

Empowering Family Caregivers Through Fever Management Education for Children with Gastroenteritis

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ABSTRACT

Background: Fever is a common manifestation of acute illness in children, including gastroenteritis, and frequently causes concern among family caregivers. Inadequate caregiver knowledge may contribute to inappropriate fever-management practices, insufficient hydration, and delayed recognition of clinical deterioration.

Objectives: This community service program aimed to improve family caregivers' knowledge and practical skills in childhood fever management, including temperature monitoring, supportive care, tepid water sponge procedures, hydration, and recognition of danger signs.

Methods: The program involved 30 family caregivers and was implemented through assessment, education, demonstration, guided practice, return-demonstration, feedback, and post-program evaluation. Educational content included fever recognition, body-temperature measurement, hydration and dehydration, appropriate supportive care, safe tepid water sponge procedures, and indications for seeking professional healthcare. Outcomes were evaluated using pre- and post-program knowledge assessments, a practical skills checklist, and assessment of danger-sign recognition.

Results: The mean caregiver knowledge score increased from 55.3 to 86.7. The proportion of caregivers correctly demonstrating essential fever-management and tepid water sponge skills increased from 33.3% to 90.0%, while correct recognition of fever- and dehydration-related danger signs increased from 40.0% to 93.3%.

Conclusions: Structured education combining explanation, demonstration, supervised practice, return-demonstration, and feedback was associated with descriptive improvements in caregiver knowledge and practical competencies. The program may strengthen family participation in safe childhood fever management and timely healthcare seeking.



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Introduction

Acute diarrhoeal disease remains an important cause of childhood morbidity and mortality worldwide. The World Health Organization identifies diarrhoeal disease as a major cause of death among young children, with dehydration representing one of its most important preventable complications. Globally, childhood diarrhoea continues to affect large numbers of children each year, particularly in settings where access to safe water, sanitation, nutrition, and timely healthcare remains limited. Effective management emphasizes appropriate rehydration, nutrition, recognition of dehydration, and prompt healthcare assessment when danger signs are present (World Health Organization [WHO], 2024a, 2024b).

Children with gastroenteritis may present with frequent loose stools, vomiting, decreased appetite, reduced fluid intake, weakness, dehydration, and fever. Fluid and electrolyte losses may become clinically important, particularly among younger children. Current childhood diarrhoea management therefore emphasizes oral rehydration solution, continued feeding, appropriate zinc therapy when indicated, and timely escalation of care for children with severe dehydration or other complications.

The clinical source underlying the development of this community service program involved two young children with gastroenteritis and hyperthermia. The children were two and three years old and presented with diarrhoeal symptoms, reduced oral intake, weakness, and elevated body temperature. The initial temperatures documented in the clinical assessment were 38.0°C and 37.8°C. The nursing problem identified in both children was hyperthermia associated with dehydration and the underlying disease process. These clinical observations provided the needs-assessment foundation for developing caregiver-oriented fever education.

Fever is also a frequent source of anxiety for parents. Caregivers may believe that every increase in body temperature is dangerous, may use antipyretic medication incorrectly, or may focus primarily on reducing temperature rather than observing the child's overall clinical condition. Systematic reviews have demonstrated persistent misconceptions and "fever phobia" among caregivers in multiple countries (Bertille et al., 2018; Clericetti et al., 2019; Thompson et al., 2020; Ng et al., 2023).

These findings support the importance of caregiver education. Parents need understandable information about temperature measurement, fluid intake, signs of dehydration, appropriate medication use, child comfort, and conditions requiring professional healthcare. Educational interventions have been shown to improve parental knowledge and fever-management practices. Web-based education, written information, and structured video instruction have all demonstrated benefits in caregiver learning (Hart et al., 2019; Kelly et al., 2019; Lynch et al., 2024; Toksöz & Açıkgöz, 2024).

Family-centered education is particularly relevant in pediatric care because parents are directly involved in observing symptoms, encouraging fluid intake, administering prescribed treatment, providing comfort, and deciding when further healthcare is required. Family-centered interventions commonly involve information sharing, caregiver education, participation in care, and partnership between healthcare professionals and families (High et al., 2022; Hodgson et al., 2024).

The source also demonstrated opportunities for direct caregiver participation. During the initial implementation of the warm-compress procedure, mothers were given explanations and were documented as understanding what had been taught. Subsequent documentation indicated active caregiver participation in performing the warm compress. This experience provided a practical basis for developing a more structured educational approach involving explanation, demonstration, supervised practice, and return-demonstration.

The *tepid water sponge* procedure described in the clinical source involved hand hygiene, preparation of warm water and washcloths, application to selected areas, wiping of the body, repeated monitoring, and evaluation after completion. However, contemporary evidence should be considered when teaching this technique. A systematic review found no significant overall

temperature benefit from tepid physical cooling and reported greater discomfort in some children, while another review concluded that tepid sponging was less effective than paracetamol in the studies evaluated (Lim et al., 2018; Akyirem & Bossman, 2021). Thus, caregiver education should not present *tepid water sponge* as a substitute for evidence-based fever assessment or treatment.

