



Effectiveness of a Structured Teaching Programme on Parental Knowledge of First Aid for Burns, Fractures, and Foreign Body Aspiration in Children Aged Up to 18 Years: A Pre-Experimental Study

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ABSTRACT

Background: Unintentional injuries including burns, fractures, and foreign body aspiration (FBA) are among the leading causes of morbidity and mortality in children worldwide. Parents, as primary caregivers, are often the first responders in such emergencies; however, evidence consistently indicates substantial deficits in their first aid knowledge. **Objective:** To assess the effectiveness of a structured teaching programme (STP) on knowledge regarding first aid for burns, fractures, and foreign body aspiration among parents of children aged up to 18 years in Anakkayam Grama Panchayath. **Methods:** A pre-experimental one-group pre-test-post-test design was employed. One hundred parents of children aged up to 18 years were recruited by non-probability purposive sampling from Anakkayam Grama Panchayath, Kerala, India. Data were collected using a 15-item structured knowledge questionnaire. Knowledge scores were categorised as inadequate (1–5), moderate (6–10), or adequate (11–15). The STP was administered following the pre-test. Data were analysed using descriptive statistics, paired t-test, and chi-square test. **Results:** Prior to the intervention, 56 (56%) parents had inadequate knowledge, 41 (41%) had moderate knowledge, and 3 (3%) had adequate knowledge. Following the STP, 98 (98%) parents demonstrated adequate knowledge, 2 (2%) had moderate knowledge, and none had inadequate knowledge. The mean knowledge score increased from 5.56 (SD 2.865) pre-test to 14.72 (SD 0.841) post-test ($t = 16.80, p < 0.001$). Chi-square analysis revealed a statistically significant association between post-test knowledge scores and the preferred healthcare-seeking centre ($\chi^2 = 30.8468, df = 6, p < 0.05$), whereas no significant associations were found for age of child, parental education, occupation, or prior accident experience. **Conclusion:** The structured teaching programme significantly improved parental knowledge of first aid for burns, fractures, and foreign body aspiration in children, demonstrating that targeted educational interventions can effectively bridge caregiver knowledge gaps in community settings.

Keywords: parents; first aid; burns; fractures; foreign body aspiration; structured teaching programme; paediatric emergencies; knowledge

INTRODUCTION

Unintentional injuries constitute a major global public health burden, particularly among children and adolescents. A comprehensive analysis of Global Burden of Disease (GBD) 2021 data has confirmed that injuries remain a leading cause of childhood mortality and disability-adjusted life years (DALYs) across all regions, with the greatest burden concentrated in low- and middle-income countries (LMICs) [1]. In India, as in other LMICs, inadequate safety infrastructure and limited access to timely emergency care amplify the consequences of common childhood injuries such as burns, fractures, and foreign body aspiration (FBA).

Burns represent one of the most severe and prevalent forms of childhood injury. Globally, approximately 180,000 deaths occur from burns each year, predominantly in LMICs [2]. More than 500,000 children worldwide are hospitalised annually due to burn injuries [3]. In the Indian subcontinent, burns rank among

the leading causes of accidental injury in children, with scalds and flame burns accounting for the majority of cases [3]. The physical, functional, and psychosocial consequences of burn injury extend well beyond the acute phase and impose significant burdens on affected families and healthcare systems.

Foreign body aspiration is a well-recognised paediatric emergency, particularly among children below three years of age. A large real-world study of 4,227 FBA cases from western China confirmed that over 63% of events occurred in children aged one to two years, with organic materials such as peanuts and seeds constituting the majority of aspirated objects [4]. Studies from Europe and the Middle East have demonstrated that parental awareness of FBA risks and appropriate first aid responses is frequently inadequate: in a Croatian cohort, 59.6% of parents could not specify the correct course of action when a child aspirated a foreign body, and only 2% provided a fully accurate response [5]. Similarly, in a study from Makkah, Saudi

Arabia, a substantial proportion of parents demonstrated poor knowledge and practices regarding FBA prevention and management [6]. Fractures, commonly resulting from falls, are among the most frequent non-fatal injuries in children and contribute substantially to the global non-fatal injury burden, particularly through falls-related disability [1].

