

Challenges Faced By Healthcare Providers in Delivering High-Quality Care to Neonates in Ghana and West Africa

Alfred Addy¹, Prince Opuni Frimpong², Harriet Osaebia Kwakye³,
Juliet Otoo⁴, George Benneh Mensah⁵

¹Vice Principal, Assinman Nursing and Midwifery College, Fosu, Central Region, Ghana

²Anaesthetist, Korle-Bu Teaching Hospital, Greater Accra, Ghana

³Public Health Nurse, Ablekuma North Health Directorate, Greater Accra, Ghana

⁴Ophthalmic Nurse, Assin Fosu Polyclinic, Central Region, Ghana

⁵Principal Consultant, E-Group Research Consulting Ghana Ltd. Co. Greater Accra, Ghana

Abstract

The challenges faced by healthcare providers in delivering high-quality care to neonates in Ghana and West Africa are numerous. Limited resources, including equipment, medications, and skilled personnel, hinder the ability to provide optimal care. Additionally, cultural beliefs and practices often pose obstacles to effective healthcare delivery. Furthermore, inadequate infrastructure and transportation systems make it difficult to reach remote areas where many neonates reside. Despite these challenges, healthcare providers strive to overcome these barriers through education, training programs, and partnerships with international organizations. By addressing these challenges head-on, the goal of providing high-quality care to neonates in Ghana and West Africa can be achieved.

Keywords: Protocols and Guidelines, challenges, healthcare providers, Ghana and West Africa, Benchmarking, Quality Neonatal Care, Care to Neonates

Introduction:

In the realm of healthcare, the quality of neonatal care is of utmost importance as it directly affects the survival and well-being of newborn infants.¹⁻⁴ Ghana, a country located in West Africa, has made significant strides in improving its healthcare system over the years.⁵⁻⁶ However, it is crucial to critically assess the standards of care provided to neonates within this context and explore how these standards relate to the standard operating system.

One issue that warrants examination is the standards of care in neonatal care systems.⁷⁻⁹ This entails evaluating the policies, protocols, and guidelines implemented to ensure optimal care for neonates. By scrutinizing these standards, we can identify areas where improvements are needed and highlight any gaps between theory and practice.

Another aspect deserving attention is the management of neonatal admissions at hospitals.¹⁰⁻¹² This involves analyzing how hospitals handle incoming neonatal cases, including their triage process, staffing levels, and availability of resources such as equipment and medications.¹³⁻¹⁶ Understanding how hospitals

manage these admissions will shed light on potential barriers or facilitators to providing high-quality neonatal care.

Furthermore, it is imperative to explore factors impacting the quality of neonatal care in Ghana within the broader framework of its healthcare system. These factors may include socioeconomic issues, cultural beliefs and practices surrounding childbirth and infant care, access to healthcare facilities in rural areas, or even systemic challenges such as limited funding or inadequate infrastructure. By contextualizing these factors within Ghana's healthcare system and critically assessing their influence on neonatal care quality, we can uncover gaps in research and theories pertaining to this field. Identifying these gaps will pave the way for future studies aimed at addressing them head-on while striving for continuous improvement in providing optimal neonatal care across Ghana's healthcare landscape. This research paper will delve into three essential issues: standards of care in neonatal systems; management of neonatal admissions at hospitals; and factors impacting quality of neonatal care. Through a critical assessment of these aspects, we aim to shed light on the current state of neonatal care in Ghana, identify areas for improvement, and bridge gaps in research and theories surrounding this vital field.

Standards of Care in Neonatal Care Systems:

The standards of care in neonatal care systems play a crucial role in determining the quality of healthcare provided to neonates.¹⁷⁻¹⁹ In the context of Ghana, the standard operating system for neonatal care is essential in ensuring that adequate and appropriate care is delivered to these vulnerable infants.²⁰ However, a critical assessment of these standards reveals certain gaps and challenges that need to be addressed.

One aspect that requires careful evaluation is the management of neonatal admissions at hospitals.²¹⁻²³ The efficient management of admissions is vital for ensuring prompt access to necessary medical interventions and resources.²⁴⁻²⁶ In Ghana, however, there are several factors affecting this process.²⁷⁻³⁰ Limited resources and infrastructure pose significant challenges in delivering optimal care to neonates.³¹⁻³⁴ The shortage of skilled healthcare professionals further exacerbates this issue, as it hampers the ability to provide timely interventions and specialized treatments.³⁵⁻³⁷

Furthermore, contextualizing these factors within the Ghanaian healthcare system sheds light on additional gaps in research and theories concerning neonatal care. While there have been efforts made towards improving healthcare services, there remains a lack of comprehensive studies focusing specifically on neonatal care in West Africa.³⁸⁻⁴⁰ This gap hinders the development of evidence-based practices tailored to address the unique needs and challenges faced by this population.

Moreover, it is important to identify other factors affecting the quality of neonatal care within Ghana's healthcare system. Socioeconomic disparities contribute significantly to disparities in access and utilization of healthcare services among different populations.⁴¹⁻⁴⁴ Additionally, cultural beliefs and practices can influence parental attitudes towards seeking medical assistance for their neonates or adhering to recommended treatments.⁴⁵⁻⁴⁹ Assessing the standards of care in relation to the standard operating system for neonatal care highlights several areas needing improvement within Ghana's healthcare system. The management of neonatal admissions faces various challenges due to limited resources and a shortage of skilled professionals.⁵⁰⁻⁵³ Furthermore, gaps in research and theories pertaining specifically to neonatal care impede progress towards evidence-based practices tailored for West African settings like Ghana.⁵⁴⁻⁵⁶ Additionally, factors such as socioeconomic disparities and cultural beliefs contribute to the overall quality of care provided to neonates.⁵⁷⁻⁵⁹ Addressing these gaps and challenges is crucial for enhancing the quality of neonatal care in Ghana and ensuring improved outcomes for neonates in the country.

Management of Neonatal Admissions at Hospitals:

The management of neonatal admissions at hospitals plays a critical role in ensuring the quality of neonatal care in Ghana.⁶⁰⁻⁶³ The standard operating system used to handle these admissions is crucial in determining the effectiveness and efficiency of care provided to neonates.⁶⁴⁻⁶⁵ However, a critical assessment reveals several gaps in the standards of care and their relationship with the standard operating system. One key aspect to consider is the management of neonatal admissions at hospitals.⁶⁶⁻⁷² In Ghana, there are significant challenges in this area that impact the quality of care provided to neonates.⁷³⁻⁷⁹ Firstly, there is a lack of standardized protocols and guidelines for admitting and managing neonates.⁸⁰⁻⁸³ This leads to inconsistencies in practice across different healthcare facilities, making it difficult to ensure that every baby receives optimal care.⁸⁴⁻⁸⁶ Furthermore, there is often a shortage of trained healthcare professionals specifically equipped to handle neonatal admissions.⁸⁷⁻⁹⁰ The limited number of skilled staff contributes to overwhelmed healthcare teams, resulting in decreased attention and resources available for each individual patient.⁹¹⁻⁹³ This can lead to delayed interventions or missed opportunities for early detection and treatment.⁹⁴⁻⁹⁶ Another factor affecting the quality of neonatal care in West Africa, within the context of Ghana's healthcare system, is inadequate infrastructure and equipment.⁹⁷⁻¹⁰¹ Many hospitals lack essential resources such as incubators, ventilators, or even basic supplies like clean water or electricity. Without these necessary tools, providing adequate care becomes challenging if not impossible.¹⁰¹ Moreover, socioeconomic factors also play a significant role in influencing the quality of neonatal care provided at hospitals.¹⁰²⁻¹⁰⁴ Families from low-income backgrounds often face barriers accessing healthcare services due to financial constraints or transportation issues.¹⁰⁵⁻¹⁰⁸ Consequently, they may delay seeking medical attention for their neonates until conditions worsen significantly.¹⁰⁹⁻¹¹³

These factors highlight significant gaps within current research and theories on neonatal care management at hospitals in Ghana. There is a need for further investigation into effective strategies for standardizing protocols and guidelines across all healthcare facilities. Additionally, research should focus on addressing human resource shortages by implementing training programs specific to neonatal care and exploring innovative ways to optimize staff allocation.

The management of neonatal admissions at hospitals in Ghana faces significant challenges that impact the quality of care provided to neonates. The lack of standardized protocols, shortages of trained healthcare professionals, inadequate infrastructure and equipment, and socioeconomic factors all contribute to these challenges. Addressing these gaps in research and theories will be crucial in improving the quality of neonatal care in West Africa, within the context of Ghana's healthcare system.

Factors Impacting Quality of Neonatal Care:

The quality of neonatal care in Ghana is impacted by various factors that influence the standard operating system and management of neonatal admissions at hospitals. These factors play a crucial role in shaping the overall quality of care provided to neonates in West Africa, particularly within the context of the Ghanaian healthcare system. However, there are significant gaps in research and theories regarding these factors.

One factor that affects the quality of neonatal care is the availability and accessibility of resources and infrastructure. Limited resources, such as medical equipment, medications, and trained healthcare professionals, can hinder the provision of optimal care for neonates. This lack of resources often leads to inadequate monitoring and treatment options for neonates, resulting in compromised healthcare outcomes.¹¹⁴⁻¹¹⁸ Additionally, staffing shortages pose a significant challenge to neonatal care in Ghana.

The shortage of skilled healthcare professionals, particularly specialized neonatologists and nurses trained in newborn care, places a heavy burden on existing staff members. This can lead to increased workloads and decreased attention given to individual patients, potentially compromising the quality of care provided.¹¹⁹⁻¹²³ Moreover, socio-economic factors have a profound impact on neonatal care standards.¹²⁴⁻¹²⁶ Poverty levels and limited access to education contribute to inadequate knowledge about maternal health practices among expectant mothers. This lack of awareness can result in delayed or inadequate prenatal care, leading to increased risks during childbirth and poorer outcomes for neonates.¹²⁷⁻¹²⁹ Furthermore, cultural beliefs and practices also influence the quality of neonatal care in Ghana. Traditional customs related to childbirth may conflict with evidence-based medical interventions recommended for improving newborn health outcomes.¹³⁰⁻¹³⁴ For example, traditional birth attendants may prefer home births over hospital deliveries despite potential risks associated with complications that may arise during childbirth.

These factors collectively contribute to gaps within research and theories surrounding neonatal care standards in Ghana's healthcare system. While studies have been conducted on specific aspects like resource availability or cultural practices impacting newborn health outcomes individually; there is a lack of comprehensive research addressing these factors holistically.¹³⁵ Additionally, limited research focusing on the quality of neonatal care specifically within the Ghanaian context further widens these gaps. Factors impacting the quality of neonatal care in Ghana are diverse and multifaceted.¹³⁶ The availability and accessibility of resources, staffing shortages, socio-economic factors, and cultural beliefs all play a significant role in shaping the standard operating system and management of neonatal admissions.¹³⁷⁻¹³⁹ However, there is a pressing need for more comprehensive research to bridge the gaps in understanding these factors and develop evidence-based interventions that can improve the overall quality of neonatal care in Ghana.

In summary, the quality of neonatal care in Ghana is influenced by various factors, including the standards of care in neonatal care systems, the management of neonatal admissions at hospitals, and the factors impacting the quality of neonatal care. Firstly, the standards of care in neonatal care systems play a crucial role in determining the quality of care provided to neonates. It is essential for healthcare facilities to adhere to standardized protocols and guidelines to ensure consistent and effective treatment. However, there are gaps in research and theories regarding these standards in Ghana, highlighting the need for further investigation. Secondly, the management of neonatal admissions at hospitals is another critical aspect that affects the quality of care. Efficient admission processes and appropriate allocation of resources are necessary to provide timely and adequate treatment for neonates. Identifying gaps in this area can help improve overall healthcare delivery. Lastly, several factors impact the quality of neonatal care in Ghana. These include limited resources, inadequate staffing levels, lack of specialized training for healthcare professionals, cultural beliefs and practices affecting healthcare-seeking behavior, and socioeconomic disparities. Addressing these factors is crucial for enhancing neonatal care outcomes.

Bridging the Research Gaps

In recent years, there has been an increased focus on improving the quality of healthcare services provided to neonates in Ghana and West Africa.¹⁴⁰ This section of the research paper aims to comprehensively analyze relevant selected studies to explore evidence-based guidelines and protocols that can be tailored to the local context of Ghana and benchmark with international best practices in neonatal care.

Need for Localized Evidence-based Guidelines for Neonatal Care:

The provision of high-quality care to neonates in Ghana and West Africa is a challenge that healthcare providers face due to various specific challenges.¹⁴¹⁻¹⁴² These challenges can be identified through comprehensive analysis of relevant selected studies conducted in the region.¹⁴³ One such challenge is the lack of localized evidence-based guidelines for neonatal care.¹⁴⁴ In order to deliver optimal care to neonates, healthcare providers need access to guidelines and protocols that are tailored specifically to the local context of Ghana and West Africa.¹⁴⁵ This is crucial as the healthcare landscape in these regions may differ significantly from international best practices in neonatal care.¹⁴⁶

Localized evidence-based guidelines are essential because they take into account the unique socio-cultural, economic, and infrastructural factors that impact neonatal care in Ghana and West Africa.¹⁴⁷ These factors may include limited resources, inadequate infrastructure, low levels of awareness among caregivers, and cultural beliefs that influence health-seeking behaviors.¹⁴⁸⁻¹⁵⁵ By developing guidelines that are specifically designed for this context, healthcare providers can ensure that their practices align with the reality on the ground. Moreover, localized evidence-based guidelines help bridge the gap between international best practices and local implementation.¹⁵⁶ While international guidelines provide valuable insights into effective neonatal care strategies, they may not always be directly applicable or feasible within the resource-constrained settings of Ghana and West Africa.¹⁵⁷ Localized guidelines can address this gap by adapting international recommendations to suit local realities. Furthermore, having localized evidence-based guidelines enables standardization of care across different healthcare facilities within Ghana and West Africa.¹⁵⁸ This ensures consistency in treatment approaches and improves overall quality of care provided to neonates. Standardization also facilitates collaboration among healthcare providers as they share a common framework for decision-making and problem-solving.¹⁵⁹

There is a clear need for localized evidence-based guidelines for neonatal care in Ghana and West Africa. These guidelines would address specific challenges faced by healthcare providers in delivering high-quality care to neonates within their unique context. By tailoring protocols according to local realities, healthcare providers can bridge the gap between international best practices and local implementation, ensuring optimal care for neonates in Ghana and West Africa. From the comprehensive analysis of relevant selected studies in Ghana and West Africa¹⁶⁰⁻¹⁶³ the specific challenges faced by healthcare providers in delivering high-quality care to neonates were revealed. Limited resources and infrastructure for neonatal care have been identified as a major obstacle, with inadequate facilities, equipment, and trained personnel hindering the provision of optimal care.¹⁶⁴⁻¹⁶⁹ Also, cultural beliefs and practices impacting newborn healthcare have been found to play a significant role in shaping healthcare decisions and practices. These cultural factors can sometimes conflict with evidence-based guidelines and protocols, further complicating the delivery of high-quality care.¹⁷⁰⁻¹⁷³ Furthermore, there is a clear need for localized evidence-based guidelines for neonatal care that take into account the unique context of Ghana and West Africa. While international best practices provide valuable guidance, they must be tailored to address the specific challenges faced by healthcare providers in this region. This includes considering cultural beliefs and practices, as well as working within limited resources and infrastructure. Addressing these challenges requires collaboration between policymakers, healthcare providers, researchers, and communities. Efforts should focus on improving access to resources and infrastructure for neonatal care while also promoting culturally sensitive approaches that respect local beliefs. Additionally, developing localized evidence-based guidelines will help ensure that healthcare providers have access to up-to-date information that is relevant to their specific context. Overall, by addressing limited resources and infrastructure for neonatal

care, cultural beliefs impacting newborn healthcare, and the need for localized evidence-based guidelines, Ghana and West Africa can work towards improving the quality of care provided to neonates.

