

Effectiveness of Behaviour Change Communication on Knowledge, Attitude, and Practices Regarding Child Health among Mothers of Under-Five Children: A Sequential Exploratory Mixed-Methods Study

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Abstract: *Childhood morbidity and mortality remain major public health challenges in India despite improvements in maternal and child health services. Enhancing mothers' knowledge, attitudes, and practices (KAP) through Behaviour Change Communication (BCC) may improve child health outcomes. This study evaluated the effectiveness of a BCC intervention among mothers of under-five children. A sequential exploratory mixed-methods design was adopted. In the qualitative phase, focus group discussions were conducted to identify mothers' learning needs regarding child health, which guided the development of the BCC intervention. In the quantitative phase, 280 mothers of under-five children were selected using multistage cluster sampling. Baseline KAP was assessed using validated structured instruments, followed by implementation of the BCC programme and post-intervention assessment. Data were analysed using descriptive and inferential statistics. The BCC intervention produced significant improvements in maternal knowledge, attitudes, and practices related to child health. Improvements were observed in key domains, including nutrition, complementary feeding, immunization, diarrhoeal disease management, pneumonia recognition, and utilization of child health services. Baseline knowledge was significantly associated with mothers' occupation and monthly family income ($p < 0.05$). Behaviour Change Communication is an effective community-based strategy for improving maternal knowledge, attitudes, and practices regarding child health. Integrating structured BCC programmes into routine maternal and child health services, particularly in underserved coastal communities, may enhance childcare practices and contribute to improved child health outcomes.*

Keywords: Behaviour Change Communication; Child Health; Mothers; Under-Five Children; Knowledge; Attitude; Practice; Mixed-Methods Research.

1. Introduction

Children are the foundation of a nation's future, and ensuring their survival, growth, and development is a global public health priority. India has one of the largest populations of children under five years of age and continues to bear a substantial burden of preventable childhood morbidity and mortality. Although considerable progress has been achieved through national maternal and child health programmes, illnesses such as diarrhoea, pneumonia, malnutrition, anaemia, and vaccine-preventable diseases remain major contributors to under-five mortality. Many of these conditions can be prevented through timely health education, appropriate childcare practices, and early utilization of health services.

Mothers play a central role in promoting child health by ensuring optimal nutrition, exclusive breastfeeding, timely complementary feeding, complete immunization, and prompt recognition and management of common childhood illnesses. However, maternal knowledge and caregiving practices are influenced by educational status, socioeconomic conditions, cultural beliefs, and access to reliable health information. Inadequate awareness regarding nutrition, oral rehydration therapy, recognition of danger signs, and preventive healthcare often results in delayed treatment and poor child health outcomes.

India has implemented several initiatives, including the National Health Mission (NHM), Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A) strategy, Integrated Child Development Services (ICDS), Universal Immunization Programme (UIP), and Rashtriya Bal Swasthya Karyakram (RBSK), to improve maternal and child health. These programmes have significantly enhanced access to healthcare services and reduced child mortality. Nevertheless, disparities in health literacy and childcare practices persist, particularly in socioeconomically disadvantaged and coastal communities, highlighting the need for effective community-based educational interventions.

Behaviour Change Communication (BCC) has emerged as an effective health promotion strategy that extends beyond conventional health education by encouraging individuals to adopt and sustain healthy behaviours through interactive, culturally appropriate, and evidence-based communication. Unlike traditional information dissemination, BCC focuses on improving knowledge, shaping positive attitudes, and facilitating behavioural changes through active community participation and continuous reinforcement. Previous studies have demonstrated that Behaviour Change Communication can improve breastfeeding practices, nutritional behaviours, immunization uptake, and home management of common childhood illnesses.

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Despite the availability of child health programmes, limited evidence exists regarding comprehensive Behaviour Change Communication interventions that address multiple dimensions of child health among mothers of under-five children, particularly using a mixed-methods approach. Understanding mothers' perceived learning needs and tailoring educational interventions accordingly may enhance the effectiveness and sustainability of health promotion programmes.

Therefore, the present study employed a sequential exploratory mixed-methods design to evaluate the effectiveness of a Behaviour Change Communication intervention on mothers' knowledge, attitudes, and practices regarding child health. The findings are expected to provide evidence for strengthening community-based maternal and child health education and support the integration of Behaviour Change Communication into routine nursing and public health services, particularly in underserved communities.

