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A Study to Assess the Effectiveness of Educational Intervention on Knowledge Regarding Management of Febrile Seizure among the Mothers of Under-Five Children Attending Primary Health Centre, Bangalore

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ABSTRACT

Background: Familiarity with seizures helps parents respond appropriately. We aimed to determine knowledge changes following an educational intervention among mothers attending Bangalore primary health centre. We employed a one-group, pretest-posttest design. Sixty mothers were selected through convenience sampling. Knowledge was assessed with a structured questionnaire. Results: Knowledge score increased from a mean of 15.75 (52.5%) to 23.25 (77.5%). The number with inadequate knowledge decreased from 34 to 0. Adequate knowledge increased from 0 to 40. Mean knowledge scores improved, although inconsistencies in the reported test statistics prevented independent verification of statistical significance. The improvement was observed after teaching; controlled evaluations are needed to assess causality.

Keywords: Febrile seizures; maternal knowledge; educational intervention; pediatric nursing; primary healthcare; caregiver education.

INTRODUCTION

An impairment of the central nervous system (CNS) is not present in children with febrile seizures between the ages of 6 months and 6 years. A prior history of CNS infection or an unprovoked seizure is not present in children with febrile seizures. Most febrile seizures are generalized and self-limited. The duration of the seizures is usually brief; however, family members often feel a great deal of anxiety as they witness the seizure and subsequently the loss of responsiveness. Currently, reviews recommend assessing children for possible signs of meningitis, the length of the seizure and other warning signs, but recommend against ordering routine laboratory testing on children who appear to be in good health after an uncomplicated seizure.

Febrile seizures are usually the first convulsive episodes and require an initial response by family members until help arrives. The first steps in managing a seizure include placing the child on his or her side to protect the airway and preventing the child from injuring himself or herself. There are situations that require immediate help or Transport to the hospital, such as seizure duration of greater than 5

minutes, respiratory distress, repeated seizure activity, inability of the child to fully recover or wash out the seizure activity. Antipyretics do not reliably reduce the risk of febrile seizure recurrence and comfort is improved with their use.

In primary healthcare, brief, accessible educational sessions may address knowledge gaps and reduce anxiety related to febrile seizures. Parents and caregivers can be taught seizure first aid, airway protection, injury prevention, and the indications for urgent medical assessment. Community nurses are well placed to deliver culturally appropriate instructions and take-home educational materials. The present study examined maternal knowledge of febrile seizure management before and seven days after a structured teaching session at a selected primary health centre in Bangalore.

REVIEW OF LITERATURE

Many research studies have documented knowledge gaps. In one research study, 62% of the parents of children who had febrile seizures had no prior knowledge about febrile seizures, and 89% of the parents expressed fear during the event [5]. In a separate research study, 88.9% of the surveyed parents in Riyadh had poor knowledge about febrile seizures, but 90.4% of the parents had a positive attitude towards caregiver first aid for febrile seizures [6]. In a research study in Aseer, it was found that many caregivers continue to have misconceptions about seizures and epilepsy [7]. It has been shown that familiarity with fever does not mean that caregivers can provide first aid for seizures.

The measurement literature supports the use of structured assessment. In the health sciences literature, Toksoz and colleagues developed a febrile convulsion knowledge scale for caregivers, which was one of the few published validated scales [8]. In a clinical trial to assess the education of caregivers on the management of pediatric fever, it was found that the educational video enhanced the caregivers' knowledge [9]. Al-Hammouri and colleagues found uncertainty and anxiety, along with low knowledge, among caregivers in Jordan [10]. These studies support the use of targeted communication. However, a single arm before-after study limits the ability to isolate education from the context and/or external influences.

OBJECTIVES AND HYPOTHESES

The main objective of the study was to assess knowledge about fever and its association with selected demographic variables. It was hypothesized that there would be a difference in the knowledge scores of the caregivers before and after the education (H1). In addition, it was hypothesized that there would be an association between the baseline knowledge and selected demographic variables (H2). P-values were set a priori at 0.05.

PARTICIPANTS AND METHODS

Description of study setting and design

A quantitative evaluative, one-group pretest–posttest design was employed to assess changes in knowledge regarding febrile seizure management after a structured teaching intervention. The participants were 60 mothers of children younger than five years attending a selected primary health centre in Bangalore. Inclusion criteria were attendance during recruitment, willingness to participate, and ability to communicate in Kannada or English. Mothers working in medical or nursing professions and mothers of critically ill children were excluded.