The challenges, evidence-based guidelines and alignments with international best practices

The healthcare system in Ghana and West Africa faces numerous challenges in delivering high-quality care to neonates.¹⁷⁴⁻¹⁷⁶ These challenges are unique to the region and require tailored solutions that align with evidence-based guidelines and protocols.¹⁷⁷⁻¹⁷⁹ This subsection of the research paper aims to compare and contrast the specific challenges faced by healthcare providers in Ghana, examine the evidence-based guidelines for neonatal care in West Africa, and explore how the local context of Ghana aligns with international best practices. One of the primary challenges faced by healthcare providers in Ghana is a lack of resources. Limited funding, inadequate infrastructure, and a shortage of skilled personnel hinder the delivery of high-quality care to neonates.¹⁸⁰⁻¹⁸⁶ Further, cultural beliefs and practices can affect healthcare-seeking behaviors, further complicating the provision of adequate neonatal care.¹⁸⁷⁻¹⁸⁹ In contrast, evidence-based guidelines for neonatal care in West Africa provide a framework for improving health outcomes among neonates.¹⁹⁰⁻¹⁹¹ These guidelines focus on essential interventions such as antenatal care, skilled birth attendance, postnatal visits, immunization programs, breastfeeding support, and early detection of illnesses.¹⁹²⁻¹⁹⁴ By adhering to these guidelines, healthcare providers can enhance their ability to deliver quality care despite resource constraints. When comparing the local context of Ghana with international best practices in neonatal care, several areas stand out. While there has been progress in reducing infant mortality rates through initiatives like national health insurance schemes and increased access to healthcare facilities, disparities still exist between rural and urban areas.¹⁹⁵ Furthermore, integrating traditional birth attendants into formal healthcare systems has proven effective in some regions but requires careful consideration due to varying levels of training and knowledge.

Therefore, addressing the specific challenges faced by healthcare providers in delivering high-quality neonatal care is crucial for improving health outcomes among neonates in Ghana and West Africa. By tailoring evidence-based guidelines and protocols to the local context while benchmarking against international best practices, significant progress can be made towards achieving optimal neonatal health across the region.

Challenges Faced By Healthcare Providers in Ghana:

Healthcare providers in Ghana face numerous challenges in delivering high-quality care to neonates.¹⁹⁶ One major challenge is the lack of adequate resources and infrastructure.¹⁹⁷⁻²⁰² Many healthcare facilities in Ghana lack essential medical equipment, such as incubators and ventilators, which are crucial for providing specialized care to sick or premature infants.²⁰³⁻²⁰⁷ Additionally, there is a shortage of trained healthcare professionals, particularly neonatologists and pediatricians, who possess the necessary expertise to manage complex neonatal conditions. This scarcity of skilled personnel further hampers the provision of quality care to neonates.²⁰⁸⁻²¹¹ Another significant challenge faced by healthcare providers in Ghana is the limited access to evidence-based guidelines and protocols tailored to the local context.²¹²⁻²¹⁴ While international best practices exist for neonatal care, they may not always be applicable or feasible within the constraints of Ghana's healthcare system. Thus, healthcare providers often struggle to adapt these guidelines to suit their specific circumstances and resources available.²¹⁵ This can result in inconsistent or suboptimal care being provided to neonates. Furthermore, cultural beliefs and practices pose additional challenges for healthcare providers in Ghana.²¹⁶⁻²¹⁹ Traditional beliefs surrounding

childbirth and infant care can sometimes conflict with modern medical practices. For instance, some communities adhere strongly to traditional birthing rituals that may not align with evidence-based obstetric practices aimed at ensuring safe deliveries. Overcoming such deeply ingrained cultural norms requires effective communication and community engagement strategies.²²⁰⁻²²³ The dearth of reliable data on neonatal health outcomes also poses a significant challenge for healthcare providers in Ghana.²²⁴⁻²²⁷ Without accurate information on morbidity and mortality rates among neonates, it becomes challenging to identify areas that require improvement or evaluate the effectiveness of interventions implemented. Consequently, addressing gaps in data collection systems should be a priority for improving neonatal care delivery.

Healthcare providers in Ghana face several challenges when it comes to delivering high-quality care to neonates. These challenges include inadequate resources and infrastructure, limited access to tailored evidence-based guidelines and protocols, cultural barriers that impact medical practices, and a lack of reliable data on neonatal health outcomes.²²⁸⁻²³¹ Addressing these challenges requires a multi-faceted approach that involves strengthening healthcare infrastructure, increasing the availability of local guidelines, promoting cultural sensitivity, and improving data collection systems. Only through concerted efforts can Ghana's healthcare system strive to meet international benchmarks and provide optimal care for neonates.

Evidence-based Guidelines for Neonatal Care in West Africa:

In West Africa, healthcare providers face numerous challenges in delivering high-quality care to neonates.²³²⁻²³⁴ Studies conducted in Ghana and other West African countries have identified specific obstacles that hinder the provision of optimal neonatal care.²³⁵⁻²³⁷ One such challenge is the limited availability of resources, including medical equipment and skilled healthcare professionals. This scarcity often leads to overcrowded hospitals and understaffed neonatal units, which ultimately compromise the quality of care provided to neonates. Additionally, inadequate training and knowledge among healthcare providers contribute to suboptimal practices in neonatal care.²³⁸⁻²⁴⁰ Many providers lack awareness of evidence-based guidelines and protocols for neonatal care, resulting in variations in practice that may not align with international best practices.²⁴¹⁻²⁴⁶

To address these challenges, evidence-based guidelines and protocols can be tailored to the local context of Ghana and West Africa's healthcare system.²⁴⁷⁻²⁴⁸ These guidelines are crucial as they provide standardized approaches to neonatal care based on rigorous scientific research. By implementing evidence-based guidelines, healthcare providers can ensure that their practices align with international best practices while accounting for local constraints. One example of an evidence-based guideline is promoting exclusive breastfeeding for neonates during their first six months of life.²⁴⁹⁻²⁵⁰ Research shows that exclusive breastfeeding significantly reduces the risk of infections and mortality among infants. In Ghana specifically, studies²⁵¹⁻²⁵⁸ have highlighted the need for interventions aimed at improving exclusive breastfeeding rates due to cultural beliefs surrounding early introduction of complementary foods. Another important guideline is proper infection prevention measures within neonatal units. Studies²⁵⁹⁻²⁶⁶ have shown that implementing strict hand hygiene protocols significantly reduces infection rates among neonates. In resource-limited settings like West Africa, where access to clean water and sanitation facilities may be limited, it becomes even more crucial to prioritize infection prevention measures within neonatal units.²⁶⁷

Furthermore, evidence-based guidelines also emphasize the importance of kangaroo mother care (KMC) for preterm infants or those with low birth weight.²⁶⁸ KMC involves close skin-to-skin contact between a mother or caregiver and a newborn baby, providing warmth, stability, and nutrition.²⁶⁹⁻²⁷⁰ Studies²⁷¹⁻²⁸⁸ have consistently demonstrated the positive impact of KMC on infant survival rates, weight gain, and neurodevelopment. Evidence-based guidelines tailored to the local context of Ghana and West Africa can help address the specific challenges faced by healthcare providers in delivering high-quality neonatal care. By implementing these guidelines, healthcare providers can bridge the gap between local constraints and international best practices in neonatal care. This ultimately improves outcomes for neonates in West Africa's healthcare system.

Comparing Local Context with International Best Practices:

When comparing the local context of Ghana and West Africa with international best practices in delivering high-quality care to neonates, it becomes evident that there are specific challenges faced by healthcare providers in these regions. Numerous studies²⁸⁹⁻³⁰⁶ conducted in Ghana and West Africa have shed light on these challenges, highlighting the need for tailored evidence-based guidelines and protocols. One particular study³⁰⁷ conducted in Ghana identified a lack of essential resources, such as neonatal intensive care units and skilled healthcare professionals, as a significant challenge in delivering quality care to neonates. Similarly, another study³⁰⁸ conducted in West Africa highlighted the limited access to prenatal care and inadequate transportation systems as major obstacles faced by healthcare providers. These findings emphasize the urgent need for tailored guidelines and protocols that can address these specific challenges within the local context.

To meet this demand, evidence-based guidelines and protocols can be developed to accommodate the unique needs of Ghana and other countries in West Africa. For instance, research³⁰⁹ has shown that implementing kangaroo mother care (KMC) can significantly improve outcomes for premature infants. KMC involves skin-to-skin contact between the mother or caregiver and the newborn, promoting thermal regulation and breastfeeding initiation. By tailoring this practice to fit into the cultural norms of Ghanaian society, where extended family members often play an active role in childcare, healthcare providers can ensure its successful implementation. Furthermore, benchmarking against international best practices is crucial when developing guidelines tailored to Ghana's local context. By examining successful neonatal care models from around the world, such as those implemented in Scandinavian countries with low infant mortality rates, valuable insights can be gained. For example, ensuring continuous training for healthcare professionals on evidence-based practices has proven effective in reducing neonatal mortality rates globally. Comparing the local context of Ghana and West Africa with international best practices reveals specific challenges faced by healthcare providers when delivering high-quality care to neonates. These challenges include a lack of essential resources and limited access to prenatal care.³¹⁰ However, by tailoring evidence-based guidelines and protocols to the local context and benchmarking against international best practices, healthcare providers in Ghana and West Africa can make significant strides towards improving neonatal care.³¹¹ Implementing practices such as kangaroo mother care and ensuring continuous training for healthcare professionals are just a few examples of how these regions can bridge the gap between their current healthcare systems and international standards.

In fact, healthcare providers in Ghana face several challenges in delivering high-quality care to neonates. These challenges include limited resources, inadequate infrastructure, and a shortage of skilled healthcare professionals. Additionally, cultural beliefs and practices can also pose obstacles to providing optimal

neonatal care. However, despite these challenges, there are evidence-based guidelines for neonatal care in West Africa that can be tailored to the local context of Ghana. These guidelines focus on promoting breastfeeding, preventing infections, and ensuring proper nutrition for neonates. When comparing the local context with international best practices in neonatal care, it is evident that there is a need for improvement in Ghana's healthcare system. While some progress has been made in recent years, there is still a long way to go in order to meet international standards. It is crucial for healthcare providers and policymakers to collaborate and implement strategies that address the specific challenges faced by neonates in Ghana. Overall, addressing the challenges faced by healthcare providers in delivering high-quality care to neonates requires a multi-faceted approach. This includes improving infrastructure and resources, increasing access to skilled healthcare professionals, promoting evidence-based guidelines for neonatal care, and adapting international best practices to the local context of Ghana.

Summary, Conclusions and Recommendations

Ensuring the provision of high-quality care to neonates is a critical aspect of healthcare delivery. However, healthcare providers in Ghana and West Africa face specific challenges that hinder their ability to deliver optimal care to neonates. This research paper aims to provide a summary of relevant studies conducted in the region, identify the challenges faced by healthcare providers, and propose evidence-based guidelines and protocols tailored to the local context.

Challenges Faced by Healthcare Providers:

1. **Limited resources:** In Ghana and many other West African countries, healthcare facilities often lack adequate resources such as medical equipment, medications, and skilled personnel. This shortage hampers the ability of healthcare providers to deliver high-quality care to neonates.
2. **Inadequate training:** Many healthcare providers lack specialized training in neonatal care due to limited educational opportunities or insufficient emphasis on this area during their training. As a result, they may struggle with identifying and managing common neonatal conditions effectively.
3. **Cultural beliefs and practices:** Traditional cultural beliefs surrounding childbirth can influence the acceptance of modern medical interventions for neonates. Some communities may rely on traditional healers or delay seeking medical help until conditions worsen, leading to adverse outcomes for neonates.

Evidence-Based Guidelines Tailored for Local Context: To address these challenges, it is crucial to develop evidence-based guidelines and protocols that are tailored specifically for the local context of Ghana and West Africa:

1. **Strengthening infrastructure:** Investment in healthcare infrastructure is essential for improving neonatal care services. This includes ensuring access to essential medical equipment such as incubators, ventilators, phototherapy units, as well as establishing well-equipped neonatal intensive care units (NICUs) across the region.
2. **Enhancing education and training:** Providing comprehensive training programs focused on neonatal care will equip healthcare providers with the necessary skills and knowledge to deliver high-quality care. This can be achieved through collaborations with international organizations, such as the World Health Organization (WHO), to develop training curricula and facilitate knowledge exchange.
3. **Community engagement:** Engaging local communities is vital in promoting awareness of neonatal healthcare practices. Healthcare providers should collaborate with community leaders, traditional birth

attendants, and local health workers to educate families about the importance of seeking early medical intervention for neonates.

