

6**Bridging the Knowledge–Practice Gap in Home-Based Care of Low-Birth-Weight Babies: A Systematic Review of Maternal Education and Nursing-Led Interventions****Medonna.S^{1*} & Prof. (Dr.) Gaurav Tyagi²**¹Research Scholar, Department of Nursing, Desh Bhagat University.²Professor, Department of Nursing, Desh Bhagat University, Mandi Gobindgarh, Punjab, India.

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Abstract

Low birth weight (LBW) (birth weight < 2,500 g) is an important public health concern because LBW infants experience higher rates of neonatal morbidity and mortality, stunted growth, infection, feeding difficulties and developmental problems. Whilst improvements in the care of premature and vulnerable babies in hospital have increased survival, there is a transition from hospital to home that is a critical time where mothers and families take on the responsibility for the ongoing care of the baby. Maternal knowledge and skills, confidence, family support, access to health services and continuity of professional guidance have a significant impact on the quality of home-based care. Persistent knowledge-practice gaps can result from mothers' knowledge of recommended newborn care practices, but not being able to apply them consistently due to psychosocial, cultural, socioeconomic or health-system barriers. This review covers maternal education programmes and nurse-led interventions to promote home care of LBW infants and preterm infants. Special emphasis is placed on thermal protection, breastfeeding and feeding support, hygiene and infection prevention, Kangaroo Mother Care (KMC), recognition of neonatal danger signs, growth monitoring, immunization and appropriate health-seeking behaviour. Literature suggests that structured education, skills demonstration, home visits, continuous counselling, family involvement, KMC promotion and digital follow-up can positively impact maternal knowledge and selected caregiving behaviours. But the size and persistence of these impacts can differ significantly depending on the level of interventions, contexts, and the quality of implementation. The interventions of nurses are especially useful as nurses can link the hospital and community care by preparing for discharge, teaching in the practical, home visiting, psychosocial support, referral and follow up. The review highlights that information alone is insufficient to close the knowledge–practice gap. Multimodal education and skills-training, reinforcement, family and community engagement, and system-level support are essential elements of effective interventions. Future studies should focus on standardized outcomes, longer follow-up, more rigorous comparative

study designs, cost-effectiveness analysis, and more consideration of family and contextual factors that influence LBW home care.

Keywords: Low Birth Weight, Home-Based Care, maternal Education, Nursing Interventions, Knowledge–Practice Gap, Kangaroo Mother Care, Newborn Care, Breastfeeding, Neonatal Health.

Introduction

Low birth weight is one of the most important risk factors on neonatal and infant health. Low birth weight is defined by the World Health Organization (WHO) as a birth weight of less than 2,500 g, regardless of the gestational age. LBW can be caused by being born too early and/or Fetal Growth Restriction (FGR). The neonatal period is a critical time for these infants due to their immature physiological systems, decreased thermal stability, feeding challenges, greater vulnerability to infection, and higher risk of being cared for in a specialized setting.

While enhancements in neonatal intensive care and hospital-based services have helped to keep fragile infants alive, surviving is not enough to ensure healthy development. After discharge, LBW infants may need special care in terms of feeding, temperature control, protection from infection, monitoring of growth, identifying danger signs, and prompt referral to health services. Thus the home has become a continuation of the neonatal care setting.

Mums are the main carers of LBW babies and are an important key to continuity of care after discharge. But raising a premature or small baby can be challenging and stressful. Limited experience, lack of confidence, lack of practical skills or lack of family support. Furthermore, family custom, financial constraints, difficulties with travel, advice from family members, as well as lack of professional help-seeking can impact caregiving behavior.

The uploaded PhD synopsis on which this chapter is based, also has a similar concern. The proposed research aims to evaluate the effectiveness of home-based care intervention to enhance mothers' knowledge and practices of LBW babies. Planned intervention includes educational sessions, demonstration and printed materials on topics including thermal protection, breastfeeding, hygiene and KMC.

The problem, then, is not just whether mothers have information; it's whether they can turn that information into safe and consistent parenting behavior. This gap is usually referred to as the knowledge/practice gap. A mother might be aware that her LBW baby needs warmth but not always carry out skin-to-skin care. She might know why breastfeeding is important, but be struggling with attachment, frequency or expressing breast milk. Likewise, she could be aware of the symptoms of sickness,

but still not seek treatment due to economic, transportation or family decision making issues.