The role of parents and primary caregivers as first responders in these emergencies is critical. Prompt and appropriate first aid cooling a burn wound under running water, immobilising a suspected fracture, or applying back blows and abdominal thrusts for an aspirating child can significantly reduce morbidity, pain, and the risk of complications [2]. However, studies conducted in diverse settings consistently reveal that parental knowledge of paediatric first aid is poor. In Ethiopia, an assessment of knowledge, attitude, and practice (KAP) among parents at a tertiary hospital found that the majority had inadequate knowledge of first aid for FBA, with corresponding deficiencies in attitudes and practices [7]. These findings mirror observations from Indian and other South Asian contexts, where parents often resort to potentially harmful home remedies in the absence of formal first aid training.

Structured teaching programmes (STPs) have emerged as an effective modality for improving first aid knowledge in community and clinical populations. Several studies have demonstrated significant improvements in knowledge following STPs on burns first aid. In a rural Indian setting, a planned teaching programme on burns first aid for parents of children under five years significantly improved mean knowledge scores, with a marked shift from poor to good knowledge categories [8]. A similar pre-experimental study conducted in Turkey demonstrated that a simple educational intervention produced statistically significant improvements in parental knowledge of burns first aid ($p = 0.000$), affirming the value of nurse-led education for this purpose [3]. More recently, a study in Nepal showed that a structured educational intervention significantly improved knowledge of both choking and burns first aid among community women, with large effect sizes [9]. Despite this evidence, comparable studies addressing a combined curriculum of burns, fracture, and FBA first aid in Indian community settings remain limited.

Anakkayam Grama Panchayath, located in Malappuram district, Kerala, India, is a semi-urban community with a diverse occupational and socioeconomic profile. Preliminary observations indicated a potential gap in parental knowledge of basic first aid for common paediatric emergencies in this area. The present study was therefore undertaken to assess the baseline first aid knowledge among parents, implement a structured teaching programme addressing burns, fractures, and foreign body aspiration, and evaluate the programme's effectiveness in enhancing parental knowledge.

Objectives

1. To assess the baseline knowledge of parents of children up to 18 years regarding first aid for burns, fractures, and foreign body aspiration, using a structured knowledge questionnaire.

2. To evaluate the effectiveness of the structured teaching programme by comparing pre-test and post-test knowledge scores.
3. To determine the association between post-test knowledge scores and selected demographic variables of parents.

METHODS

Study Design and Setting: A pre-experimental one-group pre-test–post-test design was employed. The study was conducted at Anakkayam Grama Panchayath, Malappuram District, Kerala, India. Data collection was carried out following formal approval from the panchayat authority.

Population and Sample: The target population comprised parents of children aged up to 18 years residing within the jurisdiction of Anakkayam Grama Panchayath. A total of 100 parents were recruited using non-probability purposive sampling.

Data Collection Tool: Data were collected using a researcher-developed structured knowledge questionnaire comprising 15 items covering first aid principles and procedures for burns, fractures, and foreign body aspiration. Total scores ranged from 1 to 15, and were categorised as follows:

- Inadequate knowledge: Score 1–5
- Moderate knowledge: Score 6–10
- Adequate knowledge: Score 11–15

Validity and Reliability: Content validity of the questionnaire was established through review by a panel of subject-matter experts, and revisions were made based on their feedback. The internal consistency reliability of the data collection tool was assessed using Cronbach's alpha coefficient. The tool demonstrated good internal consistency, with a Cronbach's alpha value of $\alpha = 0.86$. This indicated that the tool was reliable for assessing the intended variables.

Intervention: Following the pre-test, a structured teaching programme was administered to all participants. The programme addressed first aid management of burns (initial cooling, wound care, and when to seek medical attention), fractures (immobilisation, splinting principles, and transport), and foreign body aspiration (recognition of airway obstruction, back blows, and abdominal thrust/Heimlich manoeuvre).