In conclusion, healthcare providers in Ghana and West Africa face numerous challenges in delivering high-quality care to neonates. However, by implementing evidence-based guidelines and protocols tailored to the local context, these challenges can be addressed effectively. Strengthening infrastructure, enhancing education and training programs, and engaging communities are essential steps towards benchmarking with international best practices in neonatal care.

References

1. Bryce, E., Mullany, L.C., Khatry, S.K. *et al.* Coverage of the WHO's four essential elements of newborn care and their association with neonatal survival in southern Nepal. *BMC Pregnancy Childbirth* 20, 540 (2020). <https://doi.org/10.1186/s12884-020-03239-6>
2. Shiras T, Bradley SEK, Johns B, Cogswell H (2022) Sources for and quality of neonatal care in 45 low- and middle-income countries. *PLoS ONE* 17(7): e0271490. <https://doi.org/10.1371/journal.pone.0271490>
3. Hagar Palgi Hacker, Elena Ateva, R. Rima Jolivet, Bushra Al-makaleh, Theresa Shaver, Emma Sacks (2022) Global Research Priorities for Understanding and Improving Respectful Care for Newborns: A Modified Delphi Study *Global Health: Science and Practice* Feb 2022, 10 (1) e2100292; DOI: 10.9745/GHSP-D-21-00292
4. Gertrude Nancy Annan and Yvonne Asiedu (2018) *Predictors of Neonatal Deaths in Ashanti Region of Ghana*, *Advances in Public Health* 2018 (2018), 11 <https://doi.org/10.1155/2018/9020914>
5. Escribano-Ferrer, B., Cluzeau, F., Cutler, D., Akufo, C., & Chalkidou, K. (2016). Quality of Health Care in Ghana: Mapping of Interventions and the Way Forward. *Ghana medical journal*, 50(4), 238–247. <https://doi.org/10.4314/gmj.v50i4.7>
6. Drislane, F. W., Akpalu, A., & Wegdam, H. H. (2014). The medical system in Ghana. *The Yale journal of biology and medicine*, 87(3), 321–326.
7. Gantan EF, Wiedrich L. Neonatal Evaluation. [Updated 2023 Aug 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK558943/>
8. Keene, C. M., Aluvaala, J., Murphy, G. A. V., Abuya, N., Gathara, D., & English, M. (2019). Developing recommendations for neonatal inpatient care service categories: reflections from the research, policy and practice interface in Kenya. *BMJ global health*, 4(2), e001195. <https://doi.org/10.1136/bmjgh-2018-001195>
9. Tette EMA, Nartey ET, Nuertey BD, Azusong EA, Akaateba D, Yirifere J, Alandu A, Seneadza NAH, Gandau NB, Renner LA. The pattern of neonatal admissions and mortality at a regional and district hospital in the Upper West Region of Ghana; a cross sectional study. *PLoS One*. 2020 May 4;15(5):e0232406. doi: 10.1371/journal.pone.0232406. PMID: 32365073; PMCID: PMC7197810.
10. Ashokcoomar, P., & Bhagwan, R. (2022). The neonatal transfer process through the lens of neonatologists at public hospitals in South Africa. *Health SA = SA Gesondheid*, 27, 1617. <https://doi.org/10.4102/hsag.v27i0.1617>

11. Elikplim Pomevor K, Adomah-Afari A. Health providers' perception of quality of care for neonates in health facilities in a municipality in Southern Ghana. *Int J Health Care Qual Assur.* 2016 Oct 10;29(8):907-20. doi: 10.1108/IJHCQA-04-2016-0055. PMID: 27671425.
12. Enweronu-Laryea, C. C., Nsiah-Boateng, E., Andoh, H. D., Frimpong-Barfi, A., Asenso-Boadi, F. M., & Aikins, M. (2019). Evaluating services for perinatal asphyxia and low birth weight at two hospitals in Ghana: a micro-costing analysis. *Ghana medical journal*, 53(4), 256–266. <https://doi.org/10.4314/gmj.v53i4.2>
13. Fanelli, S., Bellù, R., Zangrandi, A. *et al.* Managerial features and outcome in neonatal intensive care units: results from a cluster analysis. *BMC Health Serv Res* 20, 957 (2020). <https://doi.org/10.1186/s12913-020-05796-0>
14. World Health Organization 2016 Standards for improving quality of maternal and newborn care in health facilities <https://cdn.who.int/media/docs/default-source/mca-documents/qoc/quality-of-care/standards-for-improving-quality-of-maternal-and-newborn-care-in-health-facilities.pdf>
15. Jabbari, H., Abdollahi Sabet, S., & Heidarzadeh, M. (2015). Hospital Care for Newborn Babies: Quality Assessment, A Systematic Review. *Iranian journal of pediatrics*, 25(5), e3706. <https://doi.org/10.5812/ijp.3706>
16. Horwood, C., Haskins, L., Phakathi, S. *et al.* A health systems strengthening intervention to improve quality of care for sick and small newborn infants: results from an evaluation in district hospitals in KwaZulu-Natal, South Africa. *BMC Pediatr* 19, 29 (2019). <https://doi.org/10.1186/s12887-019-1396-8>
17. Saaka, M., Ali, F., & Vuu, F. (2018). Prevalence and determinants of essential newborn care practices in the Lawra District of Ghana. *BMC pediatrics*, 18(1), 173. <https://doi.org/10.1186/s12887-018-1145-4>
18. Gantan EF, Wiedrich L. Neonatal Evaluation. [Updated 2023 Aug 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK558943/>
19. A. O'Sullivan, B. Boyd, Marian O'Shaughnessy, A. MacIntyre, Cecily Begley, Evaluation of the introduction of a postnatal ward liaison neonatal nurse, *Journal of Neonatal Nursing*, Volume 21, Issue 1, 2015, Pages 34-39,
a. <https://doi.org/10.1016/j.jnn.2014.07.003>. (<https://www.sciencedirect.com/science/article/pii/S1355184114000970>)
20. World Health Organization 2016 Standards for improving quality of maternal and newborn care in health facilities <https://cdn.who.int/media/docs/default-source/mca-documents/qoc/quality-of-care/standards-for-improving-quality-of-maternal-and-newborn-care-in-health-facilities.pdf>
21. Lassi, Z.S., Kumar, R., Mansoor, T. *et al.* Essential interventions: implementation strategies and proposed packages of care. *Reprod Health* 11 (Suppl 1), S5 (2014). <https://doi.org/10.1186/1742-4755-11-S1-S5>
22. Tuyisenge, D., Byiringiro, S., Manirakiza, M. L., Mutsinzi, R. G., Nshimyiryo, A., Nyishime, M., Hirschhorn, L. R., Biziyaremye, F., Gitera, J., Beck, K., & Kirk, C. M. (2021). Quality improvement strategies to improve inpatient management of small and sick newborns across All Babies Count supported hospitals in rural Rwanda. *BMC pediatrics*, 21(1), 89. <https://doi.org/10.1186/s12887-021-02544-z>

23. World Health Organization 2016 Standards for improving quality of maternal and newborn care in health facilities <https://cdn.who.int/media/docs/default-source/mca-documents/qoc/quality-of-care/standards-for-improving-quality-of-maternal-and-newborn-care-in-health-facilities.pdf>
24. MOH (2014) Ghana-Newborn_Strategy https://www.healthynetwork.org/hnn-content/uploads/FINAL_Ghana-Newborn_Strategy_2014July10.pdf
25. Ameyaw, E.K., Amoah, R.M., Njue, C. *et al.* An assessment of hospital maternal health services in northern Ghana: a cross-sectional survey. *BMC Health Serv Res* 20, 1088 (2020). <https://doi.org/10.1186/s12913-020-05937-5>
26. Amoakoh, H. B., Klipstein-Grobusch, K., Agyepong, I. A., Amoakoh-Coleman, M., Kayode, G. A., Reitsma, J. B., Grobbee, D. E., & Ansah, E. K. (2020). Can an mhealth clinical decision-making support system improve adherence to neonatal healthcare protocols in a low-resource setting?. *BMC pediatrics*, 20(1), 534. <https://doi.org/10.1186/s12887-020-02378-1>
27. Gertrude Nancy Annan and Yvonne Asiedu (2018). Predictors of Neonatal Deaths in Ashanti Region of Ghana, *Advances in Public Health* 2018 (2018), 11 <https://doi.org/10.1155/2018/9020914> <https://www.hindawi.com/journals/aph/2018/9020914/>
28. GHANA HEALTH SERVICE 2017 Ghana Health Service 2016 Annual Report <https://www.moh.gov.gh/wp-content/uploads/2017/09/2016-Annual-Report.pdf>
29. World Health Organization 2016 Standards for improving quality of maternal and newborn care in health facilities <https://cdn.who.int/media/docs/default-source/mca-documents/qoc/quality-of-care/standards-for-improving-quality-of-maternal-and-newborn-care-in-health-facilities.pdf>
30. Mahwasane, T., Maputle, M. S., Simane-Netshisaulu, K. G., & Malwela, T. (2020). Provision of Care to Preterm Infants at Resource Limited Health Facilities of Mopani District, South Africa. *Annals of global health*, 86(1), 10. <https://doi.org/10.5334/aogh.2555>
31. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
32. Gondwe MJ, Desmond N, Aminu M, Allen S (2022) Resource availability and barriers to delivering quality care for newborns in hospitals in the southern region of Malawi: A multisite observational study. *PLOS Glob Public Health* 2(12): e0001333. <https://doi.org/10.1371/journal.pgph.0001333>
33. Essendi, H., Johnson, F.A., Madise, N. *et al.* Infrastructural challenges to better health in maternity facilities in rural Kenya: community and healthworker perceptions. *Reprod Health* 12, 103 (2015). <https://doi.org/10.1186/s12978-015-0078-8>
34. Jaeger, F.N., Bechir, M., Harouna, M. *et al.* Challenges and opportunities for healthcare workers in a rural district of Chad. *BMC Health Serv Res* 18, 7 (2018). <https://doi.org/10.1186/s12913-017-2799-6>
35. Džakula, A., & Relić, D. (2022). Health workforce shortage - doing the right things or doing things right?. *Croatian medical journal*, 63(2), 107–109. <https://doi.org/10.3325/cmj.2022.63.107>
36. Bradley, S., Kamwendo, F., Chipeta, E. *et al.* Too few staff, too many patients: a qualitative study of the impact on obstetric care providers and on quality of care in Malawi. *BMC Pregnancy Childbirth* 15, 65 (2015). <https://doi.org/10.1186/s12884-015-0492-5>
37. Chinbuah, M.A., Taylor, M., Serpa, M. *et al.* Scaling up Ghana's national newborn care initiative: integrating 'helping babies breathe' (HBB), 'essential care for every baby' (ECEB), and newborn

- 'infection prevention' (IP) trainings. *BMC Health Serv Res* 20, 739 (2020). <https://doi.org/10.1186/s12913-020-05225-2>
38. Escribano-Ferrer, B., Cluzeau, F., Cutler, D., Akufo, C., & Chalkidou, K. (2016). Quality of Health Care in Ghana: Mapping of Interventions and the Way Forward. *Ghana medical journal*, 50(4), 238–247. <https://doi.org/10.4314/gmj.v50i4.7>
39. McMaughan, D. J., Oloruntoba, O., & Smith, M. L. (2020). Socioeconomic Status and Access to Healthcare: Interrelated Drivers for Healthy Aging. *Frontiers in public health*, 8, 231. <https://doi.org/10.3389/fpubh.2020.00231>
40. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Care Services; Committee on Health Care Utilization and Adults with Disabilities. Health-Care Utilization as a Proxy in Disability Determination. Washington (DC): National Academies Press (US); 2018 Mar 1. 2, Factors That Affect Health-Care Utilization. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK500097/>
41. Geta, E.T., Wakjira, A. & Hailu, W.B. Disparities in modern health service utilization across socio-demographic and economic inequalities among households in Gida Ayana district, Oromia Regional state, Ethiopia: a community-based cross-sectional study. *BMC Health Serv Res* 23, 597 (2023). <https://doi.org/10.1186/s12913-023-09527-z>
42. Nyaloko, M., Lubbe, W., Moloko-Phiri, S.S. *et al.* Exploring cultural determinants to be integrated into preterm infant care in the neonatal intensive care unit: an integrative literature review. *BMC Pregnancy Childbirth* 23, 15 (2023). <https://doi.org/10.1186/s12884-022-05321-7>
43. Adama EA, Sundin D, Bayes S. Sociocultural Practices Affecting the Care of Preterm Infants in the Ghanaian Community. *Journal of Transcultural Nursing*. 2021;32(5):458-465. doi:10.1177/1043659620975098
44. Nyande, F. K., Ricks, E., Williams, M., & Jardien-Baboo, S. (2022). Socio-cultural barriers to the delivery and utilisation of child healthcare services in rural Ghana: a qualitative study. *BMC health services research*, 22(1), 289. <https://doi.org/10.1186/s12913-022-07660-9>
45. Adatar, P., Strumpher, J., Ricks, E., & Mwini-Nyaledzigbor, P. P. (2019). Cultural beliefs and practices of women influencing home births in rural Northern Ghana. *International journal of women's health*, 11, 353–361. <https://doi.org/10.2147/IJWH.S190402>
46. Salia SM, Afaya A, Wuni A, Ayanore MA, Salia E, Kporvi DD, et al. (2021) Knowledge, attitudes and practices regarding neonatal jaundice among caregivers in a tertiary health facility in Ghana. *PLoS ONE* 16(6): e0251846. <https://doi.org/10.1371/journal.pone.0251846>
47. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. doi:10.29392/001c.72089
48. Ashghali-Farahani, M., Ghaffari, F., Hoseini-Esfidarjani, S. S., Hadian, Z., Qomi, R., & Dargahi, H. (2018). Neonatal Intensive Care Nursing Curriculum Challenges based on Context, Input, Process, and Product Evaluation Model: A Qualitative Study. *Iranian journal of nursing and midwifery research*, 23(2), 111–118. https://doi.org/10.4103/ijnmr.IJNMR_3_17
49. Ashghali-Farahani, M., Ghaffari, F., Hoseini-Esfidarjani, S. S., Hadian, Z., Qomi, R., & Dargahi, H. (2018). Neonatal Intensive Care Nursing Curriculum Challenges based on Context, Input, Process, and Product Evaluation Model: A Qualitative Study. *Iranian journal of nursing and midwifery research*, 23(2), 111–118. https://doi.org/10.4103/ijnmr.IJNMR_3_17

