

LIFE LOW BIRTHWEIGHT INFANT FEEDING EXPLORATION STUDY



EXECUTIVE SUMMARY

Study Findings: A One-Year Birth Cohort



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NEW EVIDENCE AND CONTRIBUTIONS FROM THE LIFE STUDY

- Despite being predominantly breastfed, the 1,100 moderately low birthweight infants in the LIFE study had suboptimal growth throughout infancy. Later growth outcomes were heavily influenced by birth outcomes, as well as growth in early infancy.
- Not all moderately low birthweight infants are alike. Specific characteristics make some low birthweight infants more vulnerable than others to illness, slow growth, and even death. These poor outcomes could be avoided with focused interventions at key timepoints.
- Growth monitoring soon after birth allows for early identification of risk and proactive intervention to prevent poor growth and developmental outcomes in later infancy.
- Growth and feeding assessment tools designed specifically for low birthweight infants in resource-limited settings are needed to facilitate targeted lactation support, clinical decision-making and allocation of scarce resources.

PROBLEM STATEMENT

Globally, 20.5 million infants are born low birthweight¹ each year, with limited improvement over the past 15 years. These infants account for more than 80% of newborn deaths, with 1.9 million dying annually, and are 20 times more likely to die than normal birthweight infants. Low birthweight infants are at increased risk for illness, growth deficits, and developmental delays. Low- and middle-income countries bear the greatest burden of low birthweight births and neonatal deaths.

OPPORTUNITY

In recent years, there has been an increased global focus on low birthweight infants. In 2015, the United Nations identified ending preventable deaths of newborns and children by 2030 as a Sustainable Development Goal, and in 2020, the WHO published standards for improving the quality of care for small and sick newborns in health facilities.

Researchers, policymakers, clinicians, and funders need an enhanced evidence-base on feeding practices and growth patterns in order to strengthen existing global feeding guidelines and identify priority areas for further research.

Launched in 2019, the Low Birthweight Infant Feeding Exploration (LIFE) study fills this need by documenting current feeding practices, growth patterns, child development, and other health outcomes among more than 1,100 low birthweight infants with a birthweight between 1.5kg and <2.5kg in low- and middle-income countries. The LIFE study, led by [Ariadne Labs](#) in partnership with leading institutions, aimed to identify effective interventions and high-risk infants, highlight remaining evidence gaps to inform the future research agenda, and contribute to global guidelines with evidence-based action steps.

The LIFE study is a multi-site, mixed-methods observational cohort study with six data collection streams conducted in India (Karnataka State and Odisha State), Malawi and Tanzania. Its ultimate goal is to identify how the maternal, newborn, and child health community can ensure that low birthweight infants survive and thrive.

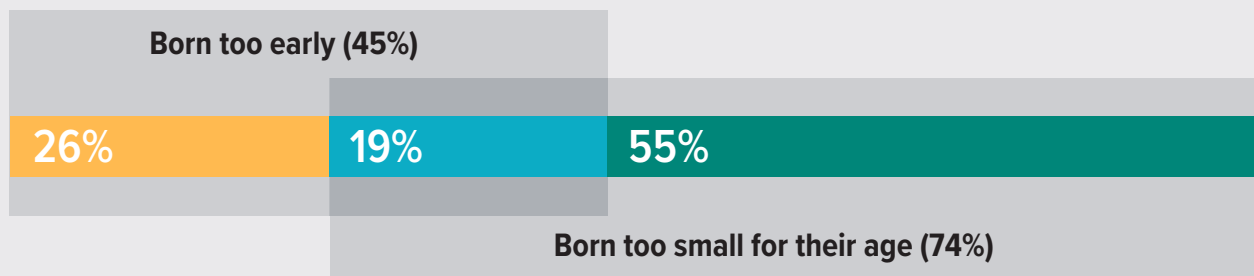
¹ Low birthweight infants are those born weighing less than 2.5kg, who are growth-restricted and/or preterm.

FINDINGS AND KEY ACTIONS

Findings show that the greatest opportunity for improvement in growth, survival, and development outcomes lies in identifying infants at highest risk for poor outcomes and intervening as early as possible.

Key Findings For A One-Year Low Birthweight Infant Cohort

Moderately low birthweight infants have different birth compositions



Poor early growth raises risk of growth problems at 6 months

If a baby then at 6 months their risk is higher of:		
	STUNTING	UNDERWEIGHT	WASTING
is born too early and too small: <i>Compared to babies born too early but healthy size</i>	1.8 x	1.8 x	No higher risk
is born on time and too small: <i>Compared to babies born too early but healthy size</i>	2.4 x	2.8 x	No higher risk
does not regain its birthweight in first 2 weeks: <i>Compared to babies who regain birthweight in 2 weeks</i>	1.5 x	1.5 x	No higher risk

Poor growth at 6 months raises growth problems at 1 year

If a baby then at 12 months their risk is higher of:		
	STUNTING	UNDERWEIGHT	WASTING
has growth problems at 6 months: <i>Compared to babies who do not have poor growth at 6 months</i>	2.8 x	6.4 x	4.9 x

Our sample includes >1,100 LBW infants (between 1,500g and 2,499g)

Refer to definitions of poor growth outcomes in the WHO Fact Sheet: <https://www.who.int/news-room/fact-sheets/detail/malnutrition>.