Ethical Considerations: Ethical approval was obtained from the Institutional Ethics Committee of the concerned institution prior to the commencement of the study. Informed consent was obtained from all participants before their inclusion in the study. Participants were informed about the purpose and procedures of the study, the voluntary nature of participation, and their right to withdraw from the study at any time without any penalty or effect on the care or services received. Confidentiality and anonymity of the participants were maintained throughout the study, and the collected data were used solely for research purposes. The study was conducted after obtaining approval from the Anakkayam Grama Panchayath administration.

Statistical Analysis: Descriptive statistics (frequency and percentage) were used to summarise sociodemographic characteristics and knowledge levels. The effectiveness of the STP was evaluated using the paired t-test by comparing pre-test

and post-test mean knowledge scores. The chi-square test was used to examine associations between post-test knowledge scores and selected demographic variables. A p-value < 0.05 was considered statistically significant. Statistical analyses were performed using standard statistical software.

RESULTS

Sociodemographic Characteristics (Table 1)

The sociodemographic profile of the 100 parents who participated in the study is presented in Table 1. The majority of children were in the age group of 2–6 years (42, 42%), followed by 7–12 years (26, 26%), 13–18 years (19, 19%), and 0–1 year

(12, 12%). With respect to parental educational qualification, 42 (42%) had completed higher secondary education, 37 (37%) held a degree or diploma and above, 19 (19%) had secondary education, and 2 (2%) had primary education. Regarding occupation, 54 (54%) were engaged in business, 27 (27%) were employed in the private sector, 10 (10%) were daily wage earners, and 9 (9%) were in the government sector. Forty-five (45%) parents reported previous experience of accidental incidents, while 55 (55%) had not encountered similar incidents. In terms of healthcare-seeking behaviour, 55 (55%) preferred private hospitals, 22 (22%) preferred government hospitals, 18 (18%) preferred primary health centres, and 5 (5%) preferred cooperative hospitals.

Table 1. Sociodemographic Characteristics of Study Participants (N = 100)

Sl. No.	Demographic Variable	Frequency (n)	Percentage (%)
1	Age of Child (years)		
	a) 0–1	12	12
	b) 2–6	42	42
	c) 7–12	26	26
	d) 13–18	19	19
2	Educational Qualification of Parent		
	a) Primary	2	2
	b) Secondary	19	19
	c) Higher secondary	42	42
	d) Degree/diploma and above	37	37
3	Occupation of Parent		
	a) Private sector	27	27
	b) Government sector	9	9
	c) Business	54	54
	d) Daily wage	10	10
4	Prior Accident Incidents		
	a) Yes, experienced	45	45
	b) No, not experienced	55	55
5	Preferred Healthcare-Seeking Centre		
	a) Health centre	18	18
	b) Government hospital	22	22
	c) Private hospital	55	55
	d) Cooperative hospital	5	5

Pre-Test and Post-Test Knowledge Levels (Table 2)

Table 2 presents the distribution of knowledge levels among participants before and after the structured teaching programme. Prior to the intervention, the majority of parents (56, 56%) had

inadequate knowledge, 41 (41%) had moderate knowledge, and only 3 (3%) had adequate knowledge regarding first aid for burns, fractures, and FBA. Following the STP, 98 (98%) parents demonstrated adequate knowledge, 2 (2%) had moderate knowledge, and none had inadequate knowledge.

Table 2. Distribution of Pre-Test and Post-Test Knowledge Levels (N = 100)

Sl. No.	Level of Knowledge	Pre-Test Frequency (n)	Pre-Test (%)	Post-Test Frequency (n)	Post-Test (%)
1	Adequate (11–15)	3	3	98	98
2	Moderate (6–10)	41	41	2	2
3	Inadequate (1–5)	56	56	0	0

Effectiveness of the Structured Teaching Programme (Table 3)

The paired t-test was used to compare pre-test and post-test mean knowledge scores. As shown in Table 3, the mean post-test knowledge score (14.72, SD 0.841) was substantially higher

than the mean pre-test score (5.56, SD 2.865), yielding a t-value of 16.80. This difference was statistically significant ($p < 0.001$), confirming the effectiveness of the structured teaching programme in improving parental knowledge.

