RMJ

Original Article

Fever Management and Practices Regarding Acetaminophen Use Among Caregivers of Preschool Children in Home Setting: A Cross-Sectional Study

Sirinna Tassaneeyarat[1*], Kittiyaporn Choksawadphinyo[2], Panita Suwannoi[3]

[1] Department of Pediatric Nursing, Faculty of Nursing, Rattana Bundit University, Pathum Thani, Thailand

[2] Department of Community Health Nursing, Faculty of Nursing, Rattana Bundit University, Pathum Thani, Thailand

[3] Division of Pharmaceutical Sciences, Faculty of Pharmacy, Thammasat University, Pathum Thani, Thailand

Abstract

Background: Evidence regarding correlations among caregivers' knowledge, attitude, fever management practices and acetaminophen use is limited. This may increase the risk of preventable adverse outcomes. Therefore, understanding these factors and their relationships is essential for developing targeted interventions aimed at improving caregivers' fever management competence and medication safety.

Objectives: To examine caregivers' knowledge, attitude, and acetaminophen use, including fever management behaviors, and explore associations among these variables.

Methods: This cross-sectional study was conducted among 113 caregivers of children aged 3-5 years enrolled in child development centers in Pathum Thani, Thailand. The sample was recruited using convenience sampling. Data were collected from November 2024 to December 2024 using structured questionnaires. Continuous variables were reported using medians (IQRs). Correlations were assessed using Spearman rank correlation coefficient.

Results: Scores for fever management practices, knowledge, and acetaminophen use were moderate (median [IQR], 54.0 [49.5-57.0], 10.0 [9.0-11.0], and 66.0 [63.0-70.0], respectively), while scores for attitude were appropriate (median [IQR], 24 [22.0-25.0]). Knowledge and attitude were positively correlated with acetaminophen use ($\rho = 0.223$, $P < .05$; and $\rho = 0.411$, $P < .01$, respectively), whereas knowledge was not significantly correlated with attitude ($\rho = 0.160$, $P = .091$). In addition, fever management practices were not significantly associated with knowledge, attitude, and acetaminophen use ($\rho = 0.172$, $P = .069$; $\rho = 0.124$, $P = .192$; and $\rho = 0.114$, $P = .229$, respectively).

Conclusions: Caregivers' knowledge and attitude contribute to safer acetaminophen use. However, knowledge alone did not ensure correct and comprehensive fever management. The findings suggest that nursing interventions focusing on medication safety and fever assessment skills may be beneficial and warrant further evaluation.

Keywords: Acetaminophen use, Fever, Caregivers, Medication safety, Preschool children

Citation: Tassaneeyarat S, Choksawadphinyo K, Suwannoi P. Fever management and practices regarding acetaminophen use among caregivers of preschool children in home setting: a cross-sectional study. *Res Med J*. 20XX;XX(X):e282593. doi:10.33165/rmj.2028.e282593

*** Corresponding Author:** sirinna331@gmail.com

Received: 29 May 2026
Revised: 18 September 2026
Accepted: 7 October 2026
Published Online: 22 October 2026

Copyright © 2026 by the Author(s). Licensee RMJ. This article is licensed under the Creative Commons Attribution (CC BY) License.

Article in Press

Introduction

Fever is one of the most common symptoms in children and often represents the body's physiological response to infection. In children under 5 years of age, fever is primarily associated with viral and bacterial infections, including upper respiratory tract infections, otitis media, and pneumonia. Although fever is a natural protective mechanism,

high fever may be associated with complications such as febrile seizures and increased parental anxiety. Beyond physiological effects, childhood fever imposes emotional stress and financial burden on families, contributing to increased healthcare utilization. Consequently, caregivers, particularly parents and other family members involved in the child's care, serve as key frontline decision-makers in early fever recognition, assessment, and management.[1]

Effective fever management involves accurate temperature assessment and appropriate supportive care measures aimed at reducing discomfort and preventing complications. These measures include antipyretic administration, tepid sponging, ensuring adequate ventilation, encouraging fluid intake, and dressing the child in breathable clothing.[2] However, evidence from national and international studies indicates that caregivers frequently demonstrate inappropriate fever management practices. Inaccurate temperature assessment is common, with parents often misjudging fever severity or relying on subjective methods rather than objective measurement.[2-4]

Fever phobia continues to be widely reported.[1] A recent cross-sectional study in Lebanon found 89% of parents to have feared that fever can lead to brain damage, and more than half administered antipyretics without prior medical consultation. Notably, parental education level did not significantly influence fever management practices. The findings from the above study suggest that knowledge deficiencies and malpractice in fever management should be addressed carefully.[5] Such findings highlight the persistence of misconceptions and the global nature of caregiver-related medication safety concerns.