This gap needs to be bridged by interventions that are beyond the traditional health education. Good knowledge, practical skill building, reinforcement, emotional support, family involvement and easy to access professional follow up make up effective programmes.

Background and Rationale

The homeward journey from hospital is a crucial time for LBW infants. Newborns can have regular checks and help with feeding, temperature, preventing infections and other care needs while they are in hospital. These tasks are then passed on primarily to mothers and families after the baby is born.

Literature from the uploaded synopsis highlights various issues with LBW care. These are lack of knowledge of thermoregulation, infection prevention, feeding and other aspects of newborn care. The synopsis also highlights that the needs of LBW carers and challenges that are specific to different regions, such as cultural, systemic and socio-economic factors, are not being adequately researched.

Maternal education can thus be considered as an integral part of postnatal care. But education is best when it is systematic, applied, comprehensible and repeated. It is a synopsis of an intervention program that includes educational sessions, demonstrations and printed educational materials.

The results of the literature reviewed support the need for the above interventions. For instance, the studies in the synopsis show that structured educational programmes have been effective to increase mothers' knowledge of newborn and LBW care. But, knowledge changes do not always lead to changes in actual caring. This separation reinforces the necessity of assessing knowledge and observed practice, as opposed to self-reported knowledge.

The present review is therefore focused on the following four key questions:

- What kind of maternal education interventions have been adopted to enhance home-based LBW care?
- How do nurses and CHWs involve with mothers post-discharge?
- What intervention strategies seem to work best in transfer of knowledge into practice?
- What are the remaining obstacles and research need to improve the provision of effective home-based care?

Objectives of the Review

- Synthesise evidence related to maternal education and nursing-led interventions for home care of LBW and preterm infants.

- Discuss approaches aimed at closing the knowledge/behaviour gap.
- Investigate impact of interventions on mothers' knowledge, practical skills in infant care, breastfeeding, health-seeking behaviour and infant outcomes.
- Identify barriers and facilitators towards the implementation of home-based LBW care.
- Identify implications for nursing practice, education, health policy and future research.

Conceptual Framework: Understanding the Knowledge–Practice Gap

The knowledge–practice gap is the gap between caregiver knowledge and what the caregiver actually does. Knowledge does not necessarily lead to change of behaviour in the context of LBW care.

Mother may know exclusive breastfeeding is important, but can't breastfeed well with lack of attachment or support for lactation. Similarly, she might know how to do KMC, but not use it on a regular basis due to discomfort, privacy issues, household activities, or lack of family support.

The distance can be explained in three layers of interaction.

- **Individual Factors**

Factors at the individual level include maternal age, education, experience, confidence, self-efficacy, fatigue, stress, anxiety, and physical health. Having an LBW infant may cause a greater amount of work and emotional stress to the mother. The lack of confidence can make a mother more reluctant to take action on their own to carry out care tasks.

- **Interpersonal Factors**

Caregiving is highly affected by the family ecology. Grandparents, fathers, relatives and other caregivers can be an important source of help, but also of traditional behaviours that are not in line with evidence-based newborn care. The choices concerning seeking healthcare may also rely on family members.

- **Structural Factors**

Barriers are structural, such as poverty, difficulties in the transport system, lack of access to health services, lack of follow up after discharge, shortage of qualified health care staff and absence of linkage between hospital and community services.

Hence, intervention needs to work at all three levels. Knowledge should be enhanced through education, practical skills should be strengthened through a demonstration, confidence should be built through counselling, social support should be enhanced through family engagement, and follow-up and referral through healthcare systems.

Methodology of the Systematic Review

• Search Strategy

The systematic review that constitutes this chapter was designed to include search terms from the major biomedical, nursing and health-science databases including PubMed, CINAHL, Scopus and Cochrane Library. The proposed search period is through 2024.

The four concepts that were identified were: infant population, care setting, intervention, and outcome. The most important terms used were permutations of:

- “low birth weight”
- “LBW infant”
- “preterm infant”
- “home-based care”
- “maternal education”
- “caregiver education”
- “nursing intervention”
- “home visit”
- “Kangaroo Mother Care”
- “knowledge”
- “practice”
- “health-seeking behaviour”
- “breastfeeding”

These concepts can be combined using Boolean operators (AND, OR).

• Eligibility Criteria

Studies were deemed relevant if they focused on educational, nursing, community or home-based interventions with mothers or caregivers of LBW or preterm infants.