Improve Survival and Growth Outcomes

KEY ACTION 1: *Proactively identify and prioritize resources in early infancy to those at highest risk for mortality and poor growth outcomes.*

Survival: The study found that there were more deaths among preterm compared to term infants. Further, infants with lower birthweights, those with poor growth in the first two weeks, and those living in rural areas were at increased risk for infant mortality.

Growth: Twins, small-for-gestational age infants, and/or males were at highest risk for stunting, wasting, and/or underweight at 12 months, as were infants born to mothers with lower income, limited education, and/or multiple children. A diverse diet after six months reduced the risk of underweight and wasting at 12 months; however, 40% of infants did not have a diverse diet by 12 months.

While acknowledging that all low birthweight infants require specialized care, clinicians can use the above-mentioned risk factors to identify infants who may need more frequent growth monitoring, increased breastmilk intake, and/or improved nutrient composition of milk.

Improve Developmental Outcomes

KEY ACTION 2: *Evaluate the impact of early nutritional support on neurodevelopment among infants who have not regained their birthweight by two weeks.*

Our research found that a lack of birthweight regain by two weeks and poor growth outcomes at 6 and 12 months signaled risk for developmental delays at one year. Assessment at these timepoints may allow for earlier intervention and promotion of nurturing care. Infants with a diverse diet in the second half of infancy had better developmental outcomes at one year, and caretakers should be counseled on the World Health Organization Infant and Young Child Feeding practices.

Refine Strategies for Risk Assessment and Intervention

Efforts are needed to refine tools for identification of at-risk infants and conduct research to develop optimal nutritional interventions.

KEY ACTION 3: *Develop a suite of standardized tools specific to low birthweight infants that clinicians, policymakers, and other stakeholders can implement to assess growth and breastfeeding quality.*

Guidance is lacking on the application and interpretation of existing child growth standards and breastfeeding assessment tools for low birthweight infants. Developing guidance and refining tools for specific application to this population will allow for more appropriate clinical decision-making and targeted lactation support, inform resource allocation, and enhance tracking of progress towards global targets.

KEY ACTION 4: *Assess the role of breastmilk volume and nutrient composition on growth among low birthweight infants.*

The study found no significant relationship between exclusive breastfeeding duration and growth at 6 and 12 months, pointing to the need for rigorous research to understand the characteristics of breastmilk and various forms of fortification and volume amplification.



Enhance Support for Infant Feeding

Beyond clinical interventions, educational and financial support for families are needed to ensure access to and provision of adequate nutrition for infants.

KEY ACTION 5: *Develop, evaluate, and scale programs that provide effective, specialized lactation support and feeding counseling to address the needs of low birthweight infants in facilities and communities.*

The study found that while 44% of mother-infant pairs reported feeding difficulties, feeding counseling and support were neither universal nor consistent. Though early initiation of breastfeeding is known to have benefits for infant feeding and milk supply, only 33% of newborns in the study had initiated breastfeeding within one hour of birth, and even fewer among preterm infants.

A great deal of global investment has been made in lactation support, however, low birthweight infants and their mothers face unique challenges with feeding and lactation. Curricula specific to their needs that promote frequency of feeding, milk expression to increase supply, hygiene safety, kangaroo mother care, and monitoring for danger signs should be developed at the facility and community level and tested to understand their feasibility, acceptability, and impact on feeding and growth outcomes.

KEY ACTION 6: *Establish national programs to improve affordability of diverse foods to allow families to feed their low birthweight infants a balanced diet starting at 6 months.*

Mothers reported cost as the main barrier to feeding infants certain nutritious foods, and infants born to mothers in households with lower incomes were less likely to achieve optimum dietary outcomes at 12 months.

FOR MORE INFORMATION

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PARTNERS

Lead

Ariadne Labs, a joint center for health systems innovation at Brigham and Women's Hospital and Harvard T.H. Chan School of Public Health. With a mission to save lives and reduce suffering, our vision is that health systems equitably deliver the best possible care for every patient, everywhere, every time. Our work has been accessed in more than 165 countries, touching hundreds of millions of lives.

Study Partners

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- **JJM Medical College**, Davangere, India
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- **Muhimbili University of Health and Allied Sciences (MUHAS)** Dar es Salaam, Tanzania
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This document is based on research funded in part by the Bill & Melinda Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Bill & Melinda Gates Foundation (INV-007326).