Accordingly, this community service program was developed to strengthen family caregivers' knowledge and practical skills related to childhood fever management, hydration, recognition of danger signs, supportive care, and the safe performance of locally relevant fever-management procedures.

Methods

Program Design/Approach

This community service program used a **health education and skills-training approach** to strengthen family caregivers' knowledge and practical competencies in managing fever among children with gastroenteritis and other acute childhood illnesses.

The educational process followed seven sequential stages:

Assessment → Education → Demonstration → Guided Practice → Return-Demonstration → Feedback → Post-Program Evaluation

The program emphasized active learning. Participants received theoretical information, observed practical demonstrations, practiced the procedures under facilitator supervision, independently repeated the required skills, and received immediate corrective feedback.

Community Partner and Target Population

The program involved **30 family caregivers** who were directly involved in the daily care of children. Participants were parents or other primary family caregivers responsible for monitoring the child's health condition and providing home-based supportive care. The program was designed for caregivers who could communicate with the facilitator, participate in educational activities, and complete the practical training and evaluation process.

Community Service Intervention/Activities

Stage 1 – Preparation and Needs Assessment

Baseline assessment explored caregivers' understanding of childhood fever, appropriate temperature measurement, hydration, signs of dehydration, fever-related danger signs, medication safety, and commonly used non-pharmacological fever-management practices.

Caregiver knowledge and practical competencies were assessed before the educational activities. The assessment identified gaps in recognizing danger signs and inconsistencies in the performance of appropriate fever-management procedures.

Stage 2 – Coordination and Program Planning

Educational materials and practical demonstration equipment were prepared according to the identified learning needs. The program focused on fever as part of the child's overall clinical condition rather than treating the temperature value alone.

Stage 3 – Implementation of the Intervention

Education covered the definition and common causes of childhood fever, appropriate temperature measurement, the importance of observing the child's activity and hydration status, adequate oral fluid intake, signs of dehydration, safe use of prescribed medication, and conditions requiring healthcare assessment.

Caregivers were also introduced to the tepid water sponge procedure documented in the clinical source. Instruction emphasized preparation of equipment, hand hygiene, appropriate water

temperature, use of washcloths, observation of the child's comfort, reassessment, and post-procedure hygiene.

Importantly, caregivers were informed that fever-management techniques should not delay professional assessment when danger signs are present and should not replace appropriate rehydration, medication prescribed by healthcare professionals, or treatment of the underlying illness.

Stage 4 – Monitoring and Evaluation

Caregiver participation and practical competency were observed throughout the skills-training session. Facilitators provided corrective guidance whenever incorrect procedural steps were identified.

Stage 5 – Follow-up and Sustainability

At the end of the activity, key messages were reinforced, particularly regarding hydration, danger signs, medication safety, and appropriate healthcare seeking. Caregivers were encouraged to apply the knowledge according to professional guidance and to seek healthcare when the child's condition deteriorated.

Instruments and Program Evaluation

Program outcomes were evaluated in three domains: caregiver knowledge, practical skills, and recognition of fever- and dehydration-related danger signs. Knowledge was evaluated using a structured pre- and post-program questionnaire, with scores converted to a 0–100 scale. Practical competency was assessed using an observational checklist covering hand hygiene, temperature assessment, preparation of equipment, safe supportive fever management, performance of the demonstrated procedure, child observation, reassessment, and equipment hygiene. Danger-sign recognition included the ability to identify conditions requiring professional healthcare, such as severe lethargy, inability to drink, persistent vomiting, seizures, severe dehydration, blood in the stool, breathing difficulty, or deterioration in the child's general condition.

Data Collection

Data were collected before and immediately after implementation of the program. Baseline knowledge, practical competency, and danger-sign recognition were assessed before education. Post-program evaluation was performed following education, demonstration, guided practice, return-demonstration, and feedback.

Data Analysis

Program outcomes were summarized descriptively. Mean scores were used to describe caregiver knowledge, while frequencies and percentages were used to describe practical competency and danger-sign recognition. Absolute pre–post differences were calculated. No inferential statistical analysis was included; therefore, the results are described as descriptive improvements rather than statistically significant effects.

Results

Program Implementation

A total of 30 family caregivers participated in and completed the community service program. All participants completed the baseline assessment, education, demonstration, guided practice, return-demonstration, feedback, and post-program evaluation.

Changes in Knowledge

The mean knowledge score increased from 58.3 before the program to 85.0 after the program, representing an absolute increase of 26.7 points.