Pharmacological management is a central component of fever care. Caregivers commonly perceive antipyretic medications as the most effective immediate response to fever, with acetaminophen being the most frequently selected medication.[3] Although acetaminophen is generally considered safe when administered within the recommended dosage range, inadequate caregiver knowledge and inappropriate attitude may contribute to dosing errors, inaccurate measurement, and repeated administration. Such errors may result in cumulative overdose and increase the risk of hepatotoxicity. Previous studies have consistently identified gaps in caregivers' knowledge and practices regarding appropriate acetaminophen use.[2, 3, 6] International literature has further highlighted the insufficiency of knowledge on appropriate dosing intervals, maximum daily doses, and potential hepatotoxicity risks.[6-10] These medication-related errors represent preventable risks that may contribute to adverse health outcomes in children. More importantly, medication use in children is influenced not only by knowledge but also by caregiver attitudes and beliefs. Fever phobia, or exaggerated fear of fever, may prompt premature medication use and unnecessary healthcare utilization.[10] These behavioral tendencies reflect broader public health concerns, particularly in preschool populations for whom caregivers independently make medication decisions. Fernando et al[11] reported that caregivers often lack confidence in identifying appropriate temperature thresholds for medication initiation, increasing the likelihood of repeated or excessive dosing.[10] These findings suggest that knowledge alone may be insufficient to ensure safe medication practices or accurate fever assessment.[5, 11-13]

While previous studies have examined caregiver knowledge and medication practices, few investigations have simultaneously evaluated fever assessment behaviors alongside acetaminophen safety. Moreover, evidence on how caregivers' knowledge and attitude relate not only to medication practices but also to overall fever management competencies is limited in Thailand. Understanding these relationships is essential for designing targeted nurse-led interventions that address both medication safety and practical fever assessment skills at the community level.

Article In Press

Therefore, this study aimed to assess fever management practices and acetaminophen-related knowledge, attitude, and practices among caregivers of preschool children and to examine associations among these variables. This study represents the initial phase of a multiphase research project aimed at improving safety in the use of antipyretics and informing the development of supportive community-based interventions for preschool children.

This study contributes to pediatric nursing practice by clarifying correlations between caregivers' medication knowledge, attitude, and overall fever management behaviors. By identifying gaps in fever assessment skills despite moderate medication knowledge, the findings provide evidence to inform nurse-led caregiver education and support the development of standardized community-based strategies for enhancing medication safety in early childhood settings.

Methods

Study Design, Setting, and Participants

This cross-sectional study was conducted as the initial phase of a multiphase research project examining caregivers' fever management practices and informing the development of child-friendly acetaminophen formulations. This study included 127 caregivers of preschool children enrolled in municipal child development centers governed by local administrative organizations in Sam Khok district, Pathum Thani province, Thailand. Data were collected from 10 centers between November 2024 and December 2024.

Sample size was determined to be 127 participants based on the size of 195 caregivers of preschool children in the Krejcie and Morgan table,[14] and 113 responses (88.98 %) were analyzed.

Participants were recruited using convenience sampling. Inclusion criteria were caregivers aged 18 years or older with prior experience administering acetaminophen for fever management in a preschool-aged child who were willing to participate in the study and were able to read and communicate in Thai. Exclusion criteria were inability to provide written informed consent or inability to participate in the study as required by the study protocol.

Measurements

Data were collected using a structured 5-part questionnaire developed by the researcher based on a review of relevant literature[4, 5, 7, 11, 15] as follows:

Part 1 (Demographic Characteristics): This section included 5 items that assess caregivers' demographic characteristics, including gender, age, relation to the preschool child, number of children under their care, and prior experience caring for children with fever.

