

Infant mortality in Ghana: investing in health care infrastructure and systems

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Abstract

Child and infant mortality is a global problem. Almost half of deaths of children under age 5 years occur in the neonatal period, the first 28 days of life, with 2.4 million neonatal deaths globally in 2020. Sub-Saharan Africa has disproportionately high numbers of neonatal deaths. Ghana's neonatal mortality rate is 22.8 per 1000 live births and remains behind targets set by the United Nations Sustainable Development Goals. Quality antenatal care, postnatal monitoring, breastfeeding support, and postnatal family planning are important in preventing neonatal deaths. While Ghana has made progress in making care more financially accessible, it has not been matched with the improvements in the critical infrastructure required to ensure quality health care. The improvements have also not eliminated out-of-pocket costs for care, which have hindered progress in decreasing infant mortality. Policymakers should consider investments in health care infrastructure, including expanding public-private partnerships. Policies that improve workforce development programs, transportation infrastructure, and health insurance systems improvements are needed.

Key words: infant mortality; neonatal mortality; child mortality; Ghana; policy; health care infrastructure; workforce development; systems thinking.

Introduction

Child and infant mortality are global public health concerns and common indicators used to assess the population health status of the community.^{1–3} Despite global progress in reducing child and infant mortality, the 2022 Child Mortality Report by the United Nations (UN) Inter-agency Group for Child Mortality Estimation reports that, in 2021, approximately 5 million children died before age 5.^{2,4} This child mortality rate estimation refers to the number of deaths per 1000 live births of neonates, those in their first month of life, infants aged 1–11 months, and children under age 1–4 years.⁴ The leading causes of neonatal mortality globally are premature birth and birth complications.^{4,5} Almost half of all under-5 deaths occurred during the first 28 days of life, known as the neonatal period, the riskiest period for child survival.⁴ Although under-5 child mortality has decreased within the last 30 years almost everywhere in the world, neonatal mortality is not decreasing as much as mortality in children between 1 and 59 months.⁴ Progress has been made in reducing infant and child mortality, but stark disparities between and within countries persist.⁴ Thus, child survival chances vary dramatically among regions, with children born in sub-Saharan Africa at the highest risk of infant death in the world.^{3,6} Globally, sub-Saharan Africa remains the area with the highest child mortality disparity rates, reporting 1 in 13–14 children dying before reaching the age of 5 years, 14 times higher than the risk in high-income countries, and accounting for 56% of global

under-5 deaths.^{1,4} A newborn aged 1–28 days old in sub-Saharan Africa is 11 times more likely to die than a newborn in the Australia/New Zealand region.⁴

The Sustainable Development Goals (SDGs), adopted by the UN, call for a reduction in neonatal mortality to 12 or fewer deaths per 1000 live births and a reduction in under-5 mortality to 25 or fewer per 1000 live births by 2030.^{7,8} The goal to decrease the neonatal mortality rate to 12 or fewer deaths per 1000 live births has already been achieved by 126 countries; however, 63 countries will not meet this goal if current trends continue.⁴ Most countries that are not meeting the goal will need to double their rate of progress to achieve the goal.⁴ Similarly, 133 countries have met the under-5 mortality target, and 54 countries are not on target to meet the goal.^{4,8}

Ghana is among the countries needing to accelerate progress toward the under-5 and neonatal mortality targets.⁹ Ghana's neonatal mortality rate is 22.8 deaths per 1000 live births, and its under-5 mortality rate is 44 deaths per 1000 live births.¹⁰ Ghana's infant mortality rate is 32.6 deaths per 1000 live births, and its stillbirth rate is 21.4 deaths per 1000 live births.¹⁰ While Ghana's neonatal and under-5 mortality rates are better than many countries in the region, with Nigeria's at 34.9 and 110.8 deaths per 1000 live births, respectively, and Cote d'Ivoire's at 55.9 and 74.9 deaths per 1000 live births, respectively,¹⁰ Ghana's rate of progress remains behind targets set by the SDGs.⁹