Table 3. Comparison of Pre-Test and Post-Test Mean Knowledge Scores (N = 100)

Sl. No.	Parameter	Mean	Standard Deviation	Mean Difference	Paired t-value	p -Value
1	Pre-test	5.56	2.865	9.16	16.80	<0.001*
2	Post-test	14.72	0.841			

*p < 0.001 indicates a statistically significant difference.

Association Between Post-Test Knowledge and Demographic Variables (Table 4)

Chi-square analysis was performed to examine the association between post-test knowledge scores and selected demographic variables (Table 4). At a significance level of $p < 0.05$, no statistically significant associations were found between post-test knowledge and the age of the child ($\chi^2 = 10.564$, df = 6, table value 12.592), parental educational qualification ($\chi^2 = 4.314$,

df = 6, table value 12.592), occupation ($\chi^2 = 9.9437$, df = 6, table value 12.592), or prior accident experience ($\chi^2 = 2.3796$, df = 2, table value 5.991). However, a statistically significant association was observed between post-test knowledge and the preferred healthcare-seeking centre ($\chi^2 = 30.8468$, df = 6, table value 12.592), indicating that the choice of healthcare facility was significantly associated with post-intervention knowledge levels.

Table 4. Association Between Post-Test Knowledge Scores and Selected Demographic Variables (N = 100)

Sl. No.	Demographic Variable	Chi-Square Value	Degrees of Freedom	Table Value	Significance
1	Age of child	10.564	6	12.592	Not significant
2	Educational qualification	4.314	6	12.592	Not significant
3	Occupation	9.9437	6	12.592	Not significant
4	Prior accident experience	2.3796	2	5.991	Not significant
5	Healthcare-seeking centre	30.8468	6	12.592	Significant

DISCUSSION

Pre-Intervention Knowledge Levels

The pre-test findings revealed that the majority of parents (56%) had inadequate knowledge of first aid for burns, fractures, and foreign body aspiration, with only 3% demonstrating adequate knowledge. These findings are consistent with evidence from multiple international settings indicating pervasive gaps in parental knowledge of paediatric first aid. In a study assessing KAP regarding FBA first aid among parents at a tertiary hospital in Addis Ababa, Ethiopia, Hailu and Yifru (2025) similarly identified inadequate knowledge and practices among the majority of participants, with limited awareness of appropriate first aid responses and risk-reduction strategies (7). In Croatia, Begović et al. (2022) found that nearly 60% of parents could not correctly identify the appropriate first aid action for FBA, and only 2% provided a fully accurate description of the required intervention, despite the majority recognising FBA as a potentially life-threatening condition (5). In Saudi Arabia, Bin Laswad et al. (2023) reported that a significant proportion of parents in Makkah had poor knowledge and practices concerning FBA prevention and management in children (6). Collectively, these findings underscore that inadequate first aid knowledge among caregivers is not a locally isolated phenomenon but a broader public health concern requiring targeted educational strategies.

The demographic profile of the study participants provides contextual insight. The majority of children in the study were aged 2–6 years (42%), which corresponds to the peak vulnerability period for FBA and burns — a finding

corroborated by a large real-world study from western China reporting that 63.28% of FBA events occurred in children aged one to two years (4). The predominance of higher secondary-educated parents (42%) and the relatively low proportion of parents with only primary education (2%) indicate a moderately educated community; yet, educational attainment alone did not translate into adequate first aid knowledge at baseline, reinforcing the need for specific, structured educational interventions irrespective of general educational level.