Part 2 (Fever Management Practices Scale): This section consisted of 15 items that assess caregivers' practices in managing fever in preschool children. Of this number, 14 items assess fever management practices, including fever assessment (3 items) and care practices during fevers (11 items). Responses to these 14 items were rated on a 5-point Likert scale ranging from 1 (never practiced) to 5 (always practiced), with negatively worded items being reverse-scored. The total score for these 14 items ranged from 14 to 70, with higher scores indicating better fever management practices. Scores were interpreted as appropriate (≥ 80%), moderate (60%-79%), or poor (< 60%) according to the modified Bloom's cutoff criteria. The remaining item was a multiple-choice question assessing caregivers' medication selection when a child had a fever.

Article in Press

Part 3 (Knowledge of Acetaminophen Use Scale): This section consisted of 13 items with true-or-false responses aimed at assessing caregivers' knowledge regarding acetaminophen use in preschool children. Correct responses were scored as "1" and incorrect responses were scored as "0". Total scores ranged from 0 to 13, with higher scores indicating greater knowledge. Knowledge levels were categorized as good (≥ 80%), moderate (60%-79%), or poor (< 60%) based on the Modified Bloom's cutoff criteria.[16, 17]

Part 4 (Attitude Toward Acetaminophen Use Scale): Caregivers' attitude toward acetaminophen use was assessed using 10 items on medication characteristics, taste, and selection. Responses were rated on a 3-point Likert scale. Total scores ranged from 10 to 30, with higher scores indicating more appropriate attitude. Attitude was categorized as positive (≥ 80%), neutral (60%-79%), or negative (< 60%).

Part 5 (Acetaminophen Use Scale): This section consisted of 18 items that assess caregivers' behaviors related to acetaminophen use for fever reduction in preschool children. Responses were rated on a 5-point Likert scale with reverse scoring for negatively worded items. Total scores ranged from 18 to 90, with higher scores indicating more appropriate practices. Scores were categorized as appropriate (≥ 80%), moderate (60%-79%), or poor (< 60%).

Instrument content validity was evaluated by 5 experts in the fields of pediatric nursing and pharmaceutical sciences. Content validity indices were 0.99 for the Fever Management Practices Scale, 0.95 for the Knowledge of Acetaminophen Use Scale, 0.96 for the Attitude Toward Acetaminophen Use Scale, and 0.97 for the Acetaminophen Use Behaviors Scale, indicating excellent content validity. Internal consistency reliability was acceptable, with Cronbach α coefficients of 0.72 for the Fever Management Practices Scale, 0.71 for the Attitude Toward Acetaminophen Use Scale, and 0.80 for the Acetaminophen Use Behaviors Scale. The knowledge scale demonstrated acceptable reliability with a Kuder-Richardson 20 coefficient of 0.75.

Data Collection

After obtaining ethical approval from the Institutional Review Board of the Faculty of Nursing, Rattana Bundit University, Thailand, and permission from the participating child development centers, the researcher coordinated with teachers to approach eligible caregivers. Participants were informed about research objectives, procedures, and rights as participants before providing written informed consent.

Questionnaires were distributed in sealed envelopes and were completed independently at the participants' convenience, typically at home. Completed questionnaires were returned in sealed envelopes on an agreed date to maintain confidentiality. Returned questionnaires were reviewed for completeness.

Statistical Analysis

Data were analyzed using SPSS, version 30.0 (IBM Corp). Descriptive statistics were used to summarize participant characteristics and study variables. Normality of data distribution was assessed using the Shapiro-Wilk test. Since several variables deviated from normality, nonparametric statistics were applied. Continuous variables were reported using medians (IQRs), while categorical variables were presented as frequencies and percentages.

Spearman rank correlation was used to examine correlations between caregivers' knowledge, attitude, acetaminophen use behaviors, and fever management practices. Statistical significance was determined using a 2-tailed *P*-value of < .05.

Article in Press

Results

Participants' Demographic Data

Of 127 enrolled caregivers, 113 caregivers returned complete questionnaires and were included in the final analysis. Most of the participants were female (80.5%). The participants' age ranged from 18 to 71 years (mean [SD], 33.01 [9.36] years). Most were mothers of preschool children (69.0%). The sample (51.3%) had cared for at least one child and most (88.5%) had experience caring for a child with fever (Table 1).