2. Literature Review

Childhood morbidity and mortality remain major public health concerns worldwide, particularly in low- and middle-income countries. Although significant progress has been made in reducing under-five mortality, preventable conditions such as diarrhoea, pneumonia, malnutrition, and vaccine-preventable diseases continue to account for a substantial proportion of childhood illnesses and deaths. Maternal knowledge and caregiving practices are recognized as key determinants of child survival and healthy development.

Previous studies have consistently reported that mothers with higher educational status and greater health awareness demonstrate better childcare practices, including appropriate infant feeding, timely immunization, early recognition of childhood illnesses, and prompt healthcare-seeking behaviour. Conversely, inadequate maternal knowledge has been associated with poor nutritional practices, delayed treatment, and increased risk of childhood morbidity.

Behaviour Change Communication (BCC) has emerged as an effective health promotion strategy for improving health-related knowledge, attitudes, and behaviours. Evidence suggests that BCC interventions significantly enhance breastfeeding practices, complementary feeding, immunization coverage, hygiene practices, and home management of common childhood illnesses. Community-based educational programmes delivered through interactive communication and participatory learning have demonstrated greater effectiveness than conventional health education in promoting sustained behavioural change.

Despite these findings, most existing studies have focused on individual aspects of child health or specific educational interventions. Limited research has evaluated comprehensive Behaviour Change Communication programmes addressing multiple dimensions of child health using a mixed-methods approach. Furthermore, evidence regarding the effectiveness of such interventions among mothers in underserved coastal communities remains scarce.

The present study addresses these gaps by developing a culturally appropriate Behaviour Change Communication programme based on mothers' perceived learning needs and evaluating its effectiveness in improving knowledge, attitudes, and practices regarding child health among mothers of under-five children.

3. Need and Significance of the Study:

The first five years of life represent a critical period for physical growth, cognitive development, and emotional well-being. Appropriate nutrition, timely immunization, early recognition of childhood illnesses, and effective utilization of health services during this period are essential for ensuring optimal child survival and development. However, preventable conditions such as malnutrition, diarrhoea, pneumonia, and vaccine-preventable diseases continue to contribute substantially to childhood morbidity and mortality, particularly in low-resource settings.

India has implemented several national programmes, including the National Health Mission (NHM), Integrated Child Development Services (ICDS), Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A), and Rashtriya Bal Swasthya Karyakram (RBSK), to improve child health outcomes. Despite these initiatives, disparities in maternal health literacy and childcare practices persist, especially in socioeconomically disadvantaged and coastal communities, where access to accurate health information and preventive services may be limited.

Behaviour Change Communication (BCC) is a proven strategy for promoting sustainable health behaviours by enhancing knowledge, shaping positive attitudes, and encouraging healthy practices. Nevertheless, evidence regarding comprehensive BCC interventions addressing multiple aspects of child health among mothers of under-five children remains limited, particularly in community settings. During community field practice, the investigator observed that many mothers had inadequate knowledge regarding complementary feeding, immunization, management of common childhood illnesses, and available child health services, indicating a need for structured educational interventions.

Therefore, this study was undertaken to evaluate the effectiveness of a Behaviour Change Communication intervention in improving mothers' knowledge, attitudes, and practices regarding child health. The findings are expected to provide evidence for strengthening community-based maternal and child health education and support the integration of Behaviour Change Communication into routine nursing practice and public health programmes, ultimately contributing to improved child health outcomes.

4. Objectives of the Study

- To assess the felt needs of mothers of under-five regarding child health.
- To assess the level of knowledge, attitude, and practice of mothers regarding child health

- To evaluate the effectiveness of Behavioral Change Communication on the knowledge, attitude, and practice of mothers regarding child health.
- To determine the association between the pretest knowledge, attitude and practice scores with selected demographic variables.
- To find the correlation between knowledge attitude and practice on child health among mothers of under five's

5. Conceptual Framework

The study was guided by **Imogene King's Goal Attainment Theory**, which emphasizes mutual interaction, communication, and goal-directed collaboration between the nurse and the client to achieve desired health outcomes. The theory provides a suitable framework for Behaviour Change Communication (BCC), as it focuses on facilitating behavioural change through effective communication, shared decision-making, and continuous feedback.