Post-Intervention Knowledge and Programme Effectiveness

Following the structured teaching programme, 98% of participants achieved adequate knowledge scores, and the mean knowledge score increased from 5.56 (SD 2.865) to 14.72 (SD 0.841), a difference that was statistically significant ($t = 16.80$, $p < 0.001$). This marked improvement is consistent with the findings of comparable intervention studies. Taksande (2021) reported a significant improvement in knowledge about burns first aid among parents of under-five children in rural Maharashtra, India, following a planned teaching programme, with mean scores improving from 5.20 (SD 1.97) to 10.30 (SD 1.87) and a shift from poor to good knowledge categories (8). The substantial pre-test to post-test gain observed in the present study ($\Delta \text{mean} = 9.16$) is proportionally larger, likely reflecting the greater depth of the programme (covering three emergency conditions) and the lower baseline knowledge levels in the study population. In Turkey, Cetinkaya and Odabasi (2021) demonstrated that a simple educational intervention significantly improved parents' correct responses regarding burns first aid ($p = 0.000$), affirming that even brief, structured

teaching sessions can produce meaningful knowledge gains (3). In Nepal, Shrestha (2024) found that a structured educational intervention significantly increased median knowledge scores for both choking and burns first aid in a community sample of female adults, with large effect sizes ($r = 0.88$), further supporting the generalisability of STP-based approaches across diverse community settings (9).

The near-complete shift from inadequate to adequate knowledge (from 56% inadequate pre-test to 0% inadequate post-test) observed in this study further highlights the potential of well-designed STPs delivered in community settings. Parents who receive focused, practically oriented education are better positioned to provide timely and appropriate first aid, potentially preventing secondary injury, reducing complications, and supporting better outcomes for injured children.

Association Between Knowledge and Demographic Variables

Chi-square analysis indicated no statistically significant associations between post-test knowledge scores and the age of the child, parental educational qualification, occupation, or prior experience with accidents. This suggests that the STP was equitably effective across diverse demographic subgroups — an important finding in the context of designing inclusive community health education programmes. The absence of an association between educational qualification and post-test knowledge is noteworthy: it implies that parents across the spectrum of educational attainment were equally capable of learning and retaining first aid knowledge when provided with appropriately structured content.

The sole significant association was between post-test knowledge and preferred healthcare-seeking centre ($\chi^2 = 30.8468$, $df = 6$, $p < 0.05$). Parents who preferred private hospitals demonstrated relatively higher post-test knowledge scores compared with those who preferred other centres. This association may reflect underlying socioeconomic differences, differential prior health literacy, or greater prior exposure to health education programmes available in private healthcare settings. This finding warrants further investigation in future studies.

STRENGTHS AND LIMITATIONS

Strengths: This study employed a community-based approach, reaching parents in a natural residential setting rather than a clinical environment, thereby improving ecological validity. The STP addressed three common and clinically important paediatric emergencies simultaneously, offering a comprehensive and practical curriculum. The study contributes to a limited body of

evidence on combined first aid education for burns, fractures, and FBA in Indian community settings.

Limitations: The pre-experimental one-group pre-test–post-test design lacks a control group, which limits the ability to attribute knowledge gains exclusively to the STP and precludes control for potential confounders such as Hawthorne effects or concurrent information exposure. The use of non-probability purposive sampling from a single panchayat restricts the generalisability of findings to other communities or geographical regions. The study assessed knowledge only; attitude and practice domains were not measured. Long-term retention of knowledge was not evaluated. The absence of a reported reliability coefficient for the knowledge questionnaire is a methodological limitation.

CONCLUSION

This study demonstrates that parents of children up to 18 years in Anakayam Grama Panchayath had substantially poor baseline knowledge of first aid for burns, fractures, and foreign body aspiration. The structured teaching programme designed and implemented in this study proved highly effective in enhancing parental knowledge, as evidenced by a statistically significant improvement in mean knowledge scores ($t = 16.80$, $p < 0.001$) and a marked shift from inadequate to adequate knowledge categories. These findings highlight the importance of targeted, structured educational strategies in equipping caregivers with potentially lifesaving skills. Community health nurses and public health professionals should consider integrating STP-based first aid education into routine community health outreach programmes to empower parents and contribute to improved child safety and emergency outcomes.

DECLARATIONS

Funding: No funding was received for this study.

Conflicts of interest: The authors declare no conflicts of interest.

Ethical approval: Ethical approval was obtained from the Institutional Ethics Committee prior to the study. Written informed consent was obtained from all participants, and confidentiality and the right to withdraw from the study were ensured.

Data availability: Data are available upon reasonable request to the corresponding author.

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