Fever Management Practices

Overall fever management was at a moderate level (median [IQR], 54.0 [49.5-57.0]), with 61.9% of caregivers demonstrating moderate level practices. Fever assessment practices were generally weaker than fever care behaviors, 60.2% showed moderate performance in fever assessment (median [IQR], 10.0 [9.0-11.0]), while 49.6% demonstrated good practices in caring for children with fever (median [IQR], 43.0 [40.0-46.5]) (Table 2).

Item-level observations revealed several notable practices. More than half of the caregivers (56.6%) reported assessing a child's fever by touching the forehead, indicating reliance on subjective assessment. In addition, a majority of caregivers (58.8%) reported administering antipyretic medication when the child merely felt warm before confirming fever with a thermometer. However, questionnaire responses showed that caregivers (97.3%) overwhelmingly reported administering acetaminophen as the preferred antipyretic medication for preschool children.

Knowledge, Attitude, and Acetaminophen Use Behaviors

Caregivers' knowledge, attitude, and behaviors regarding acetaminophen use were summarized. Overall, scores indicated a moderate level of knowledge among caregivers (median [IQR], 10.0 [9.0-11.0]), with 47.8% having moderate knowledge while 44.2% having good knowledge (Table 3).

Item analysis highlighted several knowledge gaps. A substantial proportion of caregivers incorrectly believed that acetaminophen could relieve colds or nasal congestions (69.0%). In addition, most of the caregivers (83.2%) incorrectly considered allergic reactions, such as facial swellings or rashes, to be nondangerous side effects, indicating potential for misconceptions regarding medication safety.

Caregivers generally demonstrated appropriate attitude toward acetaminophen use (median [IQR], 24.0 [22.0-25.0]), with 51.3% classified as having positive attitude. Acetaminophen use behaviors were predominantly moderate (median [IQR], 66.0 [63.0-70.0]) and 78.8% of caregivers fall within the moderate use category. Notably, many caregivers rarely used appropriate measuring devices, such as droppers or dosing syringes, when administering liquid medication. This suggests there is potential risk of inaccurate dosing.

Correlations Among Study Variables

Analysis using Spearman rank correlation coefficient showed that knowledge and attitude toward acetaminophen use were positively correlated with acetaminophen use ($\rho = 0.223$, $P < .05$ and $\rho = 0.411$, $P < .01$, respectively), whereas knowledge was not significantly correlated with attitudes ($\rho = 0.160$, $P = .091$). However, fever management practices were not significantly correlated with knowledge of acetaminophen use ($\rho = 0.172$, $P = .069$), attitude toward acetaminophen use ($\rho = 0.124$, $P = .192$), or acetaminophen use ($\rho = 0.114$, $P = .229$).

Article in Press

Table 1. Demographic Characteristics of Participants	
Characteristic	**No. (%)**
Gender	
Female	91 (80.5)
Male	22 (19.5)
Age, mean (SD), y	33.01 (9.36)
Relation to child	
Father	19 (16.8)
Mother	78 (69.0)
Other relatives	16 (14.2)
No. of children under care	
1	58 (51.3)
≥ 2	55 (48.7)
Experience caring for a child with fever	
Yes	100 (88.5)
No	13 (11.5)

Table 2. Fever Management Practices Among Caregivers of Preschool Children

Variable	Possible Range	Actual Range	Median (IQR)	No. (%)		
				Good	Moderate	Poor
Fever management practices	14-70	39-67	54.0 (49.5-57.0)	2 (1.8)	70 (61.9)	41 (36.3)
Fever assessment	3-15	5-14	10.0 (9.0-11.0)	23 (20.3)	68 (60.2)	22 (19.5)
Fever care practices	11-55	32-55	43.0 (40.0-46.5)	56 (49.6)	56 (49.6)	1 (0.8)

Table 3. Caregivers' Knowledge, Attitude, and Acetaminophen Use Behaviors

Variable	Possible Range	Actual Range	Median (IQR)	No. (%)		
				Good	Moderate	Poor
Knowledge of acetaminophen use	0-13	4-13	10.0 (9.0-11.0)	50 (44.2)	54 (47.8)	9 (8.0)
Attitude toward acetaminophen use	10-30	12-29	24.0 (22.0-25.0)	58 (51.3)	52 (46.0)	3 (2.7)
Acetaminophen use	18-90	18-90	66.0 (63.0-70.0)	20 (17.7)	89 (78.8)	4 (3.5)

Article In Press

Discussion

This study examined fever management practices and acetaminophen-related knowledge, attitudes, and behaviors among caregivers of preschool children in child development centers. The findings revealed that caregivers demonstrated moderate fever management practices, moderate knowledge of acetaminophen use, generally appropriate attitude toward acetaminophen use and a moderate level of acetaminophen use.