Relevant outcomes included:

- maternal knowledge;
- caregiving practices;
- breastfeeding;
- KMC;

Recognising danger signs;

- health-seeking behaviour;
- infant growth;

- morbidity;
- mortality;
- mother's confidence or stress.

Studies that investigated intensive hospital treatment only (without home-care or caregiver component) were excluded from the main focus of the review.

Adjusting the data extraction and quality assessment to the specific context and need for the indicator.

Author, year, country, design, sample characteristics, type of intervention, duration of intervention, mode of intervention, comparison group, outcome, and main findings should be included in data extraction.

Randomized controlled trials (RCTs) can be assessed with Cochrane risk-of-bias instruments, observational studies with the appropriate critical-appraisal instruments (e.g., Newcastle–Ottawa Scale), and systematic reviews (where applicable) with AMSTAR-2.

The studies in this field are highly heterogeneous in population, intensity of interventions, outcome measures, and length of follow-up periods, so care should be taken to differentiate consistent findings from areas of uncertainty in the synthesis.

Education Interventions for Mothers of LBW in Home Care

- **Content of Maternal Education**

Maternal education programmes typically cover the key areas of LBW care.

Thermal protection is needed because LBW/premature infants lack the ability to regulate body temperature. Schools should cover skin-to-skin contact, what to wear, how to wrap up and avoiding exposure to the cold.

Feeding support involves exclusive breastfeeding, early initiation, positioning and attachment, feeding frequency, expressing and storing breast milk where needed and identifying feeding difficulties.

Hygiene and infection prevention include hand washing, clean clothing, cord care, safe handling, and reducing exposure to infection.

The ability to perceive danger-signs is important as early detection of an illness can help prompt treatment. The mother should be able to tell if baby isn't feeding well, is very sleepy, has a problem breathing, is too hot or too cold, has convulsions, or is very different.

Growth monitoring and immunization ensures that children receive all the necessary follow-up and prevention services.

The checklist of observation for infants, which has been uploaded in the synopsis, also considers feeding, thermal protection, hygiene, health monitoring, bonding and KMC to be important domains of LBW care giving practice.

- **Delivery Modes**

Education can take the form of one-to-one counseling, classroom instruction, demonstration, printed materials, video, SMS or a combination of these methods.

In-person counseling enables providers to tailor information to meet the needs of each mother. Demonstrations are especially useful for hands-on topics such as positioning, KMC, bathing and safe handling.

Printed materials can serve as a point of reference for mothers after they leave, and digital solutions can be used to provide reminders, videos and remote consultations, reinforcing important messages.

Multimodal is probably the best technique. Information helps to introduce the concept, demonstration helps to develop the skill, supervised practice helps to build confidence and follow up helps to reinforce behaviour.

From Knowledge to Practice: Bridging the Gap

The evidence reviewed in this area suggests that knowledge improvement is an important but incomplete outcome. Educational programmes can help in increasing awareness, however actual behaviour requires mothers to have the capacity, opportunity, motivation and support to take action on what they learned.

For instance, breastfeeding education can increase knowledge, while successful breastfeeding can require maternal confidence, lactation support, infant feeding skills, and family support. Likewise, mothers might know the concept of KMC but need to be repeatedly shown how to do it and to be supervised so that they feel confident doing KMC on their own.

This is why interventions which include education and demonstration of skills, with follow-up, might be more effective than interventions that consist of a lecture once.

The intervention proposed in the PhD synopsis is based on this principle, which includes teaching, demonstration and printed materials.

Knowledge–practice gap can thus be tackled using four interlinked strategies:

- Know: Give information that is correctly and simply stated.
- Show: is to demonstrate the correct care practice.
- Do: Give mothers the chance to practice under supervision.
- Support: follow up and reinforcement post-discharge.

This model is especially relevant to LBW infants since caregiving is complex and can change as the infant develops.

Nursing-Led Interventions

Nurses are at a special interface between in-hospital neonatal care and family care in the community.

- **Discharge Preparation**

When preparing for discharge, it should be done prior to discharge from the hospital. Nurses are able to determine maternal readiness, demonstrate necessary skills, explain alarm signs, give written information and set up follow-up plans.

- **Home Visits**

Home visits allow one to see what really happens in terms of caregiving behaviours, and not just what people report. The nurses are able to identify issues with feeding, thermal protection, hygiene, KMC and maternal confidence.