50. Chirwa, M.D., Nyasulu, J., Modiba, L. *et al.* Challenges faced by midwives in the implementation of facility-based maternal death reviews in Malawi. *BMC Pregnancy Childbirth* 23, 282 (2023). <https://doi.org/10.1186/s12884-023-05536-2>
51. Mungai IG, Baghel SS, Soni S, Vagela S, Sharma M, Diwan V, Tamhankar AJ, Lundborg CS, Pathak A. Identifying the know-do gap in evidence-based neonatal care practices among informal health care providers-a cross-sectional study from Ujjain, India. *BMC Health Serv Res*. 2020 Oct 21;20(1):966. doi: 10.1186/s12913-020-05805-2. PMID: 33087124; PMCID: PMC7576775.
52. Bee, M., Shiroor, A. & Hill, Z. Neonatal care practices in sub-Saharan Africa: a systematic review of quantitative and qualitative data. *J Health Popul Nutr* 37, 9 (2018). <https://doi.org/10.1186/s41043-018-0141-5>
53. Brambilla Pisoni G, Gaulis C, Suter S, Rochat MA, Makohliso S, Roth-Kleiner M, Kyokan M, Pfister RE and Schönerberger K (2022) Ending Neonatal Deaths From Hypothermia in Sub-Saharan Africa: Call for Essential Technologies Tailored to the Context. *Front. Public Health* 10:851739. doi: 10.3389/fpubh.2022.851739
54. Brignoni-Pérez, E., Scala, M., Feldman, H. M., Marchman, V. A., & Travis, K. E. (2022). Disparities in Kangaroo Care for Premature Infants in the Neonatal Intensive Care Unit. *Journal of developmental and behavioral pediatrics : JDBP*, 43(5), e304–e311. <https://doi.org/10.1097/DBP.0000000000001029>
55. Omer, S., Zakar, R., Zakar, M.Z. *et al.* The influence of social and cultural practices on maternal mortality: a qualitative study from South Punjab, Pakistan. *Reprod Health* 18, 97 (2021). <https://doi.org/10.1186/s12978-021-01151-6>
56. Harvey, Vickita Akosua Antwiwaa, "Socio-economic and Cultural Determinants of Health Care Services Utilization in Ghana" (2014). UNLV Theses, Dissertations, Professional Papers, and Capstones. 2266. <http://dx.doi.org/10.34917/7048585>
57. Brathwaite, K. P., Bryce, F., Moyer, L. B., Engmann, C., Twum-Danso, N. A. Y., Kamath-Rayne, B. D., Srofenyoh, E. K., Ucer, S., Boadu, R. O., & Owen, M. D. (2020). Evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana. *Resuscitation plus*, 1-2, 100001. <https://doi.org/10.1016/j.resplu.2020.100001>
58. Kimberly P. Brathwaite, Fiona Bryce, Laurel B. Moyer, Cyril Engmann, Nana A.Y. Twum-Danso, Beena D. Kamath-Rayne, Emmanuel K. Srofenyoh, Sebnem Ucer, Richard O. Boadu, Medge D. Owen, (2020) Evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana, *Resuscitation Plus* 1–2, 2020,100001, <https://doi.org/10.1016/j.resplu.2020.100001>. (<https://www.sciencedirect.com/science/article/pii/S2666520420300011>)
59. Bakari, A., Bell, A.J., Oppong, S.A. *et al.* Neonatal near-misses in Ghana: a prospective, observational, multi-center study. *BMC Pediatr* 19, 509 (2019). <https://doi.org/10.1186/s12887-019-1883-y>
60. Chinbuah, M.A., Taylor, M., Serpa, M. *et al.* Scaling up Ghana's national newborn care initiative: integrating 'helping babies breathe' (HBB), 'essential care for every baby' (ECEB), and newborn 'infection prevention' (IP) trainings. *BMC Health Serv Res* 20, 739 (2020). <https://doi.org/10.1186/s12913-020-05225-2>
61. Dodor, E. A., Ntodi, P. K., Bagina, J., Ofori-Gyasi, S., Tinkorang, E. K. T., Antweam, D., Nagai, R. A. N., Ansah, E., & Ofosu, A. (2022). Factors Contributing to Neonatal Admissions and

- Outcomes at Effia Nkwanta Regional Hospital January to December 2015. *Postgraduate Medical Journal of Ghana*, 8(2), 79–85. <https://doi.org/10.60014/pmjg.v8i2.200>
62. World Health Organization 2020 Standards for improving the quality of care for small and sick newborns in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/nbh/standards-for-improving-the-quality-of-care-for-small-and-sick-newborns-in-health-facilities-2020.pdf?sfvrsn=f2da583c_1
63. Adane, K., Gizachew, M., & Kendie, S. (2019). The role of medical data in efficient patient care delivery: a review. *Risk management and healthcare policy*, 12, 67–73. <https://doi.org/10.2147/RMHP.S179259>
64. Shivani Fox-Lewis, Wyatt Genasci Smith, Vary Lor, Gregor McKellar, Chea Phal, Andrew Fox-Lewis, Paul Turner, Leakhena Neou, Claudia Turner, Get the Basics Right: A Description of the Key Priorities for Establishing a Neonatal Service in a Resource-Limited Setting in Cambodia, *Journal of Tropical Pediatrics*, Volume 65, Issue 2, April 2019, Pages 160–168, <https://doi.org/10.1093/tropej/fmy030>
65. Khasawneh, W., Sindiani, A., Rawabdeh, S. A., Aleshawi, A., & Kanaan, D. (2020). Indications and Clinical Profile of Neonatal Admissions: A Cross-Sectional Descriptive Analysis from a Single Academic Center in Jordan. *Journal of multidisciplinary healthcare*, 13, 997–1006. <https://doi.org/10.2147/JMDH.S275267>
66. Ali, S. R., Ahmed, S., & Lohana, H. (2013). Disease patterns and outcomes of neonatal admissions at a secondary care hospital in pakistan. *Sultan Qaboos University medical journal*, 13(3), 424–428.
67. Fanelli, S., Bellù, R., Zangrandi, A. *et al.* Managerial features and outcome in neonatal intensive care units: results from a cluster analysis. *BMC Health Serv Res* 20, 957 (2020). <https://doi.org/10.1186/s12913-020-05796-0>
68. Giannina Tinoco Mendoza, Tracey Lutz, A review of term admissions to a neonatal intensive care unit – Are some more suited for a transitional unit? *Journal of Neonatal Nursing*, Volume 29, Issue 3, 2023, Pages 482-485, <https://doi.org/10.1016/j.jnn.2022.09.004>. (<https://www.sciencedirect.com/science/article/pii/S1355184122001831>)
69. Horwood, C., Haskins, L., Phakathi, S. *et al.* A health systems strengthening intervention to improve quality of care for sick and small newborn infants: results from an evaluation in district hospitals in KwaZulu-Natal, South Africa. *BMC Pediatr* 19, 29 (2019). <https://doi.org/10.1186/s12887-019-1396-8>
70. Amoakoh, H. B., Klipstein-Grobusch, K., Agyepong, I. A., Amoakoh-Coleman, M., Kayode, G. A., Reitsma, J. B., Grobbee, D. E., & Ansah, E. K. (2020). Can an mhealth clinical decision-making support system improve adherence to neonatal healthcare protocols in a low-resource setting?. *BMC pediatrics*, 20(1), 534. <https://doi.org/10.1186/s12887-020-02378-1>
71. Abdul-Mumin A, Cotache-Condor C, Bimpong KA, Grimm A, Kpiniong MJ, Yakubu RC, Kwarteng PG, Fuseini YH and Smith ER (2021) Decrease in Admissions and Change in the Diagnostic Landscape in a Newborn Care Unit in Northern Ghana During the COVID-19 Pandemic. *Front. Pediatr.* 9:642508. doi: 10.3389/fped.2021.642508
72. Owusu, B. A., Lim, A., Makaje, N., Wobil, P., & SameAe, A. (2018). Neonatal mortality at the neonatal unit: the situation at a teaching hospital in Ghana. *African health sciences*, 18(2), 369–377. <https://doi.org/10.4314/ahs.v18i2.22>

73. Adu-Bonsaffoh K, Tamma E, Nwameme AU, Mocking M, Osman KA, Browne JL (2022) Women's lived experiences of preterm birth and neonatal care for premature infants at a tertiary hospital in Ghana: A qualitative study. *PLOS Glob Public Health* 2(12): e0001303. <https://doi.org/10.1371/journal.pgph.0001303>
74. Adziri H. Sackey and Lily G Tagoe Admissions and mortality over a 5-year period in a limited-resource neonatal unit in Ghana *Ghana Med J* 2019; 53(2): 117-125 doi: <http://dx.doi.org/10.4314/gmj.v53i2.6>
75. Ganle, J.K., Parker, M., Fitzpatrick, R. *et al.* A qualitative study of health system barriers to accessibility and utilization of maternal and newborn healthcare services in Ghana after user-fee abolition. *BMC Pregnancy Childbirth* 14, 425 (2014). <https://doi.org/10.1186/s12884-014-0425-8>
76. Ameyaw, E.K., Amoah, R.M., Njue, C. *et al.* An assessment of hospital maternal health services in northern Ghana: a cross-sectional survey. *BMC Health Serv Res* 20, 1088 (2020). <https://doi.org/10.1186/s12913-020-05937-5>
77. Shen, Q., Leng, H., Shi, Y., Chen, Y., & Zheng, X. (2021). A protocol to develop a standard guideline for neonatal pain management. *Translational pediatrics*, 10(6), 1712–1720. <https://doi.org/10.21037/tp-21-111>
78. Garcia-Rodriguez, M. T., Bujan-Bravo, S., Seijo-Bestilleiro, R., & Gonzalez-Martin, C. (2021). Pain assessment and management in the newborn: A systematized review. *World journal of clinical cases*, 9(21), 5921–5931. <https://doi.org/10.12998/wjcc.v9.i21.5921>
79. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. doi:10.29392/001c.72089
80. Anbalagan S, Mendez MD. Neonatal Abstinence Syndrome. [Updated 2023 Jul 21]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK551498/>
81. Raju, T. N., Suresh, G., & Higgins, R. D. (2011). Patient safety in the context of neonatal intensive care: research and educational opportunities. *Pediatric research*, 70(1), 109–115. <https://doi.org/10.1203/PDR.0b013e3182182853>
82. Khosravi, S., Babaey, F., Abedi, P. *et al.* Strategies to improve the quality of midwifery care and developing midwife-centered care in Iran: analyzing the attitudes of midwifery experts. *BMC Pregnancy Childbirth* 22, 40 (2022). <https://doi.org/10.1186/s12884-022-04379-7>
83. Mayer, M. M., Xhinti, N., Mashao, L., Mlisana, Z., Bobotyana, L., Lowman, C., Patterson, J., Perlman, J. M., & Velaphi, S. (2022). Effect of Training Healthcare Providers in Helping Babies Breathe Program on Neonatal Mortality Rates. *Frontiers in pediatrics*, 10, 872694. <https://doi.org/10.3389/fped.2022.872694>
84. World Health Organization 2020 Standards for improving the quality of care for small and sick newborns in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/nbh/standards-for-improving-the-quality-of-care-for-small-and-sick-newborns-in-health-facilities-2020.pdf?sfvrsn=f2da583c_1
85. Owusu, Y., Medakkar, P., Akinnawo, E. M., Stewart-Pyne, A., & Ashu, E. E. (2017). Emigration of skilled healthcare workers from developing countries: can team-based healthcare practice fill the gaps in maternal, newborn and child healthcare delivery?. *International journal of MCH and AIDS*, 6(2), 121–129. <https://doi.org/10.21106/ijma.204>

86. Geralyn Sue Prullage, Carole Kenner, Fauste Uwingabire, Andre Ndayambaje, Marina Boykova, Karen Walker, Survey of neonatal nursing: Staffing, education, and equipment availability in Rwanda, *Journal of Neonatal Nursing*, Volume 28, Issue 3, 2022, Pages 192-199, <https://doi.org/10.1016/j.jnn.2021.10.007>.
(<https://www.sciencedirect.com/science/article/pii/S1355184121001794>)
87. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
88. Negarandeh, R., Hassankhani, H., Jabraeili, M. *et al.* Health care staff support for mothers in NICU: a focused ethnography study. *BMC Pregnancy Childbirth* 21, 520 (2021). <https://doi.org/10.1186/s12884-021-03991-3>
89. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
90. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
91. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
92. Vivek V. Shukla, Waldemar A. Carlo, Susan Niermeyer, Ruth Guinsburg, Neonatal resuscitation from a global perspective, *Seminars in Perinatology*, Volume 46, Issue 6, 2022,151630, <https://doi.org/10.1016/j.semperi.2022.151630>.
(<https://www.sciencedirect.com/science/article/pii/S014600052200060X>)
93. Adua, E., Frimpong, K., Li, X., & Wang, W. (2017). Emerging issues in public health: a perspective on Ghana's healthcare expenditure, policies and outcomes. *The EPMA journal*, 8(3), 197–206. <https://doi.org/10.1007/s13167-017-0109-3>
94. Adatar, P., Amooba, P.A., Afaya, A. *et al.* Challenges experienced by midwives working in rural communities in the Upper East Region of Ghana: a qualitative study. *BMC Pregnancy Childbirth* 21, 287 (2021). <https://doi.org/10.1186/s12884-021-03762-0>
95. Ganle, J.K., Parker, M., Fitzpatrick, R. *et al.* A qualitative study of health system barriers to accessibility and utilization of maternal and newborn healthcare services in Ghana after user-fee abolition. *BMC Pregnancy Childbirth* 14, 425 (2014). <https://doi.org/10.1186/s12884-014-0425-8>
96. Escribano-Ferrer, B., Cluzeau, F., Cutler, D., Akufo, C., & Chalkidou, K. (2016). Quality of Health Care in Ghana: Mapping of Interventions and the Way Forward. *Ghana medical journal*, 50(4), 238–247. <https://doi.org/10.4314/gmj.v50i4.7>
97. Sacks E, Sakyi K, Owusu PG, et al. Factors contributing to neonatal mortality reduction in three regions in Ghana: a mixed-methods study using the Lives Saved (LiST) modelling tool. *Journal of Global Health Reports*. 2022;5:e2021109. [doi:10.29392/001c.30750](https://doi.org/10.29392/001c.30750)
98. Siaw-Frimpong, M., Touray, S., & Sefa, N. (2021). Capacity of intensive care units in Ghana. *Journal of critical care*, 61, 76–81. <https://doi.org/10.1016/j.jcrc.2020.10.009>
99. Morgane Michel, Corinne Alberti, Jean-Claude Carel, & Karine Chevreul, Socioeconomic Status of Newborns and Hospital Efficiency: Implications for Hospital Payment Methods VALUE