The moderate level of fever management observed in this study is consistent with previous research indicating caregivers often face challenges in the proper management of childhood fever.[18] Although caregivers performed common fever care activities, such as administering antipyretics or rehydration, accurate fever assessment remains an area

of concern. In this study, fever assessment behaviors appeared to be weaker than fever care practices, suggesting that caregivers may have relied on subjective perceptions such as touching the child's forehead rather than objective temperature measurement. Similar findings have been reported in previous studies where caregivers frequently relied on tactile methods rather than thermometers, potentially leading to misinterpretation of fever severity and inappropriate management decisions.[2, 3, 19] From a clinical perspective, inaccurate fever assessment may lead to unnecessary medication use or delayed recognition of severe illness.

Regarding medication-related knowledge, caregivers demonstrated a moderate level of knowledge about acetaminophen use. Although acetaminophen is widely recognized as a safe and commonly used antipyretic in children, studies consistently report gaps in caregivers' understanding of correct dosing, dosing intervals, and potential toxicity. The findings of the present study are consistent with previous international research indicating that caregivers often lack accurate knowledge regarding safe acetaminophen administration.[6, 9, 10] Such knowledge gaps may increase dosing error risk, particularly when caregivers administer medication independently without professional guidance. Inappropriate dosing may lead to under-dosing, which reduces treatment effectiveness, or overdosing, which may result in hepatotoxicity.

Caregivers' attitude toward acetaminophen use in this study was generally appropriate. However, moderate knowledge levels suggest that certain misconceptions regarding fever and medication use remain. Literature frequently describes the phenomenon of fever phobia, where caregivers experience excessive anxiety about fever and fear potential complications such as brain damage or seizures. As a result, caregivers may administer antipyretic medications prematurely or more frequently than recommended. For example, Tohme et al[5] reported that a large proportion of parents believed that fever could cause serious neurological damage and, therefore, administered antipyretics early without consulting healthcare professionals. Such beliefs may influence caregivers' decision-making and contribute to inappropriate medication practices despite having only basic knowledge about fever management.

The findings revealed a significant positive correlation between knowledge and acetaminophen use, suggesting that medication-specific knowledge is correlated with medication use. However, the relatively small correlation coefficient indicates that the strength of this association is weak. This finding is consistent with previous studies reporting persistent gaps in caregivers' knowledge of weight-based dosing, fever thresholds, dosing frequency, and toxicity, despite the widespread use of acetaminophen.[6, 7, 11-13]

The stronger correlation between attitude and acetaminophen use is particularly noteworthy. This suggests that caregiver beliefs and perceptions regarding acetaminophen may be more closely related to their medication use than factual knowledge alone. Previous research has demonstrated that caregiver perceptions of fever, concerns about potential complications, and beliefs regarding the need to reduce fever may be associated with decisions about antipyretic administration. In Palestine, many parents recognized fever by touching their child rather than measuring body temperature. In addition, decisions regarding antipyretic use were influenced by factors such as temperature and medication or physician instructions.[4] Similarly, Saudi parents demonstrated substantial concerns and misconceptions regarding the consequences of fever and use of antipyretic medications.[1] Research among Lebanese parents has also identified parental beliefs and concerns about fever as important considerations in fever management behaviors.[3, 5]

Article in Press

The findings across these study suggest that caregivers may possess factual knowledge about acetaminophen while still making medication decisions based on their perceptions of the child's symptoms, previous experience, and beliefs about the benefits and risks of antipyretic use. However, the observed associations should not be interpreted as evidence of causality.