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The determinants of infant mortality are multifactorial and complex and include factors related to the mother's age, health, residence, employment status, marital status, educational level, and age at first birth.^{3,6} Additional significant factors include the sex of the child, desire for pregnancy, gestational age, birth type, birth size, preceding birth interval, breastfeeding status, breastfeeding initiation, vaccination status, antenatal care visits, place of delivery, use of family planning, family size, available source of water and household electricity, birth asphyxia, distance to the health facility, age of the infant, maternal medical complications during pregnancy, and maternal death at birth.^{3,6,11,12} Many of these factors are primarily preventable bio-demographic factors. Preterm birth, low birth weight, neonatal sepsis and other infections, birth asphyxia, congenital anomalies, neonatal jaundice, and pneumonia are frequent causes of infant mortality in Ghana.¹³⁻¹⁵ Hence, the possibility of impactful change is significant since these include eminently addressable leading causes of global neonatal mortality, such as prematurity, infections, intrapartum-related events, and access to health care.⁸

Importance of a skilled antenatal, delivery, postnatal, and neonatal care workforce

A key factor in preventing infant deaths is quality medical care in all stages of pregnancy, delivery, and post-delivery for both mother and neonate. Infants whose mothers attend the recommended number of high-quality antenatal visits with care provided by a doctor have much better odds of survival.^{15,16} Skilled antenatal care throughout pregnancy has been found to significantly reduce the risk of having a low-birth-weight infant, which is a high-risk factor for neonatal mortality.¹⁶ Recent research indicates that the quality of antenatal care, such as screening and clinical counseling, is likely even more important than the number of visits in reducing neonatal mortality.¹⁵⁻¹⁷

An infant delivered by a doctor is almost 3 times more likely to survive than those delivered by traditional birth attendants.¹⁵ Most births in Ghana occur at a facility; however, most neonatal deaths occur at home soon after birth among infants born in a hospital, which suggests a need to improve immediate neonatal care and screening of symptoms after birth in both hospital and community settings.¹⁴ The most common cause of neonatal death following home birth is infection, indicating a need for improved access to skilled birth attendants who are trained in infection-control procedures.¹⁴ Early breastfeeding initiation has also been found to reduce the risk of neonatal infection, which can be facilitated by direct breastfeeding support and maternal health education.¹⁸

High-risk deliveries require well-resourced hospitals for delivery and extended neonatal care.¹⁴ Identifying high-risk pregnancies and deliveries, such as multiple births, requires early and consistent antenatal care and highly skilled medical team involvement throughout pregnancy and birth to ensure the best outcomes.^{19,20} Congenital anomalies make up a large portion of neonatal deaths in low- and middle-income countries.²⁰ Many of these conditions require early access to skilled surgical care for infant survival.²⁰ Skilled specialist care is also essential for preterm infants to support feeding needs, ensure they receive adequate oxygen, maintain the necessary temperature for survival, and provide other life-saving therapies.²¹

Postnatal maternal care is also essential, not only for the health of the mother but also to prevent future infant mortality. Spacing of births less than 24 months apart comes with a significantly higher risk of infant mortality due to a higher risk of high blood pressure and premature membrane rupture.¹⁹ Postnatal family planning services must be routine and widely available to optimize the spacing of births to at least 24 months apart.¹⁹

Current programs and policy successes in Ghana

Ghana has implemented several programs over the past 2 decades that have contributed to progress in reducing infant and maternal mortality. The implementation of the free maternal health care policy in 2008 as a component of the National Health Insurance Scheme (NHIS) mandates free health care coverage for antenatal visits, delivery, and postnatal and neonatal care to women registered with the insurance.^{22,23} The program was credited with an increase in the registration of more than 300 000 mothers between 2008 and 2012.²⁴ A study comparing 2 countries that implemented a free maternal health care policy, Ghana and Burkina Faso, with 2 countries in the region, Nigeria and Zambia, that did not have such a policy found that the policy was associated with a 45% reduction in risk for neonatal mortality and a 54% reduction in risk for infant mortality between 2008 and 2014.²²

The Ghana Child Health Policy and the Child Health Strategy focused on improving health care quality and accessibility, prevention, and treatment of diseases affecting infants.²⁵ This resulted in improved standards for managing diarrhea and the availability of immunization programs, which increased infant vaccination rates.²⁵ Further strides were made in addressing diseases affecting infants and children by the Ghana Essential Health Intervention Project and the Community-based Health Planning and Services (CHPS) by increasing the distribution of services to rural areas.²⁵

Ghana's CHPS provides community-based support and a basic facility to rural communities and mobilizes the resources within the community to do so, involving many stakeholders, including community leaders, community health nurses, and traditional birth attendants.²⁴ The CHPS has contributed to increased utilization of skilled medical facilities for births when one was within close proximity, increased utilization of contraception, and has been a contributing factor in lowering the infant mortality rate in Ghana by acting as gatekeepers.^{24,26,27} Despite the progress achieved with these programs and policies, many barriers to care remain.

