challenges

Socioeconomic Constraints and Emotional Factors: Economic hardship, fear, and anxiety frequently led to appointment cancellations or avoidance of care in the healthcare center where the focus group was conducted.

> *"This is a very economically depressed area… their phone numbers change frequently." [Provider 6]*

> *"On the day of the appointment, they don't know if that's driven by fear or anxiety, they get cold feet." [Provider 5]*

Knowledge and Literacy Gaps: Providers highlighted persistent gaps in patient understanding of nutrition, ultrasound interpretation, and treatment plans. Many relied on unreliable internet sources or social media instead of medical guidance.

> *"Basic questions about diet and nutrition but definitely questions about ultrasounds and what they mean." [Provider 6]*

> *"They get information from the internet and social media, so they think they already know everything." [Provider 3]*

Reluctance to Communicate and Ask Questions: Fear of judgment and uncertainty often discouraged patients from discussing their needs.

> *"Patients are reluctant to ask questions." [Provider 5]*

Cultural and Language Barriers: Providers observed challenges communicating with Spanish-speaking patients, emphasizing that even when translation services exist, cultural and linguistic gaps hinder engagement.

> *"We're getting more Spanish-speaking patients, so we have translator services available and are getting handouts translated into Spanish." [Provider 6]*

Shared Challenges (Intersection Between System and People)

Several barriers emerged at the intersection of patient and system factors, especially childcare access, mental health, and misinformation.

> *"Childcare is a huge issue… they can't find someone to watch their children." [Provider 3]*
> *"Mental health issues contribute too." [Provider 6]*
> "Social media has changed a lot… patients come in thinking they know everything, sometimes it's not accurate." [*Provider 5]*

These interconnected factors reinforce one another: structural scarcity limits support, while misinformation and stress compound disengagement.

Suggested Improvement Strategies

Providers proposed actionable interventions to reduce access inequities, expanding transportation programs, leveraging county partnerships, and improving continuity of care through outreach and early engagement.

> *"The county has contractors who have agreements with families to help out with services." [Provider 4]*
> *"It's important to really focus during pregnancy… if we can reach them early and provide education and support, we could see better outcomes." [Provider 4]*

They also recommended broadening workforce capacity through recruitment and partnerships with external organizations that provide addiction and behavioral health services. In addition, it was recommended to introduce tailored educational materials that match patients' literacy levels and cultural contexts. Many advocated for digital resources, such as QR codes linking to videos, social media content, and mobile apps, to complement written materials.

> *"QR codes linking to YouTube videos or educational content could be helpful." [Provider 7]*
> *"I think social media is the way to go, they're already on social media getting information." [Provider 3]*
> *"Technology is there, but we need to be careful about what information we're putting out there." [Provider 5]*

Finally, participants emphasized building trust through early and continuous patient–provider relationships, integrating reliable online information with face-to-face education, and addressing emotional and logistical needs holistically.

"If there's something that patients have specifically asked about or requested, that would be valuable to address in educational materials." [Provider 4]

DISCUSSION

This study explored provider perspectives on the barriers to accessing and engaging in maternity care in a rural and economically constrained community, as well as potential strategies for improvement. Consistent with previous research, the findings highlight that maternity care challenges are multifactorial, spanning system-level deficiencies, patient-level constraints, and their intersection (Elmusharaf et al., 2015; Mc Donagh & Goodburn, 2001). Providers emphasized that addressing these barriers requires a comprehensive, multilevel approach that combines structural investment, patient education, and trust-building.

Transportation emerged as the most prominent structural barrier, echoing findings from rural health studies showing that geographic isolation and lack of public transit significantly reduce prenatal and postpartum visit adherence (Rajé, 2018). Workforce shortages, particularly in specialty obstetrics and behavioral health, compounded the strain on local health systems. Providers described burnout and staff turnover as key factors limiting continuity of care, a challenge also identified in national reports on rural maternal health infrastructure. Additionally, insurance gaps and underuse of available maternal health programs reflect systemic inefficiencies that disproportionately affect low-income women, particularly those who are ineligible for comprehensive coverage during pregnancy (Rajé, 2018).

At the individual level, economic hardship and emotional distress were major contributors to disengagement from care. Many patients cancelled appointments due to cost concerns, unstable contact information, or anxiety, consistent with literature linking socioeconomic precarity to late prenatal initiation and fragmented postpartum follow-up (Banke-Thomas et al., 2020; Coo et al., 2022; Thorsen et al., 2011). Knowledge and literacy gaps were pervasive, with reliance on social media and non-clinical sources creating misconceptions about pregnancy and care. Such misinformation not only undermines provider recommendations but also reflects broader issues of digital health inequity. Fear of judgment and cultural stigma further inhibited communication between patients and providers, especially among non-English speakers and marginalized groups.

Providers' recommendations underscore the importance of early and continuous engagement through culturally relevant and technologically supported interventions. Expanding transportation partnerships, developing outreach programs, and enhancing care continuity were viewed as actionable strategies for reducing inequities. Tailored educational materials, especially those using plain language and multimedia formats, may bridge literacy gaps and counter misinformation. However, participants cautioned that digital tools must be curated carefully to ensure accuracy and cultural appropriateness. Finally, building trust through consistent provider–patient relationships remain foundational. Trust was viewed as a prerequisite for

engagement, adherence, and openness to education, aligning with prior studies emphasizing relational continuity as a determinant of positive maternal outcomes.

Addressing these barriers will require cross-sector collaboration between healthcare systems, public health agencies, and community organizations. Investments in transportation infrastructure, telehealth, and workforce development are critical for sustaining equitable access. Moreover, integrating behavioral and social services into routine prenatal and postpartum care could mitigate the compounding effects of mental health and social stressors. Policymakers should also prioritize reimbursement models that support preventive, community-based, and continuity-focused maternity care.

This study's findings are based on a limited number of provider perspectives from one rural setting, which may not capture the full diversity of experiences across regions. Future work should triangulate these perspectives with patient experiences to better understand mismatches between provider assumptions and patient realities. Mixed-methods or longitudinal designs could further evaluate the impact of proposed interventions, particularly digital tools and early outreach, on measurable outcomes such as appointment adherence, maternal satisfaction, and perinatal health.

CONCLUSION

Our study explored the factors associated with challenges in maternity health based on findings from a rural area hospital. Challenges identified covered system and people related challenges. To overcome these issues, providers and management members highlighted that it would be important to provide multilevel interventions that would help expand the transportation and childcare infrastructure and improve outreach and translation material in order to address misinformation and design tailored inclusive culturally targeted education and support systems. Our results highlight the challenges of maternity health in rural areas and suggest that more work is needed to support service delivery to ensure equitable access to care.

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