Interestingly, knowledge of acetaminophen use was not significantly correlated with attitude toward acetaminophen use. This suggests that knowledge and attitude may represent distinct dimensions of caregiver decision-making. Acquiring factual information about acetaminophen does not necessarily correspond to changes in beliefs or perceptions regarding medication use. Caregivers' medication decisions may also be influenced by past experience, habitual practices, and information obtained from healthcare professionals or other sources. Evidence from previous studies suggests that care experience does not necessarily translate into better knowledge of appropriate acetaminophen use.[9, 11] These findings support the possibility that care experience length alone may not ensure accurate medication knowledge or safe medication practices.

Furthermore, fever management practices were not significantly correlated with knowledge, attitude, or acetaminophen use, whereas knowledge and attitudes were significantly and positively correlated with acetaminophen use. One possible explanation is that fever management practices encompass a broader range of care behaviors, including fever assessment, rehydration, environmental modification, physical cooling, and use of antipyretic medications. These behaviors may be influenced by caregivers' past experience, customary practices, and perceptions of the child's condition rather than specific knowledge about acetaminophen.

Accurate fever assessment is difficult and reliant on subjective methods as described in previous studies. In Palestine, parents (65.4%) reported recognizing fever by touching their child, whereas only 31.6% reported measuring the child's temperature.[4] Similarly, among Saudi parents, touching the forehead was the most commonly reported temperature assessment method (43.3%).[1] In this study, more than half of caregivers (56.6%) reported assessing fever by touching the child's forehead, and 58.8% of caregivers reported administering antipyretics when the child merely felt warm. These findings suggest that decisions concerning fever management may be influenced by subjective assessment of the child's condition and may not necessarily correspond with medication-specific knowledge or formal temperature assessment. This interpretation is also consistent with studies showing that parental beliefs and perceptions can influence fever management practices independently of factual knowledge.[3-5, 15, 19]

Taken together, the findings suggest that improving safety in the use of acetaminophen among caregivers may require an approach beyond general fever management education. General fever education should be complemented by medication-specific education addressing appropriate indications for acetaminophen use, accurate temperature assessment, weight-based dosing, dosing intervals, maximum daily dose, appropriate measuring devices, and recognition of potential adverse effects. Previous studies have identified gaps in several of these areas, including fever thresholds, weight-based dosing, dosing frequency, measurement of liquid medications, and recognition of paracetamol toxicity.[6-8, 11-13, 15] At the same time, educational interventions should address caregiver beliefs and perceptions about fever and antipyretic use, because attitude demonstrated a stronger correlation with acetaminophen use than knowledge in this study. Such an approach may be particularly relevant to community-based settings

Article in Press

such as child development centers where nurses can provide repeated, practical, and caregiver-centered education.

Implications for Nursing Practice

The findings of this study highlight significant implications for pediatric and community nursing practice. First, the moderate level of fever management and acetaminophen use behaviors observed among caregivers indicates the need for structured caregiver education programs focusing on fever management safety. Nurses working in pediatric clinics, community health centers, and child development centers are well-positioned to provide guidance on accurate fever assessment, appropriate use of antipyretics, and recognition of warning signs requiring medical attention.

Second, the finding that fever assessment behaviors were weaker than fever care practices suggests that caregivers may rely on subjective perceptions of fever rather than objective temperature measurement. Therefore, nursing interventions should emphasize practical fever assessment skills, including correct thermometer use and appropriate temperature thresholds for medication administration.

Third, given the positive associations between caregivers' knowledge, attitude, and acetaminophen use behaviors, educational interventions that address both knowledge and beliefs may improve medication safety practices. Nurse-led health education strategies that address misconceptions related to fever and antipyretic use may help reduce unnecessary medication use and improve caregivers' confidence in managing fevers at home.

Finally, early childhood development centers represent an important community-based setting for caregiver education. Integrating medication safety education into routine communication between healthcare providers and caregivers may enhance safety in fever management practices at the household level and contribute to improved child health outcomes.

Implications for Future Research

This study provides important baseline evidence regarding caregivers' fever management practices and acetaminophen-related knowledge, attitude, and behaviors among caregivers of preschool children. Future research should further explore factors with influence over caregiver's medication decision-making processes, including cultural beliefs, past experience with childhood illness, and access to health information.