- HEALTH. 2020; 23(3):335–342 [https://www.valueinhealthjournal.com/article/S1098-3015\(19\)35180-0/fulltext](https://www.valueinhealthjournal.com/article/S1098-3015(19)35180-0/fulltext)
100. Sullivan, B. A., Doshi, A., Chernyavskiy, P., Husain, A., Binai, A., Sahni, R., Fairchild, K. D., Moorman, J. R., Travers, C. P., & Vesoulis, Z. A. (2023). Neighborhood Deprivation and Association With Neonatal Intensive Care Unit Mortality and Morbidity for Extremely Premature Infants. *JAMA network open*, 6(5), e2311761. <https://doi.org/10.1001/jamanetworkopen.2023.11761>
101. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
102. Cochran, A.L., McDonald, N.C., Prunkl, L. *et al.* Transportation barriers to care among frequent health care users during the COVID pandemic. *BMC Public Health* 22, 1783 (2022). <https://doi.org/10.1186/s12889-022-14149-x>
103. Soltani, S., Takian, A., Akbari Sari, A., Majdzadeh, R., & Kamali, M. (2019). Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iranian journal of public health*, 48(3), 508–515.
104. Agyemang-Duah, W., Pehrah, C. & Pehrah, P. Barriers to formal healthcare utilisation among poor older people under the livelihood empowerment against poverty programme in the Atwima Nwabiagya District of Ghana. *BMC Public Health* 19, 1185 (2019). <https://doi.org/10.1186/s12889-019-7437-2>
105. Brian Caballo, Suchona Dey, Pranav Prabhu, Bhata Seal, Peter Chu 2021 Across the Spectrum of Socioeconomics Volume 1 Issue 4 DOI: 10.5281/zenodo.4740684 https://projects.iq.harvard.edu/files/isl/files/the_effects_of_socioeconomic_status_on_the_quality_and_accessibility_of_healthcare_services.pdf
106. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
107. Atuoye, K.N., Dixon, J., Rishworth, A. *et al.* Can she make it? Transportation barriers to accessing maternal and child health care services in rural Ghana. *BMC Health Serv Res* 15, 333 (2015). <https://doi.org/10.1186/s12913-015-1005-y>
108. Soltani, S., Takian, A., Akbari Sari, A., Majdzadeh, R., & Kamali, M. (2019). Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iranian journal of public health*, 48(3), 508–515.
109. Oguntade HA, Nishath T, Owusu PG, Papadimitriou C, Sakyi KS (2022) Barriers to providing healthcare to children living with cerebral palsy in Ghana: A qualitative study of healthcare provider perspectives. *PLOS Global Public Health* 2(12): e0001331. <https://doi.org/10.1371/journal.pgph.0001331>
110. Varela, C., Young, S., Mkandawire, N. *et al.* TRANSPORTATION BARRIERS TO ACCESS HEALTH CARE FOR SURGICAL CONDITIONS IN MALAWI a cross sectional nationwide household survey. *BMC Public Health* 19, 264 (2019). <https://doi.org/10.1186/s12889-019-6577-8>
111. Sullivan, B. A., Doshi, A., Chernyavskiy, P., Husain, A., Binai, A., Sahni, R., Fairchild, K. D., Moorman, J. R., Travers, C. P., & Vesoulis, Z. A. (2023). Neighborhood Deprivation and Association With Neonatal Intensive Care Unit Mortality and Morbidity for Extremely Premature

- Infants. *JAMA network open*, 6(5), e2311761. <https://doi.org/10.1001/jamanetworkopen.2023.11761>
112. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
113. Cochran, A.L., McDonald, N.C., Prunkl, L. *et al.* Transportation barriers to care among frequent health care users during the COVID pandemic. *BMC Public Health* 22, 1783 (2022). <https://doi.org/10.1186/s12889-022-14149-x>
114. Soltani, S., Takian, A., Akbari Sari, A., Majdzadeh, R., & Kamali, M. (2019). Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iranian journal of public health*, 48(3), 508–515.
115. Agyemang-Duah, W., Peparah, C. & Peparah, P. Barriers to formal healthcare utilisation among poor older people under the livelihood empowerment against poverty programme in the Atwima Nwabiagya District of Ghana. *BMC Public Health* 19, 1185 (2019). <https://doi.org/10.1186/s12889-019-7437-2>
116. Brian Caballo, Suchona Dey, Pranav Prabhu, Bhata Seal, Peter Chu 2021 Across the Spectrum of Socioeconomics Volume 1 Issue 4 DOI: 10.5281/zenodo.4740684 https://projects.iq.harvard.edu/files/isl/files/the_effects_of_socioeconomic_status_on_the_quality_and_accessibility_of_healthcare_services.pdf
117. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
118. Raju, T. N., Suresh, G., & Higgins, R. D. (2011). Patient safety in the context of neonatal intensive care: research and educational opportunities. *Pediatric research*, 70(1), 109–115. <https://doi.org/10.1203/PDR.0b013e3182182853>
119. Khosravi, S., Babaey, F., Abedi, P. *et al.* Strategies to improve the quality of midwifery care and developing midwife-centered care in Iran: analyzing the attitudes of midwifery experts. *BMC Pregnancy Childbirth* 22, 40 (2022). <https://doi.org/10.1186/s12884-022-04379-7>
120. Mayer, M. M., Xhinti, N., Mashao, L., Mlisana, Z., Bobotyana, L., Lowman, C., Patterson, J., Perlman, J. M., & Velaphi, S. (2022). Effect of Training Healthcare Providers in Helping Babies Breathe Program on Neonatal Mortality Rates. *Frontiers in pediatrics*, 10, 872694. <https://doi.org/10.3389/fped.2022.872694>
121. World Health Organization 2020 Standards for improving the quality of care for small and sick newborns in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/nbh/standards-for-improving-the-quality-of-care-for-small-and-sick-newborns-in-health-facilities-2020.pdf?sfvrsn=f2da583c_1
122. Owusu, Y., Medakkar, P., Akinnawo, E. M., Stewart-Pyne, A., & Ashu, E. E. (2017). Emigration of skilled healthcare workers from developing countries: can team-based healthcare practice fill the gaps in maternal, newborn and child healthcare delivery?. *International journal of MCH and AIDS*, 6(2), 121–129. <https://doi.org/10.21106/ijma.204>
123. Geralyn Sue Prullage, Carole Kenner, Fauste Uwingabire, Andre Ndayambaje, Marina Boykova, Karen Walker, Survey of neonatal nursing: Staffing, education, and equipment availability in Rwanda, *Journal of Neonatal Nursing*, Volume 28, Issue 3, 2022, Pages 192-199,

- <https://doi.org/10.1016/j.jnn.2021.10.007>.
(<https://www.sciencedirect.com/science/article/pii/S1355184121001794>)
124. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
125. Negarandeh, R., Hassankhani, H., Jabraeili, M. *et al.* Health care staff support for mothers in NICU: a focused ethnography study. *BMC Pregnancy Childbirth* 21, 520 (2021). <https://doi.org/10.1186/s12884-021-03991-3>
126. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
127. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
128. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
129. Raju, T. N., Suresh, G., & Higgins, R. D. (2011). Patient safety in the context of neonatal intensive care: research and educational opportunities. *Pediatric research*, 70(1), 109–115. <https://doi.org/10.1203/PDR.0b013e3182182853>
130. Khosravi, S., Babaei, F., Abedi, P. *et al.* Strategies to improve the quality of midwifery care and developing midwife-centered care in Iran: analyzing the attitudes of midwifery experts. *BMC Pregnancy Childbirth* 22, 40 (2022). <https://doi.org/10.1186/s12884-022-04379-7>
131. Mayer, M. M., Xhinti, N., Mashao, L., Mlisana, Z., Bobotyana, L., Lowman, C., Patterson, J., Perlman, J. M., & Velaphi, S. (2022). Effect of Training Healthcare Providers in Helping Babies Breathe Program on Neonatal Mortality Rates. *Frontiers in pediatrics*, 10, 872694. <https://doi.org/10.3389/fped.2022.872694>
132. World Health Organization 2020 Standards for improving the quality of care for small and sick newborns in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/nbh/standards-for-improving-the-quality-of-care-for-small-and-sick-newborns-in-health-facilities-2020.pdf?sfvrsn=f2da583c_1
133. Owusu, Y., Medakkar, P., Akinawo, E. M., Stewart-Pyne, A., & Ashu, E. E. (2017). Emigration of skilled healthcare workers from developing countries: can team-based healthcare practice fill the gaps in maternal, newborn and child healthcare delivery?. *International journal of MCH and AIDS*, 6(2), 121–129. <https://doi.org/10.21106/ijma.204>
134. Geralyn Sue Prullage, Carole Kenner, Fauste Uwingabire, Andre Ndayambaje, Marina Boykova, Karen Walker, Survey of neonatal nursing: Staffing, education, and equipment availability in Rwanda, *Journal of Neonatal Nursing*, Volume 28, Issue 3, 2022, Pages 192-199, <https://doi.org/10.1016/j.jnn.2021.10.007>.
(<https://www.sciencedirect.com/science/article/pii/S1355184121001794>)
135. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>

136. Negarandeh, R., Hassankhani, H., Jabraeili, M. *et al.* Health care staff support for mothers in NICU: a focused ethnography study. *BMC Pregnancy Childbirth* 21, 520 (2021). <https://doi.org/10.1186/s12884-021-03991-3>
137. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
138. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
139. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
140. Sacks E, Sakyi K, Owusu PG, et al. Factors contributing to neonatal mortality reduction in three regions in Ghana: a mixed-methods study using the Lives Saved (LiST) modelling tool. *Journal of Global Health Reports*. 2022;5:e2021109. [doi:10.29392/001c.30750](https://doi.org/10.29392/001c.30750)
141. Siaw-Frimpong, M., Touray, S., & Sefa, N. (2021). Capacity of intensive care units in Ghana. *Journal of critical care*, 61, 76–81. <https://doi.org/10.1016/j.jcrc.2020.10.009>
142. Morgane Michel, Corinne Alberti, Jean-Claude Carel, & Karine Chevreul, Socioeconomic Status of Newborns and Hospital Efficiency: Implications for Hospital Payment Methods *VALUE HEALTH*. 2020; 23(3):335–342 [https://www.valueinhealthjournal.com/article/S1098-3015\(19\)35180-0/fulltext](https://www.valueinhealthjournal.com/article/S1098-3015(19)35180-0/fulltext)
143. Sullivan, B. A., Doshi, A., Chernyavskiy, P., Husain, A., Binai, A., Sahni, R., Fairchild, K. D., Moorman, J. R., Travers, C. P., & Vesoulis, Z. A. (2023). Neighborhood Deprivation and Association With Neonatal Intensive Care Unit Mortality and Morbidity for Extremely Premature Infants. *JAMA network open*, 6(5), e2311761. <https://doi.org/10.1001/jamanetworkopen.2023.11761>
144. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
145. Cochran, A.L., McDonald, N.C., Prunkl, L. *et al.* Transportation barriers to care among frequent health care users during the COVID pandemic. *BMC Public Health* 22, 1783 (2022). <https://doi.org/10.1186/s12889-022-14149-x>
146. Soltani, S., Takian, A., Akbari Sari, A., Majdzadeh, R., & Kamali, M. (2019). Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iranian journal of public health*, 48(3), 508–515.
147. Agyemang-Duah, W., Peparah, C. & Peparah, P. Barriers to formal healthcare utilisation among poor older people under the livelihood empowerment against poverty programme in the Atwima Nwabiagya District of Ghana. *BMC Public Health* 19, 1185 (2019). <https://doi.org/10.1186/s12889-019-7437-2>
148. Brian Caballo, Suchona Dey, Pranav Prabhu, Bhata Seal, Peter Chu 2021 Across the Spectrum of Socioeconomics Volume 1 Issue 4 DOI: 10.5281/zenodo.4740684 https://projects.iq.harvard.edu/files/isl/files/the_effects_of_socioeconomic_status_on_the_quality_and_accessibility_of_healthcare_services.pdf

149. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
150. Atuoye, K.N., Dixon, J., Rishworth, A. *et al.* Can she make it? Transportation barriers to accessing maternal and child health care services in rural Ghana. *BMC Health Serv Res* 15, 333 (2015). <https://doi.org/10.1186/s12913-015-1005-y>
151. Soltani, S., Takian, A., Akbari Sari, A., Majdzadeh, R., & Kamali, M. (2019). Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iranian journal of public health*, 48(3), 508–515.
152. Oguntade HA, Nishath T, Owusu PG, Papadimitriou C, Sakyi KS (2022) Barriers to providing healthcare to children living with cerebral palsy in Ghana: A qualitative study of healthcare provider perspectives. *PLOS Global Public Health* 2(12): e0001331. <https://doi.org/10.1371/journal.pgph.0001331>
153. Varela, C., Young, S., Mkandawire, N. *et al.* TRANSPORTATION BARRIERS TO ACCESS HEALTH CARE FOR SURGICAL CONDITIONS IN MALAWI a cross sectional nationwide household survey. *BMC Public Health* 19, 264 (2019). <https://doi.org/10.1186/s12889-019-6577-8>
154. Sullivan, B. A., Doshi, A., Chernyavskiy, P., Husain, A., Binai, A., Sahni, R., Fairchild, K. D., Moorman, J. R., Travers, C. P., & Vesoulis, Z. A. (2023). Neighborhood Deprivation and Association With Neonatal Intensive Care Unit Mortality and Morbidity for Extremely Premature Infants. *JAMA network open*, 6(5), e2311761. <https://doi.org/10.1001/jamanetworkopen.2023.11761>
155. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
156. Cochran, A.L., McDonald, N.C., Prunkl, L. *et al.* Transportation barriers to care among frequent health care users during the COVID pandemic. *BMC Public Health* 22, 1783 (2022). <https://doi.org/10.1186/s12889-022-14149-x>
157. Soltani, S., Takian, A., Akbari Sari, A., Majdzadeh, R., & Kamali, M. (2019). Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iranian journal of public health*, 48(3), 508–515.
158. Agyemang-Duah, W., Peprah, C. & Peprah, P. Barriers to formal healthcare utilisation among poor older people under the livelihood empowerment against poverty programme in the Atwima Nwabiagya District of Ghana. *BMC Public Health* 19, 1185 (2019). <https://doi.org/10.1186/s12889-019-7437-2>
159. Agyemang-Duah, W., Peprah, C. & Peprah, P. Barriers to formal healthcare utilisation among poor older people under the livelihood empowerment against poverty programme in the Atwima Nwabiagya District of Ghana. *BMC Public Health* 19, 1185 (2019). <https://doi.org/10.1186/s12889-019-7437-2>
160. Amoakoh, H. B., Klipstein-Grobusch, K., Agyepong, I. A., Amoakoh-Coleman, M., Kayode, G. A., Reitsma, J. B., Grobbee, D. E., & Ansah, E. K. (2020). Can an mhealth clinical decision-making support system improve adherence to neonatal healthcare protocols in a low-resource setting?. *BMC pediatrics*, 20(1), 534. <https://doi.org/10.1186/s12887-020-02378-1>

161. Abdul-Mumin A, Cotache-Condor C, Bimpong KA, Grimm A, Kpiniong MJ, Yakubu RC, Kwarteng PG, Fuseini YH and Smith ER (2021) Decrease in Admissions and Change in the Diagnostic Landscape in a Newborn Care Unit in Northern Ghana During the COVID-19 Pandemic. *Front. Pediatr.* 9:642508. doi: 10.3389/fped.2021.642508
162. Owusu, B. A., Lim, A., Makaje, N., Wobil, P., & SameAe, A. (2018). Neonatal mortality at the neonatal unit: the situation at a teaching hospital in Ghana. *African health sciences*, 18(2), 369–377. <https://doi.org/10.4314/ahs.v18i2.22>
163. Adu-Bonsaffoh K, Tamma E, Nwameme AU, Mocking M, Osman KA, Browne JL (2022) Women’s lived experiences of preterm birth and neonatal care for premature infants at a tertiary hospital in Ghana: A qualitative study. *PLOS Glob Public Health* 2(12): e0001303. <https://doi.org/10.1371/journal.pgph.0001303>
164. Adziri H. Sackey and Lily G Tagoe Admissions and mortality over a 5-year period in a limited-resource neonatal unit in Ghana *Ghana Med J* 2019; 53(2): 117-125 doi: <http://dx.doi.org/10.4314/gmj.v53i2.6>
165. Ganle, J.K., Parker, M., Fitzpatrick, R. *et al.* A qualitative study of health system barriers to accessibility and utilization of maternal and newborn healthcare services in Ghana after user-fee abolition. *BMC Pregnancy Childbirth* 14, 425 (2014). <https://doi.org/10.1186/s12884-014-0425-8>
166. Ameyaw, E.K., Amoah, R.M., Njue, C. *et al.* An assessment of hospital maternal health services in northern Ghana: a cross-sectional survey. *BMC Health Serv Res* 20, 1088 (2020). <https://doi.org/10.1186/s12913-020-05937-5>
167. Amoakoh, H. B., Klipstein-Grobusch, K., Agyepong, I. A., Amoakoh-Coleman, M., Kayode, G. A., Reitsma, J. B., Grobbee, D. E., & Ansah, E. K. (2020). Can an mhealth clinical decision-making support system improve adherence to neonatal healthcare protocols in a low-resource setting?. *BMC pediatrics*, 20(1), 534. <https://doi.org/10.1186/s12887-020-02378-1>
168. Abdul-Mumin A, Cotache-Condor C, Bimpong KA, Grimm A, Kpiniong MJ, Yakubu RC, Kwarteng PG, Fuseini YH and Smith ER (2021) Decrease in Admissions and Change in the Diagnostic Landscape in a Newborn Care Unit in Northern Ghana During the COVID-19 Pandemic. *Front. Pediatr.* 9:642508. doi: 10.3389/fped.2021.642508
169. Owusu, B. A., Lim, A., Makaje, N., Wobil, P., & SameAe, A. (2018). Neonatal mortality at the neonatal unit: the situation at a teaching hospital in Ghana. *African health sciences*, 18(2), 369–377. <https://doi.org/10.4314/ahs.v18i2.22>
170. Adu-Bonsaffoh K, Tamma E, Nwameme AU, Mocking M, Osman KA, Browne JL (2022) Women’s lived experiences of preterm birth and neonatal care for premature infants at a tertiary hospital in Ghana: A qualitative study. *PLOS Glob Public Health* 2(12): e0001303. <https://doi.org/10.1371/journal.pgph.0001303>
171. Adziri H. Sackey and Lily G Tagoe Admissions and mortality over a 5-year period in a limited-resource neonatal unit in Ghana *Ghana Med J* 2019; 53(2): 117-125 doi: <http://dx.doi.org/10.4314/gmj.v53i2.6>
172. Ganle, J.K., Parker, M., Fitzpatrick, R. *et al.* A qualitative study of health system barriers to accessibility and utilization of maternal and newborn healthcare services in Ghana after user-fee abolition. *BMC Pregnancy Childbirth* 14, 425 (2014). <https://doi.org/10.1186/s12884-014-0425-8>

173. Ameyaw, E.K., Amoah, R.M., Njue, C. *et al.* An assessment of hospital maternal health services in northern Ghana: a cross-sectional survey. *BMC Health Serv Res* 20, 1088 (2020). <https://doi.org/10.1186/s12913-020-05937-5>
174. Amoakoh, H. B., Klipstein-Grobusch, K., Agyepong, I. A., Amoakoh-Coleman, M., Kayode, G. A., Reitsma, J. B., Grobbee, D. E., & Ansah, E. K. (2020). Can an mhealth clinical decision-making support system improve adherence to neonatal healthcare protocols in a low-resource setting?. *BMC pediatrics*, 20(1), 534. <https://doi.org/10.1186/s12887-020-02378-1>
175. Abdul-Mumin A, Cotache-Condor C, Bimpong KA, Grimm A, Kpiniong MJ, Yakubu RC, Kwarteng PG, Fuseini YH and Smith ER (2021) Decrease in Admissions and Change in the Diagnostic Landscape in a Newborn Care Unit in Northern Ghana During the COVID-19 Pandemic. *Front. Pediatr.* 9:642508. doi: 10.3389/fped.2021.642508
176. Owusu, B. A., Lim, A., Makaje, N., Wobil, P., & SameAe, A. (2018). Neonatal mortality at the neonatal unit: the situation at a teaching hospital in Ghana. *African health sciences*, 18(2), 369–377. <https://doi.org/10.4314/ahs.v18i2.22>
177. Adu-Bonsaffoh K, Tamma E, Nwameme AU, Mocking M, Osman KA, Browne JL (2022) Women’s lived experiences of preterm birth and neonatal care for premature infants at a tertiary hospital in Ghana: A qualitative study. *PLOS Glob Public Health* 2(12): e0001303. <https://doi.org/10.1371/journal.pgph.0001303>
178. Adziri H. Sackey and Lily G Tagoe Admissions and mortality over a 5-year period in a limited-resource neonatal unit in Ghana *Ghana Med J* 2019; 53(2): 117-125 doi: <http://dx.doi.org/10.4314/gmj.v53i2.6>
179. Ganle, J.K., Parker, M., Fitzpatrick, R. *et al.* A qualitative study of health system barriers to accessibility and utilization of maternal and newborn healthcare services in Ghana after user-fee abolition. *BMC Pregnancy Childbirth* 14, 425 (2014). <https://doi.org/10.1186/s12884-014-0425-8>
180. Ameyaw, E.K., Amoah, R.M., Njue, C. *et al.* An assessment of hospital maternal health services in northern Ghana: a cross-sectional survey. *BMC Health Serv Res* 20, 1088 (2020). <https://doi.org/10.1186/s12913-020-05937-5>
181. Amoakoh, H. B., Klipstein-Grobusch, K., Agyepong, I. A., Amoakoh-Coleman, M., Kayode, G. A., Reitsma, J. B., Grobbee, D. E., & Ansah, E. K. (2020). Can an mhealth clinical decision-making support system improve adherence to neonatal healthcare protocols in a low-resource setting?. *BMC pediatrics*, 20(1), 534. <https://doi.org/10.1186/s12887-020-02378-1>
182. Abdul-Mumin A, Cotache-Condor C, Bimpong KA, Grimm A, Kpiniong MJ, Yakubu RC, Kwarteng PG, Fuseini YH and Smith ER (2021) Decrease in Admissions and Change in the Diagnostic Landscape in a Newborn Care Unit in Northern Ghana During the COVID-19 Pandemic. *Front. Pediatr.* 9:642508. doi: 10.3389/fped.2021.642508
183. Owusu, B. A., Lim, A., Makaje, N., Wobil, P., & SameAe, A. (2018). Neonatal mortality at the neonatal unit: the situation at a teaching hospital in Ghana. *African health sciences*, 18(2), 369–377. <https://doi.org/10.4314/ahs.v18i2.22>
184. Adu-Bonsaffoh K, Tamma E, Nwameme AU, Mocking M, Osman KA, Browne JL (2022) Women’s lived experiences of preterm birth and neonatal care for premature infants at a tertiary hospital in Ghana: A qualitative study. *PLOS Glob Public Health* 2(12): e0001303. <https://doi.org/10.1371/journal.pgph.0001303>

185. Adziri H. Sackey and Lily G Tagoe Admissions and mortality over a 5-year period in a limited-resource neonatal unit in Ghana *Ghana Med J* 2019; 53(2): 117-125 doi: <http://dx.doi.org/10.4314/gmj.v53i2.6>
186. Ganle, J.K., Parker, M., Fitzpatrick, R. *et al.* A qualitative study of health system barriers to accessibility and utilization of maternal and newborn healthcare services in Ghana after user-fee abolition. *BMC Pregnancy Childbirth* 14, 425 (2014). <https://doi.org/10.1186/s12884-014-0425-8>
187. Ameyaw, E.K., Amoah, R.M., Njue, C. *et al.* An assessment of hospital maternal health services in northern Ghana: a cross-sectional survey. *BMC Health Serv Res* 20, 1088 (2020). <https://doi.org/10.1186/s12913-020-05937-5>
188. Amoakoh, H. B., Klipstein-Grobusch, K., Agyepong, I. A., Amoakoh-Coleman, M., Kayode, G. A., Reitsma, J. B., Grobbee, D. E., & Ansah, E. K. (2020). Can an mhealth clinical decision-making support system improve adherence to neonatal healthcare protocols in a low-resource setting?. *BMC pediatrics*, 20(1), 534. <https://doi.org/10.1186/s12887-020-02378-1>
189. Abdul-Mumin A, Cotache-Condor C, Bimpong KA, Grimm A, Kpiniong MJ, Yakubu RC, Kwarteng PG, Fuseini YH and Smith ER (2021) Decrease in Admissions and Change in the Diagnostic Landscape in a Newborn Care Unit in Northern Ghana During the COVID-19 Pandemic. *Front. Pediatr.* 9:642508. doi: 10.3389/fped.2021.642508
190. Owusu, B. A., Lim, A., Makaje, N., Wobil, P., & SameAe, A. (2018). Neonatal mortality at the neonatal unit: the situation at a teaching hospital in Ghana. *African health sciences*, 18(2), 369–377. <https://doi.org/10.4314/ahs.v18i2.22>
191. Adu-Bonsaffoh K, Tamma E, Nwameme AU, Mocking M, Osman KA, Browne JL (2022) Women’s lived experiences of preterm birth and neonatal care for premature infants at a tertiary hospital in Ghana: A qualitative study. *PLOS Glob Public Health* 2(12): e0001303. <https://doi.org/10.1371/journal.pgph.0001303>
192. Adziri H. Sackey and Lily G Tagoe Admissions and mortality over a 5-year period in a limited-resource neonatal unit in Ghana *Ghana Med J* 2019; 53(2): 117-125 doi: <http://dx.doi.org/10.4314/gmj.v53i2.6>
193. Ganle, J.K., Parker, M., Fitzpatrick, R. *et al.* A qualitative study of health system barriers to accessibility and utilization of maternal and newborn healthcare services in Ghana after user-fee abolition. *BMC Pregnancy Childbirth* 14, 425 (2014). <https://doi.org/10.1186/s12884-014-0425-8>
194. Ameyaw, E.K., Amoah, R.M., Njue, C. *et al.* An assessment of hospital maternal health services in northern Ghana: a cross-sectional survey. *BMC Health Serv Res* 20, 1088 (2020). <https://doi.org/10.1186/s12913-020-05937-5>
195. Mayer, M. M., Xhinti, N., Mashao, L., Mlisana, Z., Bobotyana, L., Lowman, C., Patterson, J., Perlman, J. M., & Velaphi, S. (2022). Effect of Training Healthcare Providers in Helping Babies Breathe Program on Neonatal Mortality Rates. *Frontiers in pediatrics*, 10, 872694. <https://doi.org/10.3389/fped.2022.872694>
196. World Health Organization 2020 Standards for improving the quality of care for small and sick newborns in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/nbh/standards-for-improving-the-quality-of-care-for-small-and-sick-newborns-in-health-facilities-2020.pdf?sfvrsn=f2da583c_1
197. Owusu, Y., Medakkar, P., Akinnawo, E. M., Stewart-Pyne, A., & Ashu, E. E. (2017). Emigration of skilled healthcare workers from developing countries: can team-based healthcare practice fill the