In the present study, the framework was operationalized through four key components of King's theory:

- **Perception:** The investigator identified the learning needs of mothers of under-five children through assessment of their socio-demographic characteristics and baseline knowledge, attitudes, and practices (KAP) regarding child health. These findings informed the development of a structured Behaviour Change Communication programme.
- **Interaction:** The Behaviour Change Communication sessions facilitated purposeful communication between the investigator and participants. Through interactive teaching, discussion, and clarification of misconceptions, mothers actively engaged in the learning process and developed a better understanding of essential child health practices.
- **Transaction:** Goal attainment was achieved when participants demonstrated improvements in knowledge, attitudes, and practices following the intervention. The effectiveness of the Behaviour Change Communication programme was evaluated by comparing pre- and post-intervention KAP scores.
- **Feedback:** Participants' responses and post-intervention outcomes provided feedback regarding the effectiveness and acceptability of the programme. This feedback supported the usefulness of Behaviour Change Communication as a community-based strategy for improving maternal knowledge and childcare practices.
- Thus, King's Goal Attainment Theory provided a theoretical foundation for understanding how structured communication and collaborative learning can enhance maternal health literacy and promote positive child health behaviours.

6. Materials and Methods

Study Design

This study employed a **sequential exploratory mixed-methods design**, integrating qualitative and quantitative approaches to comprehensively evaluate the effectiveness of a Behaviour Change Communication (BCC) intervention on maternal knowledge, attitudes, and practices (KAP) regarding child health. The qualitative phase preceded the quantitative

phase and was used to explore mothers' perceived learning needs and contextual factors influencing child health practices. Findings from the qualitative inquiry informed the development of a culturally appropriate Behaviour Change Communication programme that was subsequently evaluated using a quasi-experimental quantitative design. This sequential approach ensured that the intervention addressed locally relevant concerns while providing rigorous quantitative evidence of its effectiveness.

Study Setting

The study was conducted in selected community settings served by Anganwadi centres in Kerala, India. Anganwadi centres function as the primary community platform for delivering maternal and child health services under the Integrated Child Development Services (ICDS) programme and provide regular contact with mothers of young children. These centres were selected because they facilitate community-based health promotion and offer opportunities for structured educational interventions among mothers of under-five children.

Study Population

The target population comprised mothers of under-five children residing in the selected communities. Eligible participants were biological mothers who had at least one child aged below five years and were permanent residents of the study area. Mothers who were willing to participate and provided written informed consent were included in the study. Mothers who were critically ill, had cognitive impairment that limited participation, or were unavailable during the intervention and follow-up assessments were excluded.

Study Phases

Phase I: Qualitative Exploration

The qualitative phase was conducted to identify mothers' perceived learning needs related to child health and childcare practices. Focus group discussions (FGDs) were conducted using a semi-structured interview guide developed after an extensive review of literature and consultation with experts in community health nursing and maternal-child health.

Participants were purposively selected to ensure diversity in educational status, socioeconomic background, and childcare experiences. Discussions explored mothers' understanding of complementary feeding, nutrition, iron supplementation, diarrhoeal disease management, pneumonia recognition, immunization, available child health services, and barriers to adopting recommended childcare practices.

Each discussion was facilitated by the principal investigator in the local language and audio-recorded with participants' permission. Field notes were maintained to capture non-verbal communication and contextual observations.

Audio recordings were transcribed verbatim and translated into English where necessary. Data were analysed using thematic content analysis. Codes were generated inductively and grouped into categories that reflected common educational needs and misconceptions. These themes served as the foundation for developing the Behaviour Change Communication intervention.

Phase II: Quantitative Evaluation

The second phase employed a quasi-experimental pre-test–post-test design with repeated measurements to evaluate the effectiveness of the Behaviour Change Communication programme. Baseline assessments were conducted before implementation of the intervention, followed by immediate post-intervention and scheduled follow-up assessments to determine knowledge retention and behavioural change over time.

Sample Size and Sampling Technique

A total of 280 mothers of under-five children participated in the quantitative phase of the study. The sample size was determined based on the study objectives, expected intervention effect, statistical power, and feasibility within the selected communities.

A multistage cluster sampling technique was employed to ensure representative participation. Initially, clusters (Anganwadi centres/community units) were selected from the study area. Subsequently, eligible mothers were identified within each selected cluster and recruited according to predefined inclusion criteria until the required sample size was achieved. This sampling strategy minimized logistical constraints while improving representativeness across geographically dispersed communities.

Development of the Behaviour Change Communication Intervention

The Behaviour Change Communication programme was developed using findings from the qualitative phase, evidence from national child health guidelines, and recommendations from experts in paediatric nursing, community health nursing, public health, and health education.