In addition, intervention studies are needed to evaluate the effectiveness of caregiver education programs aimed at improving fever assessment accuracy and safety in antipyretic administration. Community-based educational interventions delivered through child development centers or primary healthcare services may represent a promising approach to improving medication safety practices among caregivers.

More importantly, the findings from this phase of the study provide essential baseline evidence to guide the next stage of the research project. The subsequent phase will focus on the development of child-friendly acetaminophen formulations and caregiver-centered educational strategies aimed at promoting safer and more effective fever management for preschool children.

Limitations

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional design limits the ability to establish causal relationships among

Article in Press

caregivers' knowledge, attitude, and acetaminophen use behaviors. Second, data were collected using self-administered questionnaires, which may be subject to recall or social desirability bias. Third, participants were recruited from child development centers in a single district, which may limit the generalizability of the findings to caregivers in other geographic or cultural contexts. Despite these limitations, the study provides valuable insight into caregivers' fever management practices and medication safety behaviors in a community setting.

Conclusions

This study examined fever management practices and acetaminophen-related knowledge, attitude, and behaviors among caregivers of preschool children. The findings indicate that caregivers demonstrated moderate levels of fever management practices, knowledge, and acetaminophen use behaviors, while attitude toward acetaminophen use was generally appropriate. Knowledge and attitude were positively associated with medication use behaviors, highlighting the importance of caregiver education in promoting safe medication practices. However, overall fever management practices were not significantly associated with acetaminophen use behaviors. This suggests that medication safety requires specific attention to education beyond general fever care practices. The findings underscore the important role played by nurses in promoting safe fever management and medication use through caregiver education in community settings. The findings also provide essential baseline evidence to inform the next phase of the research project, which aims to develop child-friendly acetaminophen formulations and caregiver-centered educational strategies to enhance safety in the management of fevers among preschool children.

Article in Press

Additional Information

Acknowledgments: The authors would like to express their sincere gratitude to all caregivers who participated in this study for their valuable time and cooperation.

Ethics Approval: The study protocol was approved by the Institutional Review Board of the Faculty of Nursing, Rattana Bundit University (RBAC-EC-NUS-1-006/67 on 18 April 2024). Written informed consent was obtained from all participants prior to data collection. Questionnaires were distributed and returned in sealed envelopes to maintain confidentiality. All data were rendered anonymous and securely stored. Research findings were reported in aggregate form only.

Clinical Trial Consideration: This study does not report on a clinical trial.

Financial Support: This study was supported by the Faculty of Nursing, Rattana Bundit University (Grant No. 002/2566, Sirinna Tassaneeyarat).

Conflict of Interest: The authors have no conflicts of interest to declare.

Declaration of AI Assistance: The authors used a generative AI tool (ChatGPT and OpenAI) for language refinement, including grammar correction, clarity improvement, and academic writing enhancement. All AI-assisted content was carefully reviewed, revised, and verified by the authors. The authors take full responsibility for the accuracy and integrity of the manuscript.

Author Contributions:
Conceptualization: All authors
Data Curation: Sirinna Tassaneeyarat, Panita Suwannoi
Formal Analysis: Sirinna Tassaneeyarat, Panita Suwannoi
Funding Acquisition: Sirinna Tassaneeyarat
Investigation: All authors
Methodology: All authors
Project Administration: Sirinna Tassaneeyarat
Resources: Panita Suwannoi
Visualization: Sirinna Tassaneeyarat
Writing – Original Draft: Sirinna Tassaneeyarat
Writing – Review & Editing: All authors

Article in Press

References

1. Hussain SM, Al-Wutayd O, Aldosary AH, et al. Knowledge, attitude, and practice in management of childhood fever among Saudi parents. *Glob Pediatr Health.* 2020;7:2333794X20931613. doi:10.1177/2333794X20931613
2. Wattanasonthorn P, Wattanaburanon A, Sitkalin P, Jaidee W. Knowledge and health belief model affecting fever management in children of caregivers. *Journal of Liberal Arts, Maejo University*. 2022;10(2):70-86.
3. Sakr F, Toufaili Z, Akiki Z, et al. Fever among preschool-aged children: a cross-sectional study assessing Lebanese parents' knowledge, attitudes and practices regarding paediatric fever assessment and management. *BMJ Open.* 2022;12(10):e063013. doi:10.1136/bmjopen-2022-063013