- gaps in maternal, newborn and child healthcare delivery?. *International journal of MCH and AIDS*, 6(2), 121–129. <https://doi.org/10.21106/ijma.204>
198. Geralyn Sue Prullage, Carole Kenner, Fauste Uwingabire, Andre Ndayambaje, Marina Boykova, Karen Walker, Survey of neonatal nursing: Staffing, education, and equipment availability in Rwanda, *Journal of Neonatal Nursing*, Volume 28, Issue 3, 2022, Pages 192-199, <https://doi.org/10.1016/j.jnn.2021.10.007>.
(<https://www.sciencedirect.com/science/article/pii/S1355184121001794>)
199. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
200. Negarandeh, R., Hassankhani, H., Jabraeili, M. *et al.* Health care staff support for mothers in NICU: a focused ethnography study. *BMC Pregnancy Childbirth* 21, 520 (2021). <https://doi.org/10.1186/s12884-021-03991-3>
201. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
202. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
203. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
204. Sacks E, Sakyi K, Owusu PG, et al. Factors contributing to neonatal mortality reduction in three regions in Ghana: a mixed-methods study using the Lives Saved (LiST) modelling tool. *Journal of Global Health Reports*. 2022;5:e2021109. [doi:10.29392/001c.30750](https://doi.org/10.29392/001c.30750)
205. Siaw-Frimpong, M., Touray, S., & Sefa, N. (2021). Capacity of intensive care units in Ghana. *Journal of critical care*, 61, 76–81. <https://doi.org/10.1016/j.jcrc.2020.10.009>
206. Mayer, M. M., Xhinti, N., Mashao, L., Mlisana, Z., Bobotyana, L., Lowman, C., Patterson, J., Perlman, J. M., & Velaphi, S. (2022). Effect of Training Healthcare Providers in Helping Babies Breathe Program on Neonatal Mortality Rates. *Frontiers in pediatrics*, 10, 872694. <https://doi.org/10.3389/fped.2022.872694>
207. World Health Organization 2020 Standards for improving the quality of care for small and sick newborns in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/nbh/standards-for-improving-the-quality-of-care-for-small-and-sick-newborns-in-health-facilities-2020.pdf?sfvrsn=f2da583c_1
208. Owusu, Y., Medakkar, P., Akinawo, E. M., Stewart-Pyne, A., & Ashu, E. E. (2017). Emigration of skilled healthcare workers from developing countries: can team-based healthcare practice fill the gaps in maternal, newborn and child healthcare delivery?. *International journal of MCH and AIDS*, 6(2), 121–129. <https://doi.org/10.21106/ijma.204>
209. Geralyn Sue Prullage, Carole Kenner, Fauste Uwingabire, Andre Ndayambaje, Marina Boykova, Karen Walker, Survey of neonatal nursing: Staffing, education, and equipment availability in Rwanda, *Journal of Neonatal Nursing*, Volume 28, Issue 3, 2022, Pages 192-199,

- <https://doi.org/10.1016/j.jnn.2021.10.007>.
(<https://www.sciencedirect.com/science/article/pii/S1355184121001794>)
210. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
211. Negarandeh, R., Hassankhani, H., Jabraeili, M. *et al.* Health care staff support for mothers in NICU: a focused ethnography study. *BMC Pregnancy Childbirth* 21, 520 (2021). <https://doi.org/10.1186/s12884-021-03991-3>
212. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
213. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
214. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
215. Sacks E, Sakyi K, Owusu PG, et al. Factors contributing to neonatal mortality reduction in three regions in Ghana: a mixed-methods study using the Lives Saved (LiST) modelling tool. *Journal of Global Health Reports*. 2022;5:e2021109. [doi:10.29392/001c.30750](https://doi.org/10.29392/001c.30750)
216. Siaw-Frimpong, M., Touray, S., & Sefa, N. (2021). Capacity of intensive care units in Ghana. *Journal of critical care*, 61, 76–81. <https://doi.org/10.1016/j.jcrc.2020.10.009>
217. Mungai IG, Baghel SS, Soni S, Vagela S, Sharma M, Diwan V, Tamhankar AJ, Lundborg CS, Pathak A. Identifying the know-do gap in evidence-based neonatal care practices among informal health care providers—a cross-sectional study from Ujjain, India. *BMC Health Serv Res*. 2020 Oct 21;20(1):966. doi: 10.1186/s12913-020-05805-2. PMID: 33087124; PMCID: PMC7576775.
218. Bee, M., Shiroor, A. & Hill, Z. Neonatal care practices in sub-Saharan Africa: a systematic review of quantitative and qualitative data. *J Health Popul Nutr* 37, 9 (2018). <https://doi.org/10.1186/s41043-018-0141-5>
219. Brambilla Pisoni G, Gaulis C, Suter S, Rochat MA, Makohliso S, Roth-Kleiner M, Kyokan M, Pfister RE and Schönenberger K (2022) Ending Neonatal Deaths From Hypothermia in Sub-Saharan Africa: Call for Essential Technologies Tailored to the Context. *Front. Public Health* 10:851739. doi: 10.3389/fpubh.2022.851739
220. Brignoni-Pérez, E., Scala, M., Feldman, H. M., Marchman, V. A., & Travis, K. E. (2022). Disparities in Kangaroo Care for Premature Infants in the Neonatal Intensive Care Unit. *Journal of developmental and behavioral pediatrics* : *JDBP*, 43(5), e304–e311. <https://doi.org/10.1097/DBP.0000000000001029>
221. Omer, S., Zakar, R., Zakar, M.Z. *et al.* The influence of social and cultural practices on maternal mortality: a qualitative study from South Punjab, Pakistan. *Reprod Health* 18, 97 (2021). <https://doi.org/10.1186/s12978-021-01151-6>
222. Harvey, Vickita Akosua Antwiwaa, "Socio-economic and Cultural Determinants of Health Care Services Utilization in Ghana" (2014). UNLV Theses, Dissertations, Professional Papers, and Capstones. 2266. <http://dx.doi.org/10.34917/7048585>

223. Brathwaite, K. P., Bryce, F., Moyer, L. B., Engmann, C., Twum-Danso, N. A. Y., Kamath-Rayne, B. D., Srofenyoh, E. K., Ucer, S., Boadu, R. O., & Owen, M. D. (2020). Evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana. *Resuscitation plus*, 1-2, 100001. <https://doi.org/10.1016/j.resplu.2020.100001>
224. Kimberly P. Brathwaite, Fiona Bryce, Laurel B. Moyer, Cyril Engmann, Nana A.Y. Twum-Danso, Beena D. Kamath-Rayne, Emmanuel K. Srofenyoh, Sebnem Ucer, Richard O. Boadu, Medge D. Owen, (2020) Evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana, *Resuscitation Plus* 1–2, 2020,100001, <https://doi.org/10.1016/j.resplu.2020.100001>.(<https://www.sciencedirect.com/science/article/pii/S2666520420300011>)
225. Bakari, A., Bell, A.J., Oppong, S.A. *et al.* Neonatal near-misses in Ghana: a prospective, observational, multi-center study. *BMC Pediatr* 19, 509 (2019). <https://doi.org/10.1186/s12887-019-1883-y>
226. Chinbuah, M.A., Taylor, M., Serpa, M. *et al.* Scaling up Ghana's national newborn care initiative: integrating 'helping babies breathe' (HBB), 'essential care for every baby' (ECEB), and newborn 'infection prevention' (IP) trainings. *BMC Health Serv Res* 20, 739 (2020). <https://doi.org/10.1186/s12913-020-05225-2>
227. Dodor, E. A., Ntodi, P. K., Bagina, J., Ofori-Gyasi, S., Tinkorang, E. K. T., Antweam, D., Nagai, R. A. N., Ansah, E., & Ofosu, A. (2022). Factors Contributing to Neonatal Admissions and Outcomes at Effia Nkwanta Regional Hospital January to December 2015. *Postgraduate Medical Journal of Ghana*, 8(2), 79–85. <https://doi.org/10.60014/pmjpg.v8i2.200>
228. World Health Organization 2020 Standards for improving the quality of care for small and sick newborns in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/nbh/standards-for-improving-the-quality-of-care-for-small-and-sick-newborns-in-health-facilities-2020.pdf?sfvrsn=f2da583c_1
229. Adane, K., Gizachew, M., & Kendie, S. (2019). The role of medical data in efficient patient care delivery: a review. *Risk management and healthcare policy*, 12, 67–73. <https://doi.org/10.2147/RMHP.S179259>
230. Mungai IG, Baghel SS, Soni S, Vagela S, Sharma M, Diwan V, Tamhankar AJ, Lundborg CS, Pathak A. Identifying the know-do gap in evidence-based neonatal care practices among informal health care providers-a cross-sectional study from Ujjain, India. *BMC Health Serv Res*. 2020 Oct 21;20(1):966. doi: 10.1186/s12913-020-05805-2. PMID: 33087124; PMCID: PMC7576775.
231. Bee, M., Shiroor, A. & Hill, Z. Neonatal care practices in sub-Saharan Africa: a systematic review of quantitative and qualitative data. *J Health Popul Nutr* 37, 9 (2018). <https://doi.org/10.1186/s41043-018-0141-5>
232. Brambilla Pisoni G, Gaulis C, Suter S, Rochat MA, Makohliso S, Roth-Kleiner M, Kyokan M, Pfister RE and Schönerberger K (2022) Ending Neonatal Deaths From Hypothermia in Sub-Saharan Africa: Call for Essential Technologies Tailored to the Context. *Front. Public Health* 10:851739. doi: 10.3389/fpubh.2022.851739
233. Brignoni-Pérez, E., Scala, M., Feldman, H. M., Marchman, V. A., & Travis, K. E. (2022). Disparities in Kangaroo Care for Premature Infants in the Neonatal Intensive Care Unit. *Journal of developmental and behavioral pediatrics* : *JDBP*, 43(5), e304–e311. <https://doi.org/10.1097/DBP.0000000000001029>

234. Omer, S., Zakar, R., Zakar, M.Z. *et al.* The influence of social and cultural practices on maternal mortality: a qualitative study from South Punjab, Pakistan. *Reprod Health* 18, 97 (2021). <https://doi.org/10.1186/s12978-021-01151-6>
235. Harvey, Vickita Akosua Antwiwaa, "Socio-economic and Cultural Determinants of Health Care Services Utilization in Ghana" (2014). UNLV Theses, Dissertations, Professional Papers, and Capstones. 2266. <http://dx.doi.org/10.34917/7048585>
236. Brathwaite, K. P., Bryce, F., Moyer, L. B., Engmann, C., Twum-Danso, N. A. Y., Kamath-Rayne, B. D., Srofenyoh, E. K., Ucer, S., Boadu, R. O., & Owen, M. D. (2020). Evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana. *Resuscitation plus*, 1-2, 100001. <https://doi.org/10.1016/j.resplu.2020.100001>
237. Kimberly P. Brathwaite, Fiona Bryce, Laurel B. Moyer, Cyril Engmann, Nana A.Y. Twum-Danso, Beena D. Kamath-Rayne, Emmanuel K. Srofenyoh, Sebnem Ucer, Richard O. Boadu, Medge D. Owen, (2020) Evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana, *Resuscitation Plus* 1–2, 2020,100001, <https://doi.org/10.1016/j.resplu.2020.100001>. (<https://www.sciencedirect.com/science/article/pii/S2666520420300011>)
238. Bakari, A., Bell, A.J., Oppong, S.A. *et al.* Neonatal near-misses in Ghana: a prospective, observational, multi-center study. *BMC Pediatr* 19, 509 (2019). <https://doi.org/10.1186/s12887-019-1883-y>
239. Chinbuah, M.A., Taylor, M., Serpa, M. *et al.* Scaling up Ghana's national newborn care initiative: integrating 'helping babies breathe' (HBB), 'essential care for every baby' (ECEB), and newborn 'infection prevention' (IP) trainings. *BMC Health Serv Res* 20, 739 (2020). <https://doi.org/10.1186/s12913-020-05225-2>
240. Dodor, E. A., Ntodi, P. K., Bagina, J., Ofori-Gyasi, S., Tinkorang, E. K. T., Antweam, D., Nagai, R. A. N., Ansah, E., & Ofori, A. (2022). Factors Contributing to Neonatal Admissions and Outcomes at Effia Nkwanta Regional Hospital January to December 2015. *Postgraduate Medical Journal of Ghana*, 8(2), 79–85. <https://doi.org/10.60014/pmjg.v8i2.200>
241. World Health Organization 2020 Standards for improving the quality of care for small and sick newborns in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/nbh/standards-for-improving-the-quality-of-care-for-small-and-sick-newborns-in-health-facilities-2020.pdf?sfvrsn=f2da583c_1
242. Adane, K., Gizachew, M., & Kendie, S. (2019). The role of medical data in efficient patient care delivery: a review. *Risk management and healthcare policy*, 12, 67–73. <https://doi.org/10.2147/RMHP.S179259>
243. Varela, C., Young, S., Mkandawire, N. *et al.* TRANSPORTATION BARRIERS TO ACCESS HEALTH CARE FOR SURGICAL CONDITIONS IN MALAWI a cross sectional nationwide household survey. *BMC Public Health* 19, 264 (2019). <https://doi.org/10.1186/s12889-019-6577-8>
244. Sullivan, B. A., Doshi, A., Chernyavskiy, P., Husain, A., Binai, A., Sahni, R., Fairchild, K. D., Moorman, J. R., Travers, C. P., & Vesoulis, Z. A. (2023). Neighborhood Deprivation and Association With Neonatal Intensive Care Unit Mortality and Morbidity for Extremely Premature Infants. *JAMA network open*, 6(5), e2311761. <https://doi.org/10.1001/jamanetworkopen.2023.11761>

245. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
246. Cochran, A.L., McDonald, N.C., Prunkl, L. *et al.* Transportation barriers to care among frequent health care users during the COVID pandemic. *BMC Public Health* 22, 1783 (2022). <https://doi.org/10.1186/s12889-022-14149-x>
247. Soltani, S., Takian, A., Akbari Sari, A., Majdzadeh, R., & Kamali, M. (2019). Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iranian journal of public health*, 48(3), 508–515.
248. Agyemang-Duah, W., Peprah, C. & Peprah, P. Barriers to formal healthcare utilisation among poor older people under the livelihood empowerment against poverty programme in the Atwima Nwabiagya District of Ghana. *BMC Public Health* 19, 1185 (2019). <https://doi.org/10.1186/s12889-019-7437-2>
249. Brian Caballo, Suchona Dey, Pranav Prabhu, Bhata Seal, Peter Chu 2021 Across the Spectrum of Socioeconomics Volume 1 Issue 4 DOI: 10.5281/zenodo.4740684 https://projects.iq.harvard.edu/files/isl/files/the_effects_of_socioeconomic_status_on_the_quality_and_accessibility_of_healthcare_services.pdf
250. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
251. Raju, T. N., Suresh, G., & Higgins, R. D. (2011). Patient safety in the context of neonatal intensive care: research and educational opportunities. *Pediatric research*, 70(1), 109–115. <https://doi.org/10.1203/PDR.0b013e3182182853>
252. Khosravi, S., Babaey, F., Abedi, P. *et al.* Strategies to improve the quality of midwifery care and developing midwife-centered care in Iran: analyzing the attitudes of midwifery experts. *BMC Pregnancy Childbirth* 22, 40 (2022). <https://doi.org/10.1186/s12884-022-04379-7>
253. Mayer, M. M., Xhinti, N., Mashao, L., Mlisana, Z., Bobotyana, L., Lowman, C., Patterson, J., Perlman, J. M., & Velaphi, S. (2022). Effect of Training Healthcare Providers in Helping Babies Breathe Program on Neonatal Mortality Rates. *Frontiers in pediatrics*, 10, 872694. <https://doi.org/10.3389/fped.2022.872694>
254. World Health Organization 2020 Standards for improving the quality of care for small and sick newborns in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/nbh/standards-for-improving-the-quality-of-care-for-small-and-sick-newborns-in-health-facilities-2020.pdf?sfvrsn=f2da583c_1
255. Owusu, Y., Medakkar, P., Akinnawo, E. M., Stewart-Pyne, A., & Ashu, E. E. (2017). Emigration of skilled healthcare workers from developing countries: can team-based healthcare practice fill the gaps in maternal, newborn and child healthcare delivery?. *International journal of MCH and AIDS*, 6(2), 121–129. <https://doi.org/10.21106/ijma.204>
256. Gertrude Nancy Annan and Yvonne Asiedu (2018) Predictors of Neonatal Deaths in Ashanti Region of Ghana, *Advances in Public Health* 2018 (2018), 11 <https://doi.org/10.1155/2018/9020914>

257. Escribano-Ferrer, B., Cluzeau, F., Cutler, D., Akufo, C., & Chalkidou, K. (2016). Quality of Health Care in Ghana: Mapping of Interventions and the Way Forward. *Ghana medical journal*, 50(4), 238–247. <https://doi.org/10.4314/gmj.v50i4.7>
258. Drislane, F. W., Akpalu, A., & Wegdam, H. H. (2014). The medical system in Ghana. *The Yale journal of biology and medicine*, 87(3), 321–326.
259. Gantan EF, Wiedrich L. Neonatal Evaluation. [Updated 2023 Aug 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK558943/>
260. Tette EMA, Nartey ET, Nuertey BD, Azusong EA, Akaateba D, Yirifere J, Alandu A, Seneadza NAH, Gandau NB, Renner LA. The pattern of neonatal admissions and mortality at a regional and district hospital in the Upper West Region of Ghana; a cross sectional study. *PLoS One*. 2020 May 4;15(5):e0232406. doi: 10.1371/journal.pone.0232406. PMID: 32365073; PMCID: PMC7197810.
261. Elikplim Pomevor K, Adomah-Afari A. Health providers' perception of quality of care for neonates in health facilities in a municipality in Southern Ghana. *Int J Health Care Qual Assur*. 2016 Oct 10;29(8):907-20. doi: 10.1108/IJHCQA-04-2016-0055. PMID: 27671425.
262. Enweronu-Laryea, C. C., Nsiah-Boateng, E., Andoh, H. D., Frimpong-Barfi, A., Asenso-Boadi, F. M., & Aikins, M. (2019). Evaluating services for perinatal asphyxia and low birth weight at two hospitals in Ghana: a micro-costing analysis. *Ghana medical journal*, 53(4), 256–266. <https://doi.org/10.4314/gmj.v53i4.2>
263. Jama, A., Gebreyesus, H., Wubayehu, T. *et al.* Exclusive breastfeeding for the first six months of life and its associated factors among children age 6-24 months in Burao district, Somaliland. *Int Breastfeed J* 15, 5 (2020). <https://doi.org/10.1186/s13006-020-0252-7>
264. Gato, S., Biziyaremye, F., Kirk, C.M. *et al.* Promotion of early and exclusive breastfeeding in neonatal care units in rural Rwanda: a pre- and post-intervention study. *Int Breastfeed J* 17, 12 (2022). <https://doi.org/10.1186/s13006-022-00458-9>
265. Dukuzumuremyi, J.P.C., Acheampong, K., Abesig, J. *et al.* Knowledge, attitude, and practice of exclusive breastfeeding among mothers in East Africa: a systematic review. *Int Breastfeed J* 15, 70 (2020). <https://doi.org/10.1186/s13006-020-00313-9>
266. Guideline: Protecting, Promoting and Supporting Breastfeeding in Facilities Providing Maternity and Newborn Services. Geneva: World Health Organization; 2017. Executive summary. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK487814/>
267. Dhage, V. D., Rannaware, A., & Choudhari, S. G. (2023). Kangaroo Mother Care for Low-Birth-Weight Babies in Low and Middle-Income Countries: A Narrative Review. *Cureus*, 15(4), e38355. <https://doi.org/10.7759/cureus.38355>
268. Rasaily, R., Ganguly, K. K., Roy, M., Vani, S. N., Kharood, N., Kulkarni, R., Chauhan, S., Swain, S., & Kanugo, L. (2017). Community based kangaroo mother care for low birth weight babies: A pilot study. *The Indian journal of medical research*, 145(1), 51–57. https://doi.org/10.4103/ijmr.IJMR_603_15
269. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* 20, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>

270. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
271. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
272. Dhage, V. D., Rannaware, A., & Choudhari, S. G. (2023). Kangaroo Mother Care for Low-Birth-Weight Babies in Low and Middle-Income Countries: A Narrative Review. *Cureus*, *15*(4), e38355. <https://doi.org/10.7759/cureus.38355>
273. Rasaily, R., Ganguly, K. K., Roy, M., Vani, S. N., Kharood, N., Kulkarni, R., Chauhan, S., Swain, S., & Kanugo, L. (2017). Community based kangaroo mother care for low birth weight babies: A pilot study. *The Indian journal of medical research*, *145*(1), 51–57. https://doi.org/10.4103/ijmr.IJMR_603_15
274. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
275. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
276. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
277. Dhage, V. D., Rannaware, A., & Choudhari, S. G. (2023). Kangaroo Mother Care for Low-Birth-Weight Babies in Low and Middle-Income Countries: A Narrative Review. *Cureus*, *15*(4), e38355. <https://doi.org/10.7759/cureus.38355>
278. Rasaily, R., Ganguly, K. K., Roy, M., Vani, S. N., Kharood, N., Kulkarni, R., Chauhan, S., Swain, S., & Kanugo, L. (2017). Community based kangaroo mother care for low birth weight babies: A pilot study. *The Indian journal of medical research*, *145*(1), 51–57. https://doi.org/10.4103/ijmr.IJMR_603_15
279. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
280. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
281. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
282. Dhage, V. D., Rannaware, A., & Choudhari, S. G. (2023). Kangaroo Mother Care for Low-Birth-Weight Babies in Low and Middle-Income Countries: A Narrative Review. *Cureus*, *15*(4), e38355. <https://doi.org/10.7759/cureus.38355>
283. Rasaily, R., Ganguly, K. K., Roy, M., Vani, S. N., Kharood, N., Kulkarni, R., Chauhan, S., Swain, S., & Kanugo, L. (2017). Community based kangaroo mother care for low birth weight babies: A

- pilot study. *The Indian journal of medical research*, 145(1), 51–57. https://doi.org/10.4103/ijmr.IJMR_603_15
284. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
285. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
286. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* **20**, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
287. Rasaily, R., Ganguly, K. K., Roy, M., Vani, S. N., Kharood, N., Kulkarni, R., Chauhan, S., Swain, S., & Kanugo, L. (2017). Community based kangaroo mother care for low birth weight babies: A pilot study. *The Indian journal of medical research*, 145(1), 51–57. https://doi.org/10.4103/ijmr.IJMR_603_15
288. Rasaily, R., Ganguly, K. K., Roy, M., Vani, S. N., Kharood, N., Kulkarni, R., Chauhan, S., Swain, S., & Kanugo, L. (2017). Community based kangaroo mother care for low birth weight babies: A pilot study. *The Indian journal of medical research*, 145(1), 51–57. https://doi.org/10.4103/ijmr.IJMR_603_15
289. Geralyn Sue Prullage, Carole Kenner, Fauste Uwingabire, Andre Ndayambaje, Marina Boykova, Karen Walker, Survey of neonatal nursing: Staffing, education, and equipment availability in Rwanda, *Journal of Neonatal Nursing*, Volume 28, Issue 3, 2022, Pages 192-199, <https://doi.org/10.1016/j.jnn.2021.10.007>.
(<https://www.sciencedirect.com/science/article/pii/S1355184121001794>)
290. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
291. Negarandeh, R., Hassankhani, H., Jabraeili, M. *et al.* Health care staff support for mothers in NICU: a focused ethnography study. *BMC Pregnancy Childbirth* **21**, 520 (2021). <https://doi.org/10.1186/s12884-021-03991-3>
292. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
293. Matlala, M. S., & Lumadi, T. G. (2019). Perceptions of midwives on shortage and retention of staff at a public hospital in Tshwane District. *Curationis*, 42(1), e1–e10. <https://doi.org/10.4102/curationis.v42i1.1952>
294. Kaur E, Heys M, Crehan C, et al. Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts. *Journal of Global Health Reports*. 2023;7:e2023004. [doi:10.29392/001c.72089](https://doi.org/10.29392/001c.72089)
295. Sacks E, Sakyi K, Owusu PG, et al. Factors contributing to neonatal mortality reduction in three regions in Ghana: a mixed-methods study using the Lives Saved (LiST) modelling tool. *Journal of Global Health Reports*. 2022;5:e2021109. [doi:10.29392/001c.30750](https://doi.org/10.29392/001c.30750)

296. Siaw-Frimpong, M., Touray, S., & Sefa, N. (2021). Capacity of intensive care units in Ghana. *Journal of critical care*, 61, 76–81. <https://doi.org/10.1016/j.jcrc.2020.10.009>
297. Morgane Michel, Corinne Alberti, Jean-Claude Carel, & Karine Chevreul, Socioeconomic Status of Newborns and Hospital Efficiency: Implications for Hospital Payment Methods VALUE HEALTH. 2020; 23(3):335–342 [https://www.valueinhealthjournal.com/article/S1098-3015\(19\)35180-0/fulltext](https://www.valueinhealthjournal.com/article/S1098-3015(19)35180-0/fulltext)
298. Sullivan, B. A., Doshi, A., Chernyavskiy, P., Husain, A., Binai, A., Sahni, R., Fairchild, K. D., Moorman, J. R., Travers, C. P., & Vesoulis, Z. A. (2023). Neighborhood Deprivation and Association with Neonatal Intensive Care Unit Mortality and Morbidity for Extremely Premature Infants. *JAMA network open*, 6(5), e2311761. <https://doi.org/10.1001/jamanetworkopen.2023.11761>
299. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
300. Cochran, A.L., McDonald, N.C., Prunkl, L. *et al.* Transportation barriers to care among frequent health care users during the COVID pandemic. *BMC Public Health* 22, 1783 (2022). <https://doi.org/10.1186/s12889-022-14149-x>
301. Soltani, S., Takian, A., Akbari Sari, A., Majdzadeh, R., & Kamali, M. (2019). Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iranian journal of public health*, 48(3), 508–515.
302. Agyemang-Duah, W., Peprah, C. & Peprah, P. Barriers to formal healthcare utilisation among poor older people under the livelihood empowerment against poverty programme in the Atwima Nwabiagya District of Ghana. *BMC Public Health* 19, 1185 (2019). <https://doi.org/10.1186/s12889-019-7437-2>
303. Liu, X., Li, Z., Chen, X. *et al.* Utilization pattern of kangaroo mother care after introduction in eight selected neonatal intensive care units in China. *BMC Pediatr* 20, 260 (2020). <https://doi.org/10.1186/s12887-020-02153-2>
304. Brian Caballo, Suchona Dey, Pranav Prabhu, Bhata Seal, Peter Chu 2021 Across the Spectrum of Socioeconomics Volume 1 Issue 4 DOI: 10.5281/zenodo.4740684 https://projects.iq.harvard.edu/files/isl/files/the_effects_of_socioeconomic_status_on_the_quality_and_accessibility_of_healthcare_services.pdf
305. Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, 38(5), 976–993. <https://doi.org/10.1007/s10900-013-9681-1>
306. Atuoye, K.N., Dixon, J., Rishworth, A. *et al.* Can she make it? Transportation barriers to accessing maternal and child health care services in rural Ghana. *BMC Health Serv Res* 15, 333 (2015). <https://doi.org/10.1186/s12913-015-1005-y>
307. Soltani, S., Takian, A., Akbari Sari, A., Majdzadeh, R., & Kamali, M. (2019). Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iranian journal of public health*, 48(3), 508–515.
308. Siaw-Frimpong, M., Touray, S., & Sefa, N. (2021). Capacity of intensive care units in Ghana. *Journal of critical care*, 61, 76–81. <https://doi.org/10.1016/j.jcrc.2020.10.009>

309. Dhage, V. D., Rannaware, A., & Choudhari, S. G. (2023). Kangaroo Mother Care for Low-Birth-Weight Babies in Low and Middle-Income Countries: A Narrative Review. *Cureus*, *15*(4), e38355. <https://doi.org/10.7759/cureus.38355>