The educational package focused on six major domains of child health:

- Complementary feeding and optimal infant nutrition
- Iron and folic acid supplementation
- Home management of diarrhoea, including oral rehydration therapy and zinc supplementation
- Recognition and early management of childhood pneumonia
- Universal immunization and vaccine-preventable diseases
- Rashtriya Bal Swasthya Karyakram (RBSK) and available child health services

The intervention incorporated principles of adult learning, interactive communication, behavioural reinforcement, and participatory learning. Educational methods included structured lectures, group discussions, demonstrations, visual teaching aids, printed information booklets, question-and-answer sessions, and practical examples relevant to local childcare practices.

The Behaviour Change Communication sessions were delivered by the principal investigator over a structured educational schedule. Active participation, clarification of misconceptions, and reinforcement of key health messages were emphasized throughout the programme.

7. ResultsParticipant Characteristics

The qualitative phase included 30 mothers of under-five children. Most participants were aged 26–33 years (36.7%), had school-level education (83.3%), were homemakers (90.0%), belonged to the Christian community (96.7%), had a monthly family income below ₹10,000 (73.3%), lived in joint families (56.7%), had one child under five years (56.7%), and primarily received child health information through the media (66.7%).

The quantitative phase included **280 mothers**. The majority were aged **26–33 years (43.6%)**, had school-level education (45.4%), were homemakers (58.9%), belonged to the Christian community (65.0%), reported a monthly family income below ₹10,000 (48.6%), lived in nuclear families (49.3%), had one child under five years (61.4%), and identified the media as their primary source of child health information (79.6%).

Qualitative Findings

Thematic analysis identified five major learning needs regarding child health:

- 1) Complementary feeding, infant nutrition, and IFA supplementation.
- 2) Home management of diarrhoea, particularly ORS preparation and continued breastfeeding.
- 3) Early recognition and management of pneumonia.
- 4) Importance and schedule of childhood immunization.
- 5) Awareness and utilization of Rashtriya Bal Swasthya Karyakram (RBSK).

The discussions also revealed widespread misconceptions regarding infant feeding, diarrhoea management, immunization, and government child health services.

Baseline Knowledge, Attitude, and Practice

Before the intervention, **87.5%** of mothers demonstrated inadequate knowledge, **73.9%** had an unfavourable attitude, and **62.1%** exhibited moderately adaptive child health practices. Knowledge deficits were particularly evident in diarrhoea management, pneumonia recognition, immunization, and RBSK services.

Effect of Behaviour Change Communication

Significant improvements were observed in knowledge, attitude, and practice following the Behaviour Change Communication (BCC) intervention.

Knowledge scores increased progressively from a pre-test mean of 11.24 ± 3.79 to 18.18 ± 4.60 immediately after intervention, 25.34 ± 4.37 at the first follow-up, and 32.63 ± 3.54 at the second follow-up ($p < 0.001$).

Similarly, attitude scores improved from 21.49 ± 8.63 at baseline to 36.68 ± 10.13 , 55.43 ± 9.10 , and 72.55 ± 5.71 across successive assessments ($p < 0.001$).

Practice scores also demonstrated marked improvement from 4.84 ± 1.90 before intervention to 7.85 ± 1.97 , 10.55 ± 1.83 , and 13.41 ± 1.25 at subsequent assessments ($p < 0.001$).

Repeated-measures ANOVA confirmed statistically significant improvements in knowledge ($F = 6374.39$, $p < 0.001$), attitude ($F = 5847.99$, $p < 0.001$), and practice ($F = 5487.27$, $p < 0.001$) over time.

By the second follow-up, 76.1% of participants achieved an excellent level of knowledge, 36.8% demonstrated a highly favourable attitude, and 91.1% exhibited highly adaptive child health practices.

Association with Demographic Variables

Pre-test knowledge was significantly associated with maternal occupation ($p = 0.002$) and family income ($p = 0.006$). Attitude was significantly associated with educational status ($p < 0.001$). Practice was significantly associated with education ($p < 0.001$) and occupation ($p < 0.001$). No significant associations were observed with age or family type.

Correlation Between Knowledge, Attitude, and Practice

A moderate positive correlation was observed between knowledge and practice scores ($r = 0.557$, $p < 0.001$). Knowledge and attitude showed no significant correlation ($r = 0.014$, $p = 0.813$), while attitude demonstrated a weak negative correlation with practice ($r = -0.171$, $p = 0.004$).