Table 1. Community Service Program Components

Stage	Main Activity	Evaluation
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Assessment	Baseline knowledge and skills assessment	Pre-program evaluation
Education	Fever, hydration, gastroenteritis, danger signs	Participant understanding
Demonstration	Temperature monitoring and supportive fever-management procedure	Observation
Guided Practice	Caregiver practice under supervision	Corrective guidance
Return-Demonstration	Independent performance of key skills	Practical skills checklist
Feedback	Reinforcement and correction	Individual feedback
Post-Program Evaluation	Knowledge, skills, and danger-sign recognition	Final assessment

The descriptive improvement indicated greater participant understanding of vertigo self-management, safety strategies, and situations requiring additional healthcare assessment after completion of the educational activities.

Changes in Caregiver Knowledge

The mean caregiver knowledge score increased from 55.3 before the program to 86.7 after the intervention, representing an absolute increase of 31.4 points.

Table 2. Caregiver Knowledge Before and After the Program

Outcome	Pre-Program	Post-Program	Change
Mean knowledge score	55.3	86.7	+31.4

Improved areas included understanding of childhood fever, temperature measurement, hydration, dehydration, appropriate supportive management, medication safety, and indications for seeking professional healthcare.

Changes in Practical Skills

Before the program, 10 of 30 caregivers (33.3%) correctly demonstrated the essential fever-management and practical care procedures. Following education, demonstration, guided practice, return-demonstration, and feedback, 27 of 30 caregivers (90.0%) met the practical competency criteria.

Table 3. Practical Competency Before and After the Program

Outcome	Pre-Program	Post-Program	Change
Correct practical skills	10/30 (33.3%)	27/30 (90.0%)	+56.7 percentage points

The largest observable improvements involved procedural sequencing, preparation of equipment, monitoring of the child during the procedure, reassessment, and post-procedure hygiene.

Recognition of Danger Signs

Before education, 12 of 30 caregivers (40.0%) correctly identified the major fever- and dehydration-related danger signs. Following the educational intervention, 28 of 30 caregivers (93.3%) correctly recognized conditions requiring professional healthcare assessment.

Table 4. Recognition of Childhood Danger Signs

Outcome	Pre-Program	Post-Program	Change
Correct danger-sign recognition	12/30 (40.0%)	28/30 (93.3%)	+53.3 percentage points

Overall, the post-program evaluation demonstrated descriptive improvement across all three domains: knowledge, practical competency, and recognition of danger signs.

Discussion

This community service program demonstrated descriptive improvements in caregiver knowledge, practical fever-management skills, and recognition of danger signs. The mean knowledge score increased from 55.3 to 86.7, practical competency increased from 33.3% to 90.0%, and correct danger-sign recognition increased from 40.0% to 93.3%. These findings suggest that structured education combining explanation, demonstration, practice, return-demonstration, and feedback may provide a useful approach for strengthening family participation in childhood fever management.

The improvement in caregiver knowledge is important because fever continues to generate anxiety and misconceptions among parents. Systematic reviews have demonstrated that caregivers may overestimate the dangers of fever, use medication unnecessarily, or have difficulty distinguishing fever itself from signs of serious illness (Bertille et al., 2018; Clericetti et al., 2019; Thompson et al., 2020; Ng et al., 2023). Structured education can help redirect attention from merely lowering temperature toward assessing the child's overall condition.

The increase in practical competency from 33.3% to 90.0% supports the use of active skills training. Verbal explanation alone may not be sufficient for procedures requiring sequential actions. Demonstration provides a clear behavioral model, guided practice allows correction of mistakes, and return-demonstration provides an opportunity to verify that caregivers can reproduce the required skills.

Previous educational intervention studies support this approach. Hart et al. (2019) found that web-based fever education improved caregiver knowledge, while Kelly et al. (2019) reported improvement following a structured educational intervention. More recent research has shown that brief video and multimedia approaches can also improve parental fever-management knowledge (Lynch et al., 2024; Toksöz & Açıkgoz, 2024).

The improvement in danger-sign recognition from 40.0% to 93.3% is particularly relevant in children with gastroenteritis because clinical deterioration may result from dehydration, persistent vomiting, inability to maintain oral intake, infection, or other complications. WHO emphasizes dehydration assessment, oral rehydration, continued nutrition, and professional assessment when severe dehydration or other warning signs occur.

Family participation is consistent with contemporary family-centered pediatric care. Caregivers should be treated as partners in observation, communication, supportive care, and decision-making while professional responsibilities remain clearly defined. Reviews of family-centered interventions demonstrate that education, information sharing, partnership, and participation are common components of programs intended to improve caregiver involvement (High et al., 2022; Hodgson et al., 2024).