Barriers to care

Out-of-pocket costs

Studies have determined that many women covered by the NHIS free maternal health care policy continue to face out-of-pocket costs for ultrasound and other laboratory services, drugs, supplies, and items required for childbirth.²⁷⁻³⁰ There is also a lack of funding for transport for births, birth emergencies, or when a woman or neonate is referred to a better-resourced hospital for more skilled care, requiring even more out-of-pocket costs.²⁷ Health practitioners and managers have indicated that reimbursement from the NHIS is frequently delayed, erratic, or amounts are inadequate to provide quality care to pregnant women, necessitating out-of-pocket charges.²⁷⁻³² This may be resulting in the underutilization of services (Figure 1).

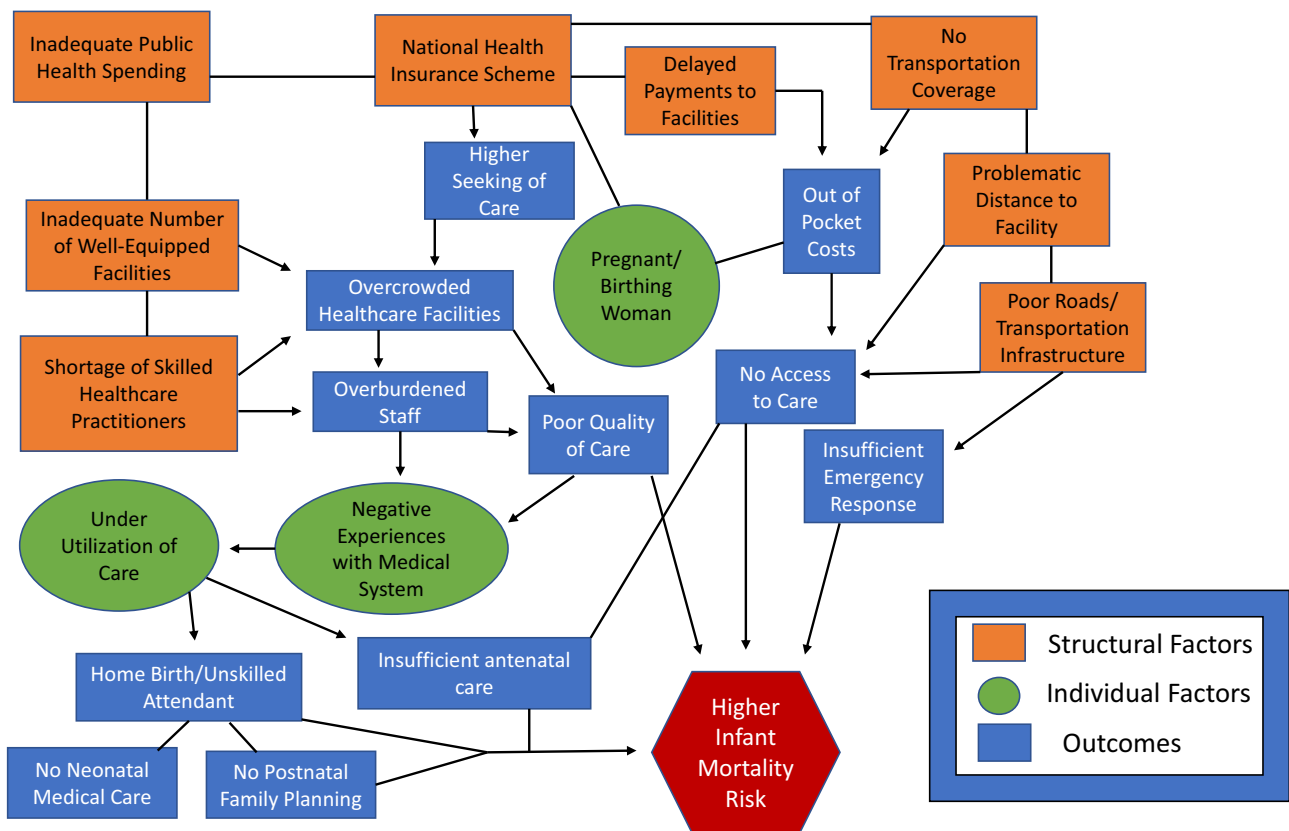


Figure 1. Framework of factors and outcomes for infant mortality risk.