Description of instrument and teaching intervention

Knowledge regarding febrile seizure management was assessed using a self-administered structured questionnaire covering demographic characteristics and seizure-management knowledge. Content validity was assessed by four child-health nursing experts, with approximately 90% agreement, and test–retest reliability was reported as 0.89. The documentation did not consistently specify the questionnaire scoring components. Mean scores and corresponding percentages mathematically indicate a 30-point scale; category cutoffs require confirmation against the questionnaire scoring key.

Teaching intervention

The educational intervention comprised a lecture-discussion supported by handouts and flashcards and lasted approximately 40–45 minutes. The content addressed management of febrile seizures in children younger than five years. Knowledge was assessed immediately before teaching and again seven days after the session. Data collection occurred from 8 to 15 May 2025. Written informed consent, voluntary participation, and confidentiality were documented. Approval by an independent institutional ethics review committee could not be confirmed from the available study documentation.

Statistical strategy

Paired-samples t-test: The pretest and posttest mean scores were compared. The reported paired-test result could not be independently recalculated without participant-level paired observations.

Chi-square tests: Associations between baseline knowledge categories and selected demographic variables were assessed. Results from sparse contingency tables were interpreted cautiously.

Pearson r: A correlation coefficient was not calculated because the required participant-level observations were unavailable.

Participant-level paired responses were unavailable for independent estimation of the variance of individual knowledge-score changes.

RESULTS

Participant profile

The ages of the participants were 12 women aged 18 to 28, 32 women aged 29 to 39, and 16 women aged 40 and above. Thirty participants reported having higher-secondary education and 20 reported having primary education. Forty six participants reported being homemakers. The community sample appears to be diverse, though convenient recruitment may limit representativeness.

Table 1. Recorded demographic profile of participating mothers (N = 60).

Characteristic	Category	n	%
Maternal age	18–28 / 29–39 / ≥40	12 / 32 / 16	20.0 / 53.3 / 26.7
Education	None / Primary / Higher secondary / Graduate+	2 / 20 / 30 / 8	3.3 / 33.3 / 50.0 / 13.3
Occupation	Homemaker / Government / Private	46 / 12 / 2	76.7 / 20.0 / 3.3
Family type	Nuclear / Joint / Extended	40 / 13 / 7	66.7 / 21.7 / 11.7
Previous source	Health worker /	12 / 2 / 46	20.0 / 3.3 / 76.7

	Internet / Other		

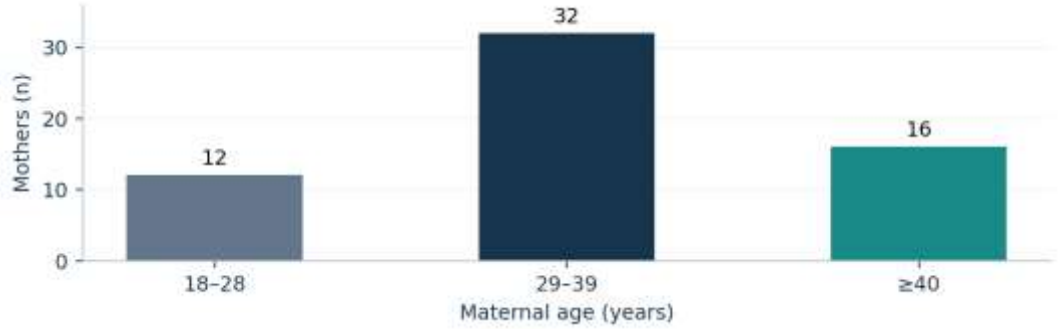


Figure 1. Distribution of mothers by age group (frequency).

Knowledge-level distribution

Before the intervention, 34 mothers (56.7%) had inadequate knowledge and 26 (43.3%) had moderate knowledge; none was classified as having adequate knowledge. At the seven-day assessment, no mother remained in the inadequate category, 20 (33.3%) were classified as moderate, and 40 (66.7%) as adequate. All percentages were calculated from the observed frequencies (40/60 = 66.7%).

Table 2. Reported pretest and posttest knowledge categories.