8. Discussion

This mixed-method sequential exploratory study evaluated the effectiveness of a Behaviour Change Communication (BCC) intervention in improving the knowledge, attitude, and practice (KAP) of mothers of under-five children regarding child health. The qualitative findings identified major educational needs related to complementary feeding, diarrhoea management, pneumonia recognition, immunization, and awareness of Rashtriya Bal Swasthya Karyakram (RBSK). These findings informed the development of the BCC intervention, ensuring that the educational content addressed the actual learning needs of mothers.

The baseline assessment demonstrated considerable deficiencies in maternal knowledge and attitude towards child health. Nearly nine out of ten mothers had inadequate knowledge, while approximately three-fourths exhibited an unfavourable attitude. Although most participants reported moderately adaptive child health practices, several misconceptions regarding breastfeeding, complementary feeding, oral rehydration therapy, immunization, and government child health services were identified. Similar deficiencies have been reported in previous studies conducted in Bangladesh and other low- and middle-income countries, where inadequate maternal education, poor socioeconomic status, and limited access to health information contributed to poor child health knowledge and practices.

Following the BCC intervention, significant improvements were observed in all three outcome variables. Knowledge scores increased progressively from 11.24 ± 3.79 at baseline to 32.63 ± 3.54 at the six-month follow-up. Likewise, attitude scores improved from 21.49 ± 8.63 to 72.55 ± 5.71 , while practice scores increased from 4.84 ± 1.90 to 13.41 ± 1.25 . Repeated-measures ANOVA demonstrated statistically

significant improvements across all assessment points ($p < 0.001$), indicating sustained effectiveness of the intervention.

The findings suggest that repeated educational reinforcement is more effective than a single educational session. The progressive improvement observed during the follow-up assessments indicates that periodic Behaviour Change Communication strengthens knowledge retention and facilitates positive behavioural changes among mothers. These findings are consistent with previous quasi-experimental studies that reported significant improvements in maternal child health knowledge following structured educational interventions.

The present study also demonstrated significant associations between maternal knowledge and occupation as well as family income, indicating the influence of socioeconomic factors on health literacy. Maternal education was significantly associated with attitude and practice scores, emphasizing the importance of educational status in promoting appropriate childcare behaviours. These findings agree with previous studies conducted in Pakistan and India, which identified maternal education as one of the strongest determinants of appropriate child health practices.

Correlation analysis revealed a moderate positive relationship between knowledge and practice, suggesting that increased knowledge contributes to improved childcare practices. In contrast, knowledge and attitude showed no significant correlation, while attitude demonstrated a weak negative correlation with practice. These findings indicate that although knowledge is an important prerequisite for behavioural change, other contextual and sociocultural factors may influence maternal attitudes and practices.

Overall, the study provides evidence that Behaviour Change Communication is an effective strategy for improving maternal knowledge, attitude, and practices related to child health. Incorporating structured BCC programmes into routine Anganwadi and primary healthcare services may substantially strengthen community-based child health promotion and contribute to improved child health outcomes.

9. Recommendations

- Integrate Behaviour Change Communication into routine Anganwadi and primary healthcare services to strengthen maternal child health education.
- Provide regular refresher Behaviour Change Communication sessions for mothers through trained community health workers to sustain behavioural changes.
- Conduct multicentre randomized controlled studies with longer follow-up periods to evaluate the long-term effectiveness of Behaviour Change Communication on maternal practices and child health outcomes.

10. Strengths and Limitations

A major strength of this study is the use of a mixed-method sequential exploratory design, which enabled the development of a culturally relevant educational intervention based on mothers' perceived learning needs. The inclusion of participants from multiple districts and repeated follow-up

assessments over six months strengthened the validity of the findings.

However, the study employed a single-group pre-test–post-test design without a control group, limiting causal inference. The reliance on self-reported practice data may have introduced social desirability bias. In addition, the study was conducted among mothers attending selected Anganwadi centres in Kerala, which may limit the generalizability of the findings to other populations.

11. Conclusion

The Behaviour Change Communication intervention significantly improved mothers' knowledge, attitudes, and practices regarding child health over six months. The sustained improvements observed across repeated follow-up assessments demonstrate the value of structured, need-based health education in promoting positive childcare behaviours. Integrating Behaviour Change Communication into existing maternal and child health programmes delivered through Anganwadi centres and primary healthcare services may enhance maternal health literacy and contribute to better child health outcomes.

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