Inadequate number and distribution of facilities, skilled birth attendants, and neonatal specialists

Although the increased utilization of services created by the free maternal health care policy has improved financial access to care, an adequate supply of skilled services and facilities to accommodate this increase is lacking in many areas in Ghana.^{33,34} Living near a health care facility is associated with the use of antenatal care,³⁵ and women who live at a problematic distance from a health facility are at higher risk for neonatal death than women who live near facilities.²³ Facilities for care and delivery are not geographically accessible to many rural women.^{23,27,34,36-38} Transportation to facilities many miles away for both antenatal care and delivery is cost-prohibitive for many women and results in low utilization of services.^{23,27,34-36} Skilled physicians, midwives, and birth attendants are in short supply and unevenly distributed throughout the country, generally in urban areas, resulting in more significant shortages in some areas than in others.^{25,34,38} Women and neonates receiving facility care also face significant risks, as many skilled birth attendants lack training in neonatal care and many facilities are overcrowded, which evidence suggests contributes to inadequate postnatal screening and monitoring before discharge, resulting in infants dying at home soon after birth in a facility.¹⁴

Limited resources and infrastructure supporting the health system

The health system relies on well-functioning infrastructure, such as available transportation systems, including efficient roads, water, and electricity.²⁷ Many CHPS facilities in northern Ghana were found to be under-resourced, lacking

reliable water, electricity services, and adequate physical space.^{27,39} Poor road conditions between many rural facilities and better-resourced hospitals and facilities hinder transport for emergencies, resulting in a higher risk of neonatal deaths.²³ Health care facilities also rely on an adequate supply of essential drugs and medical equipment. Recent studies have found these resources to be inadequate to support the needs of facilities serving pregnant and birthing women covered under the free maternal health care policy.^{27,30,33,38}

Poor quality of care resulting in women choosing not to seek health care

Several studies of maternal and child health care in Ghana found many overburdened and under-resourced health care facilities, with staff shortages and heavy workloads for both patient care workers and administrators.^{27,33,34} Health care workers in rural areas often experience poor working conditions and cannot provide quality care to birthing mothers and neonates.^{14,27,33,34} Both patients and health care providers in several communities report maternal care as substandard.^{33,37} Higher utilization of health care facilities in urban areas, brought forth by the free maternal health care policy, may be having the unintended effect of rendering the care poor quality and negatively impacting hospital birth outcomes due to crowding of facilities and lack of capacity to meet the demands.²³ Many women choose not to seek antenatal care and give birth at home with a traditional birth attendant because they experienced poor care, including long wait times, negative attitudes of health care workers, in some cases neglect or abuse, and a lack of privacy at a health care facility during prior pregnancies and births.^{23,33,37} The

dissatisfaction with the health care system is widespread among women in Ghana.^{23,28,33,34,37}

Discussion of policy recommendations

A primary focus for policymakers in reducing infant and neonatal mortality in Ghana should be to substantially improve the availability of quality skilled medical care. The shift from home births to facility births alone will not likely affect outcomes if the facilities are not equipped to provide skilled care.^{14,25} Improving the quality of medical care for pregnant, birthing, and postnatal women, neonates, and infants will affect outcomes for those using the medical system and encourage more women to use lifesaving medical pregnancy, delivery, and infant care services.

A 2020 analysis of 46 countries in sub-Saharan Africa found that increased public health expenditure to support health service infrastructure was associated with reduced infant and neonatal mortality.⁴⁰ It should be noted that the success of increased public health expenditure in impacting health outcomes depends on efficient allocation and oversight of funds.⁴¹ Other economic factors, such as GDP (Gross Domestic Product) per capita, also impact health outcomes.⁴¹ However, recent analyses support the need for Ghana to increase its public health expenditure. Past public health expenditure increases have been associated with reduced infant mortality, and current expenditures are inadequate to meet the SDGs.⁴²⁻⁴⁴ Spending recommendations to improve access to quality maternal and infant health care are outlined here in order of priority.