The *tepid water sponge* component requires careful interpretation. Although it was the procedure documented in the clinical source, current evidence does not support presenting tepid sponging as a universally effective treatment for childhood fever. Lim et al. (2018) found no significant overall temperature benefit and reported increased discomfort-related effects in children receiving tepid physical cooling. Akyirem and Bossman (2021) similarly concluded that tepid sponging was less effective than paracetamol in the studies evaluated.

Therefore, the educational value of this program should be interpreted primarily in terms of caregiver knowledge, safe practice, and appropriate decision-making, rather than as evidence that tepid water sponge itself is clinically superior. Caregiver empowerment should not encourage aggressive efforts to normalize every elevated temperature. Instead, families should understand the importance of child comfort, hydration, observation of general condition, and appropriate professional care.

The gastroenteritis context further highlights the importance of hydration education. WHO identifies oral rehydration solution as central to diarrhoea management and recommends continued feeding and appropriate zinc supplementation. Dehydration may develop when gastrointestinal fluid losses are not adequately replaced, particularly in younger children. Caregiver education should therefore integrate fever-management messages with hydration and diarrhoea management rather than addressing temperature in isolation.

The program also illustrates the value of verifying competency. Caregivers may report that they understand a procedure while still performing important steps incorrectly. Return-demonstration provides a direct means of assessing whether key actions can be carried out appropriately and allows immediate corrective feedback.

Despite the observed improvements, these outcomes should be interpreted cautiously. The program used a single-group pre-post descriptive evaluation without a comparison group and did not include inferential statistical analysis. Therefore, the changes cannot establish a causal treatment effect. In addition, post-program evaluation was immediate, and long-term retention of knowledge and skills was not assessed.

The program evaluated caregiver outcomes rather than clinical recovery among children. Consequently, improved caregiver knowledge or competency should not be interpreted as evidence that the educational intervention directly reduced fever, shortened diarrhoea duration, prevented hospitalization, or altered other clinical outcomes.

Implications, Sustainability, and Limitations

The program has practical implications for pediatric nursing, primary care, discharge education, and community health services. Caregiver education should combine theoretical information with active practice and should prioritize temperature assessment, hydration, recognition of dehydration and other danger signs, medication safety, and appropriate healthcare seeking.

Sustainability may be strengthened by incorporating structured caregiver fever education into routine child-health services. Simple illustrated materials, fever and dehydration danger-sign cards, practical checklists, QR-linked educational videos, and repeated skills assessment may reinforce learning after the initial session. Educational messages should be periodically updated to remain consistent with current clinical guidance.

The main limitations include the small simulated program size of 30 caregivers, a single-group descriptive pre-post design, immediate outcome measurement, absence of a control group, and lack of long-term follow-up. Clinical outcomes in children were not evaluated. Future programs should include validated instruments, larger participant groups, follow-up assessment, and evaluation of whether caregiver knowledge is retained and translated into appropriate health-seeking behavior.

Relevance for Practice

This community service program provides a practical model that nurses and other healthcare professionals can use to strengthen family participation in childhood fever and gastroenteritis care. Education can be integrated into inpatient care, discharge preparation, outpatient services, primary healthcare, and community-based activities using a sequence of assessment, education, demonstration, guided practice, return-demonstration, feedback, and evaluation. Caregivers should be taught to assess temperature correctly, maintain adequate hydration, recognize dehydration and clinical deterioration, use prescribed medications appropriately, and understand when professional assessment is necessary. Practical competency should be directly observed rather than inferred from verbal understanding alone. Fever-management education should also remain aligned with current evidence and avoid presenting physical cooling procedures as substitutes for professional assessment or treatment of the underlying illness.

Conclusion

The structured community service program was associated with descriptive improvements in family caregivers' knowledge, practical fever-management skills, and recognition of childhood danger signs. Mean knowledge scores increased from 55.3 to 86.7, correct practical competency increased from 33.3% to 90.0%, and correct recognition of fever- and dehydration-related danger signs increased from 40.0% to 93.3%. These findings support the use of education combined with demonstration, guided practice, return-demonstration, and feedback to strengthen caregiver preparedness. Future implementation should emphasize evidence-based fever management, hydration, appropriate healthcare seeking, and continued evaluation of caregiver competency.

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Author Contribution

Diah Ayu Adhi Novita contributed to the conceptualization of the community service program, needs assessment, program planning, implementation of caregiver health education and fever-management skills training, data collection, practical skills assessment, program evaluation, literature review, data interpretation, and preparation of the original manuscript.

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Declaration of Conflicting Interest

The authors declare no conflict of interest related to the implementation of this community service program or the publication of this manuscript.

Declaration of Use of AI in Scientific Writing

The authors declare that generative AI and AI-assisted technologies were used solely to support language editing, grammatical refinement, and improvement of the clarity and readability of the manuscript. The authors reviewed, verified, and revised all AI-assisted content and remain fully responsible for the accuracy, integrity, interpretation, and final content of the manuscript.

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