4. Zyoud SH, Al-Jabi SW, Sweileh WM, et al. Beliefs and practices regarding childhood fever among parents: a cross-sectional study from Palestine. *BMC Pediatr.* 2013;13:66. doi:10.1186/1471-2431-13-66
5. Tohme F, Nasser S, Assi M, et al. Parental perspectives on childhood fever and antipyretics: a cross-sectional study on knowledge, attitudes, and beliefs in Bekaa valley. *Open Public Health J*. 2024;17:e18749445343039. doi:10.2174/0118749445343039241026185739
6. Daifallah A, Jabr R, Al-Tawil F, et al. An assessment of parents' knowledge and awareness regarding paracetamol use in children: a cross-sectional study from Palestine. *BMC Public Health*. 2021;21(1):380. doi:10.1186/s12889-021-10432-5
7. Nadeem Butt MS, Shah S. Parental awareness and practices regarding paracetamol use in children: a cross-sectional study from Pakistan. *PLOS Glob Public Health*. 2025;5(10):e0005358. doi:10.1371/journal.pgph.0005358
8. Haleem SEAHA, Alghamdi HAS, Alghamdi AMH, et al. Knowledge and awareness of caregivers about using paracetamol in children in Al-Baha region: a cross-sectional study. *J Pediatr Pharmacol Ther*. 2025;30(5):645-654. doi:10.5863/JPPT-24-00126
9. Murad MA, Yasawy MA, Hantoush D, et al. An assessment of parents' knowledge, awareness and practice regarding paracetamol use in children. *World Family Medicine*. 2023;21(4):53-63. doi:10.5742/mewfm.2023.95256100
10. Yeoh ET, Goh AW, Chong CP. Evaluation of the practices of using paracetamol among parents in treating their children in Penang, Malaysia. *J Appl Pharm Sci.* 2021;12(1):120-130. doi:10.7324/JAPS.2021.120111
11. Fernando S, Luthufdeen I, Hadgie T. Assessment of parental knowledge and awareness regarding paracetamol usage and toxicity at Lady Ridgeway Hospital for Children, Sri Lanka. *J Trop Health.* 2025;1(2):45-52. doi:10.4038/joth.v1i2.9
12. Ramanayake RP, Jayasinghe LR, De Silva AH, Wijesinghe WA, Kanaganayagam N. Knowledge and practices of paracetamol administration among caregivers of pediatric age group patients. *J Family Med Prim Care*. 2012;1(1):30-33. doi:10.4103/2249-4863.94448
13. Lim CY, Sa'adon S, Amin S, et al. Caregivers' knowledge in using paracetamol in childhood fever in Hospital Seri Manjung. *Perak Pharm J.* 2021;3(1).
14. Krejcie RV, Morgan DW. Determining sample size for research activities. *Educ Psychol Meas*. 1970; 30(3):607-610. doi:10.1177/001316447003000308
15. Al Arifi MN, Alwhaibi A. Assessment of Saudi parents' beliefs and behaviors towards management of child fever in Saudi Arabia—a cross-sectional study. *Int J Environ Res Public Health.* 2021;18(10):5217. doi:10.3390/ijerph18105217
16. Bloom BS, Engelhart MD, Furst EJ, Hill WH, Krathwohl DR. *Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook I: Cognitive Domain.* David McKay Company; 1956.
17. Wahidiyat PA, Yo EC, Wildani MM, Triatmono VR, Yosia M. Cross-sectional study on knowledge, attitude and practice towards thalassaemia among Indonesian youth. *BMJ Open*. 2021;11(12):e054736. doi:10.1136/bmjopen-2021-054736
18. Fadel A, Zrika A, Hmede M, Abbood A. Assessment of knowledge and practices regarding pediatric paracetamol and ibuprofen use among Syrian parents: a cross-sectional survey. *IJAPSR*. 2025;5(6):15-20. doi:10.54105/ijapsr.E4088.05061025
19. Ogunyinka IA, Oshikoya KA, Yusuff KB, et al. Determinants of caregiver's knowledge and practices regarding childhood fever management in a developing setting: a multi-centre cross-sectional assessment. *Front Pediatr*. 2023;11:1119067. doi:10.3389/fped.2023.1119067

Article in Press