The synopsis which is uploaded is specifically proposing home based intervention in selected community areas of Kollam and incorporates the mothers who are available to the home visit.

- **Breastfeeding Support**

Nurses can support mothers with positioning and attachment issues, feeding frequency, expressing breast milk and identifying feeding issues. Extra care should be taken to support early breastfeeding among LBW infants, as feeding issues could be factors for poor growth and readmission.

- **Promotion of KMC**

KMC is of great importance as a strategy used for supporting LBW and preterm infants. Nurses may show skin to skin positioning, build confidence in the mother, discuss potential obstacles and include family members.

The literature reviewed in the synopsis shows that there is evidence that Kangaroo Method interventions can help to increase weight gain in LBW infants.

- **Psychosocial Support**

Stressed, anxious mothers can be distracted from caregiving. Nurses can offer reassurance, put into perspective mothers' concerns, ensure family support and recognise mothers who need further professional help.

- **Digital Follow-Up**

Home visits may be complemented by tele health and mobile communication. Using telephone calls, SMS reminders, video consultations and digital learning materials, learning can be reinforced and problems can be identified early.

However, digital interventions should not be used as a blanket alternative to in-person services as the availability of digital, literacy, internet access and privacy is not uniform among populations.

Effectiveness of Multimodal Interventions

Overall, evidence favors the adoption of structured educational interventions or nursing-led interventions to increase maternal knowledge and selected caregiving practices. But there is a lot of heterogeneity in the evidence base.

The literature provided in the uploaded synopsis gives examples on how knowledge is improved after structured education. A study on primiparous mothers reported improvement in all the domains of breastfeeding, thermal protection and danger-sign after structured teaching. Another study reported an improvement in knowledge after an educational programme about LBW care.

But an increase in knowledge does not necessarily mean an improvement in infant outcomes. A thorough assessment should differentiate between:

- knowledge outcomes;
- observed practice outcomes;
- behavioural outcomes;
- health-service utilization;
- breastfeeding outcomes;
- infant growth;
- morbidity and mortality.

This distinction is especially relevant to the large number of educational research studies that employ short-term pretest–posttest designs. These studies may be able to show an immediate increase in knowledge but the findings may not tell much about maintaining behaviour over the long term.

Hence, there is a need for repeated follow-up assessments for future interventions.

Strategies That Work

• **Multimodal Education and Skills Training**

Educating, demonstrating, supervised practice, and reinforcement are the most effective mix.

For instance, rather than just describing KMC, nurses can model the procedure, have the mother practice it, correct any mistakes and review it during subsequent visits.

• **Continuous Support**

One educational session will probably not solve all problems post-discharge. Behaviour can be reinforced by continued support and contact via home visits, phone or electronic communications.

- **Family Engagement**

Include family members in interventions, as appropriate. Fathers and grandparents can have an impact on feeding choices, traditional practices, and health services utilization.

- **Contextual Adaptation**

Educational material must be linguistically appropriate & culturally sensitive. In some states, such as Kerala, educational interventions can be reinforced with resources in Malayalam and taking into account the unique family dynamics and health resources in the area.

The synopsis uploaded highlights the significance of region specific challenges and identifies the cultural, systemic and socioeconomic factors in relation to LBW care in the Kollam context.

Barriers and Facilitators

- **Barriers**

Barriers include mastitis, fatigue, stress, low self-efficacy, low family support, traditional practices, financial constraints, transport difficulties and lack of continuity of care.

Sometimes, families and health care providers give conflicting messages to mothers. This can undermine trust and result in wrong practices.

- **Facilitators**

Important facilitators include:

- relationships of trust with nurses;
- practical demonstrations;
- simple written materials;
- repeated reinforcement;
- home visits;
- peer support;
- family involvement;
- accessible referral systems;
- Electronic reminders and communication.

The nurse–mother relationship is of special significance. Mothers may be likely to share problems when they feel the health care provider is supportive and not judgmental.

Nursing Practice Implications

The evidence has a number of implications for nursing.

First, nurses should view discharge preparation as an education and skill building activity, not simply an information session.

Second, whenever feasible, the ability of the mother should be evaluated, rather than by her words. A mother who can describe a care-giving process may not be able to do it right.

Third, there is a need to strengthen post-discharge follow up. Home visits can detect environment and practical obstacles that are not apparent in hospital.