Knowledge level	Pretest n (%)	Posttest n (%)
Inadequate	34 (56.7)	0 (0.0)
Moderate	26 (43.3)	20 (33.3)
Adequate	0 (0.0)	40 (66.7)
Total	60 (100.0)	60 (100.0)

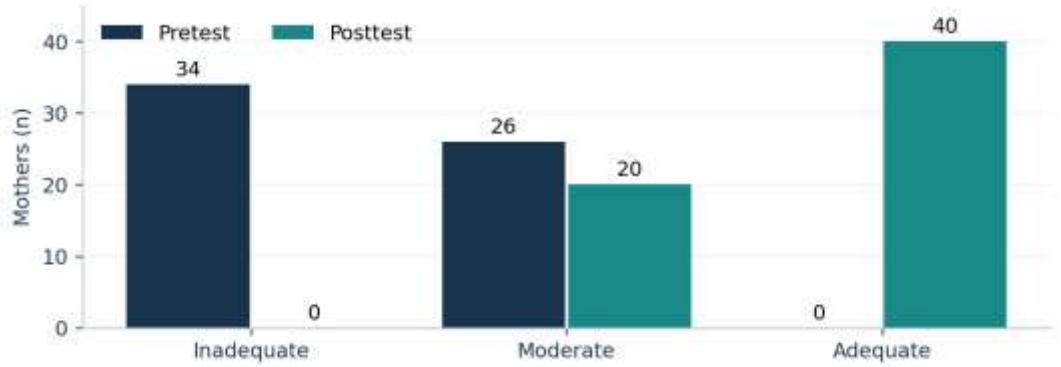


Figure 2. Knowledge categories before and after education (number of mothers).

Mean-score comparison

The mean pretest and posttest knowledge scores were 15.75 and 23.25, respectively, corresponding to an increase of 7.50 points, or 25.0 percentage points on a 30-point scale. The corresponding standard deviations were 3.17632 and 3.36293. These findings indicate improved knowledge scores after the intervention. The score maximum of 30 is derived from the reported means and percentages, although the exact questionnaire scoring specification remains to be confirmed.

Table 3. Descriptive comparison of knowledge scores (N = 60).

Measurement	Pretest	Posttest	Change
Mean score	15.75	23.25	+7.50
Standard deviation	3.176	3.363	—
Mean percentage	52.5%	77.5%	+25.0 pp
Score denominator	30 inferred	30 inferred	—



Figure 3. Mean knowledge scores before and after intervention.

Inferential analysis

A paired-samples t statistic of 15.33 with 59 degrees of freedom was reported, corresponding to a two-sided p-value below 0.001 if the statistic is correct. However, the documented standard error of the mean difference (0.590) yields t = 7.50/0.590 = 12.71, indicating an inconsistency. Consequently, the paired-test statistic, confidence interval, and standardized within-person effect size cannot be independently confirmed without the paired responses. The observed mean change is presented descriptively, while inferential interpretation remains provisional pending validation of individual difference scores, item weights, category thresholds, and missing responses.

Table 4. Educational-intervention effect: reportable statistical information.

Indicator	Value	Interpretation
Mean change	+7.50 points	Verified from means
Reported paired t; df	15.33; 59	Not independently reproduced
p from reported t	<0.001	Conditional on t = 15.33
Paired-score effect size	Not estimable	Paired data unavailable

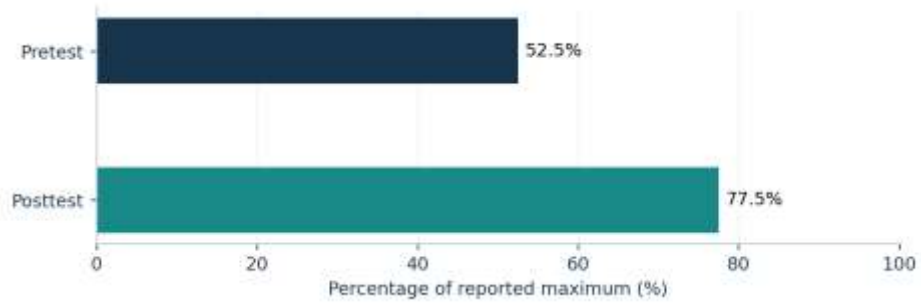


Figure 4. Mean knowledge as a percentage of the reported maximum score.

Demographic associations

Chi-square analyses showed no statistically significant association between baseline knowledge category and maternal age, religion, education, or family structure. Several expected cell counts were below five for religion, education, and family structure; their asymptotic p-values should therefore be interpreted cautiously. Additional cross-tabulations with inconsistent marginal totals were excluded from analysis.

Table 5. Recalculated associations with baseline knowledge category.