Invest in medical facility infrastructure

Early access to facilities that can respond to obstetric and infant emergencies and provide effective neonatal surgical care can significantly reduce infant deaths.^{20,23,27,34,38,45} Inadequate physical space, medical equipment, and essential drugs are sources of problems in the quality provision of obstetric and neonatal care, and maternal concern for being referred to a very distant hospital at a high cost is factoring into decisions not to utilize medical systems for pregnancy and delivery care.^{23,33,34,38} The construction of facilities in under-resourced areas is foundational to address many of the aforementioned issues and should be prioritized. An infrastructure with cutting-edge facilities and medical equipment paired with skilled providers can lead to the development of innovative interventions in neonatal/obstetrics emergencies and referrals from CHPS facilities to prevent undue neonatal complications.⁴⁶ Increased resources for the CHPS compounds are also needed to improve birth outcomes in rural areas where women receive care.³⁹

Strong consideration should be given to the value of public-private partnerships to bolster the health care infrastructure in Ghana. Private-sector health care facilities, including non-profit health care organizations, can partner with public institutions to improve service delivery and health outcomes.^{47,48}

Increase workforce development efforts and incentivize health care workers to practice in lower-resourced communities

There is a shortage of skilled maternal health care workers in Ghana, including nurses, midwives, and specialist doctors, and these practitioners are disproportionately located in urban areas.^{33,34,42} Programs to increase quality maternal and

neonatal medical training and incentivize health care workers to remain in or relocate to low-resourced areas should be strongly considered.³⁸ Evidence suggests that infrastructure investments, as outlined above, create better working conditions for medical practitioners and serve to retain staff, positively impacting maternal and child health outcomes.³⁸ Creating improved housing for staff has also been suggested as a solution for attracting skilled health care workers.⁴⁶ Alleviating overburdened health care staff in under-resourced areas will improve the overall quality of care for pregnant and birthing mothers and neonates.

Dedicate resources to transport services for maternal care and transportation infrastructure

A lack of transportation and spatial access to medical facilities hinders many women in accessing antenatal, delivery, postnatal, and neonatal care.^{27,34} The NHIS free maternal health care policy can be expanded to include transportation services for low-income women.²⁷ Investment in safe and efficient road networks will also improve emergency response time and enable more women to travel for life-saving medical care.^{27,39,46} Another consideration for stakeholders is the use of mobile health clinics, which are effective for providing antenatal and postnatal care in remote areas.^{49,50}

Prioritize timely reimbursement and expand coverage to minimize out-of-pocket charges

Delays and inconsistencies in claims reimbursements result in out-of-pocket charges to patients who should be receiving free care, discouraging women from utilizing the recommended antenatal care and skilled delivery.²⁷⁻³² Government officials should take action to ensure that the NHIS is both sustainable and efficient.⁵¹ Improvements to the claims process must be ongoing, as evidence suggests that, although an electronic claims system was implemented, timely payment of claims continued to be lacking.⁵¹ Funding should be used to ensure expedited reimbursement payments to health care providers.⁴⁶ Hidden out-of-pocket expenses for required delivery items are also cost-prohibitive to many and discourage facility delivery.²⁸ The free maternal health care policy should ensure full coverage for required delivery items and services.²⁸

Conclusion

A systems approach is needed to minimize barriers to quality prenatal, delivery, and postnatal maternal and child health care in Ghana to accelerate progress toward the SDG of decreasing neonatal mortality to 12 or fewer deaths per 1000 live births. Evidence suggests that strengthening multiple systems, including transportation and utility infrastructure, skilled workforce and medical facility capacity, and full financial coverage of health care services, would improve the utilization and quality of services throughout pregnancy, birth, and the postnatal period, and improve birth outcomes and neonatal mortality rates. The engagement of multiple stakeholders is crucial for fostering public-private partnerships and community involvement in strengthening the interacting systems that impact maternal and neonatal health care.

Supplementary material

Supplementary material is available at *Health Affairs Scholar* online.

Conflicts of interest

Please see ICMJE form(s) for author conflicts of interest. These have been provided as supplementary materials.

Notes

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