Fourth, nurses should promote family-centred care. The same information should be given to family members to minimize conflicting advice.

Lastly, nurses need to incorporate psychosocial care in LBW care. When we talk about good parenting, we have to take into account maternal confidence.

Nursing Education Inferences

Nursing curricula need to have a thorough preparation for LBW and preterm care. Pupils need to be taught about and become competent in:

- breastfeeding support;
- KMC;
- thermoregulation;
- infection prevention;
- neonatal danger-sign recognition;
- discharge counselling;
- home visits;
- family-centred care;
- communication;
- digital health.

Simulation-based education can be very helpful, especially in giving students the opportunity to learn how to teach and demonstrate to mothers and infants before they do so.

Policy and Programme Development Implications for Health

Health systems need to understand that neonatal care is not over at discharge from the hospital. Need for continuity between facility and community in effective newborn survival strategies.

LBW home-care programmes are able to be built into existing maternal and child health services. Nurses and community health workers can be trained to provide standardised post discharge counselling and home visits.

There is potential for adding digital health platforms to traditional services, especially for reminders and follow up. But technology should be used in conjunction with, not in place of, human assistance.

The economic impact on families should also be taken into account in programmes. Accessible community services, referral mechanisms, and transport assistance can minimize delays in accessing services.

Gaps in Evidence and Future Research Priorities

There are important research gaps in spite of the growing evidence.

First, there is a need for more rigorous randomized controlled trials looking at home based LBW interventions.

Second, there are short follow-up times in many studies. Additional follow-up is needed to see if the maternal knowledge and practice improvements are maintained.

Thirdly, there is a range of outcome measures. Measures of maternal knowledge, observed care-giving practices, breast-feeding, growth and health seeking behaviour would be standardized to enhance comparability.

Fourth, there is a lack of research on paternal and family involvement.

Finally, cost-effectiveness studies are needed. An intervention can be clinically effective, but not easily scaled up if it requires a lot of human resources.

Sixth, there is a need for further research in low-resource and culturally diverse environments. Evidence from one country or health care system may not be applicable or transferable to another.

Future studies should therefore focus on mixed methods where mothers' experience is explored qualitatively and quantitatively assessed.

For Kerala context, it is important to focus on the impact of local family structures, socioeconomic status, maternal education, community healthcare availability, and cultural norms on LBW home care practices.

Restrictions on the evidence

There are a number of limitations in the evidence base. There are a variety of differences among intervention studies related to the content of the education, length of intervention, method of intervention, the size of samples, and the outcome measures used. This heterogeneity makes it difficult to directly compare these.

The extent to which practices are self-reported is important for some studies as this can lead to social desirability bias. Observational assessments demonstrate actual behavior, but may be influenced by the presence of the observer.

Conclusions on sustainability are also limited by short follow-up periods. In addition, it is not always possible to assume that a gain in maternal knowledge will lead to a decrease in mortality or morbidity.

Evidence quality can also be low due to small sample sizes, no control group, non-random sampling and poor reporting.

Thus, the encouraging results obtained from education and nursing interventions need to be interpreted with due caution.

Conclusion

Home-based care plays a crucial part in the continuum of care for LBW infants. Mums often receive information about how to care for a newborn but there may be a lack of transfer of learning from knowledge to action. Individual, interpersonal, cultural, socioeconomic and health-system factors contribute to this gap.

The evidence examined in this chapter suggests that structured maternal education can increase knowledge, and education alone may not be enough to effect lasting behavioural change. More effective strategies involve education, demonstration, supervised skills practice, reinforcement, family involvement, and professional follow-up.

The nurse is in a key position in this process. Nurses are able to assist mothers as they make the transition from hospital to home by means of discharge preparation, breastfeeding assistance, KMC promotion, home visiting, psychosocial counselling, danger-sign education and digital follow-up.

The home-based care intervention therefore has a conceptual relevance in the underlying PhD study as it covers both knowledge and practice by means of educational sessions, demonstrations and printed materials focusing in particular on thermal protection, breastfeeding, hygiene and KMC.

Finally, the transition from delivering information to ongoing competency development and support is needed to close the knowledge–practice gap. Future interventions should be culturally adapted, family centred, nurse supported, and integrated in the existing maternal and child health system. There is a need for high quality research, standard outcomes and extended follow-up to identify the most effective, feasible and scalable models.

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