Variable	χ^2	df	p	Caution
Maternal age	1.671	2	0.434	Expected cells adequate
Religion	1.276	3	0.735	2 expected cells <5
Education	2.172	3	0.537	4 expected cells <5
Family type	0.172	2	0.918	2 expected cells <5

DISCUSSION

The findings indicate an improvement in maternal knowledge seven days after the structured educational session. At baseline, over half of the mothers were classified as having inadequate knowledge; at follow-up, two-thirds were classified as having adequate knowledge. Lecture-discussion supported by educational handouts and flashcards may be useful for conveying essential seizure first-aid information in primary healthcare. However, knowledge-questionnaire responses do not establish how mothers would behave during a seizure at home, nor do they demonstrate changes in anxiety, emergency visits, or seizure recurrence. The knowledge-category thresholds and inconsistencies in the inferential statistics limit interpretation. Findings from the single-group design should not be treated as evidence of a causal effect.

The results observed at baseline are in agreement with reports from other research studies. For instance, Rice and colleagues reported a lack of prior preparation and high levels of panic among caregivers [5], while Almousa and colleagues reported extensive inadequate knowledge about seizures in Riyadh [6], and Aseer reported misconceptions about seizures among the participant caregivers, although a considerable number reported being aware of seizures [11]. Comparisons should remain cautious as the tools and participants in the studies differed. The importance of the repeated training of caregivers to manage seizures is underscored by the convergence of the various studies.

Intervention evidence supports educational approaches. In the case of parental knowledge of fever management, Toksoz and Acikgoz found that parent participants in the video group had a greater understanding of the rationale of specific components of the instructions (fever management) than the control group (9). While the management of febrile seizures and the management of seizure first aid are not the same, this study shows the importance of the educational value of structured, easy to understand and accessible messages. There are validated knowledge instruments to measure the outcomes of the intervention. The emphasis of the messages should be on the prevention of injury, side positioning and seizure timing and the need for emergency referral (if available) and seizure first aid. Unproven seizure preventive measures should not be recommended.

The absence of statistically significant demographic associations does not establish equivalence between groups. A sample of 60 provides limited precision, and several contingency tables contained small expected counts. Further, the study used a single-group design without a nonintervention comparison group. Repeated testing, other information received during follow-up, and regression to the mean may have contributed to the observed changes. Controlled studies incorporating practical assessments of seizure first-aid skills would provide stronger evidence regarding educational effectiveness.

NURSING IMPLICATIONS AND LIMITATIONS

Pediatric and community nurses may incorporate brief demonstrations and pictorial take-home instructions as part of routine child health contact. Counselling should be culturally sensitive and help families to avoid placing anything in the mouth during a seizure, and inform families of emergency thresholds. Assessment should be done to determine if families have persistent misconceptions. The single-center, convenience sampling methodology, short observation period, inconsistent scoring documentation, and absence of a control group, negatively impact the generalizability of this project. The reliance on knowledge based assessments negatively impacts the project. Longer-term assessment of the retention of first-aid skills, and the use of validated instruments, are suggested.

First-aid skills need to be assessed in a variety of ways, including the caregiver's ability to state the circumstances in which emergency services should be called.

For factual improvement to be assessed, a knowledge questionnaire needs to be administered to determine if the intervention has been effective in improving factual first-aid skills.

Education may be more accessible when instructions are given using the mother's native language, and pictorial methods. These are suggested methods that may warrant further testing.

Data integrity remains essential. Inconsistencies in questionnaire totals and discordance between the paired t statistic and the reported standard error limit verification of the inferential results. Confirmation of the questionnaire scoring key and participant-level difference scores is required for a fully reproducible statistical analysis.

To improve this work, investigators should document more about the mothers, particularly the language of instruction, caregiver experience, number of children, literacy, and the retention interval. Knowledge of these variables may lead to more precise communication with caregivers about anticipated knowledge changes.

SUMMARY

Among 60 mothers attending a primary health centre in Bangalore, the mean knowledge score increased by 7.50 points over the seven days following a structured educational session. Changes in mean scores and knowledge-level categories suggest improved understanding of febrile seizure management. However, the available aggregate statistics do not permit independent confirmation of the paired-samples test, and the single-group study design does not establish causality. Future controlled evaluations should assess longer-term knowledge retention and practical seizure first-aid skills. In routine nursing practice, concise and culturally appropriate guidance can support caregivers in responding safely to febrile seizures.

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