The nursing management of fever in children: a systematic review
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Authors' objectives
To determine whether the evidence supports the types and timing of the various nursing interventions which are commonly used to reduce fever in non-critically ill children, and whether and to what extent the outcomes are influenced by these nursing interventions. As implications for practice, the review also covers issues raised by incorporating these interventions into the nursing management of fever in non-critically ill children.

Searching
The search sought studies in the English language, unpublished or published between 1988 and 1998 (although studies prior to 1988 were included in the review). Sixteen electronic databases, including MEDLINE, EMBASE, CINAHL, Expanded Academic ASAP, Current Contents, PsycLIT, DARE and the Cochrane Library, were searched using the search terms 'nurs*', 'manage*', 'fever', 'child*', 'febrile' and 'temperature'. The search dates vary for each database searched and are listed in an appendix to the review. The appendix also lists the Internet sources searched. The review panel members also conducted handsearches, checked references and contacted individual content experts in paediatrics.

Study selection
Study designs of evaluations included in the review
The review considered any randomised or quasi-randomised trials that addressed the intervention and participant criteria.

Specific interventions included in the review
Any interventions aimed at reducing fever that fall within the practice of nursing were included. The categories identified were: the administration of antipyretic medication (paracetamol or ibuprofen); maintenance of hydration; and the use of external cooling measures (including direct and environmental interventions). The review included interventions carried out in three settings: hospital, out-patient clinics or general practitioners' offices, and the child's home.

Participants included in the review
The review criteria specified non-critically ill children, aged between 3 months and 16 years, with fever. Fever was defined as a temperature ranging from 37.5 (tympanic or oral) or 38 degrees C (rectal) to 41 degrees C. Critically ill children and infants with fever were excluded.

The studies included in the review had participants aged between the first year of life to around 5 years, and there were relatively even numbers of males and females.

Outcomes assessed in the review
The outcomes specified in the review were effect on fever (reduction, prevention of increase), prevention of febrile convulsions, increased comfort (decreased irritability), and decreased parental anxiety.

How were decisions on the relevance of primary studies made?
The chairperson of the review panel assessed the potential studies and copies of relevant articles were then retrieved.

Assessment of study quality
The included studies were assessed using a checklist developed for this review. The checklist was piloted before use, but other validation information was not provided. Details of the checklist are given in an appendix to the review. Two reviewers independently assessed the included studies using the checklist. Any disagreements were discussed and passed to a third reviewer.
Data extraction

Two reviewers independently performed the data extraction for the included studies using a pre-designed and piloted data extraction form. Any disagreements were discussed with a third reviewer. Efforts made to obtain missing data for the included studies were unsuccessful.

Methods of synthesis

How were the studies combined?
Due to the heterogeneity found in the included studies, no attempt was made to use statistical pooling. A narrative comparison of the included studies was presented instead.

How were differences between studies investigated?
The authors do not state a method for assessing any differences between the studies.

Results of the review

Ten randomised trials (n=1,026) were included in the review. However, 205 participants who received treatment no longer deemed acceptable (aspirin, ice water or alcohol sponges) were excluded from the review. Two of the randomised trials were open trials, and eight were randomised controlled trials (RCTs).

Effect on fever.

For sponging compared with antipyretic alone, all 7 studies found that the antipyretic alone reduced the child's temperature more. For antipyretic plus sponging compared with sponging alone, all 5 studies found that the combined intervention lowered the temperature more than the antipyretic alone. For antipyretic plus sponging compared with antipyretic alone, all 8 studies found that the combined intervention lowered the temperature more than the antipyretic alone.

Comfort of the child.

All 5 studies used physical signs as a measure. The studies were very dissimilar in assessment and measurement so cannot be compared in this review. In 4 of the 5 studies, however, it appears that sponging was more acceptable to the child than antipyretic alone.

Prevention of febrile convulsions.

Only one febrile convulsion was reported in the total sample of 821 participants. Two of the studies excluded children with a history of febrile convulsions.

Effect on parental anxiety.

None of the included studies measured this outcome.

Authors' conclusions

The authors state that, since only narrative comparisons were made, the results of the review should be interpreted with caution. The results suggest that there is minimal clinical benefit from sponging in temperate climates or environments. When only small decreases in temperature were achieved, they were not sustained over time and were often at the expense of the child's comfort. However, in certain circumstances, for example high environmental temperatures and/or humidity, or in situations where there is a need for immediate temperature reduction, sponging may be warranted. The risks of administering antipyretics on a sustained basis, over even a short period of time and above a relatively low total daily dosage, have been identified. In addition, there is a lack of evidence in the literature that administering antipyretics reduces the incidence of febrile convulsions. The one study that addressed parental care indicated the need for parental education that focuses on knowledge of the body's protective physiological responses and how to support those responses. In summary, care needs to be individualised, based on current knowledge of the effectiveness and risks...
of interventions.

CRD commentary
In this review, the research question was clearly stated, as were details of the inclusion criteria for study design, intervention, participants and outcomes. The searches were very thorough and, although restricted to English language studies, the authors also searched several other sites, performed handsearches, searched for unpublished data, and talked to content experts in this field of study. The included studies were assessed for quality, but the results of the assessment were not used to group or exclude studies in the narrative or to check whether such exclusions affected the results of the review. Given the stated heterogeneity, the narrative combining of the data was appropriate. The conclusions of this review appear to follow from the results, although the authors note that a lack of statistical analysis means these results should be viewed with caution.

Implications of the review for practice and research
Practice: The authors state that any intervention that supports the body's beneficial physiological responses to infection should be used. Parental education is also supported, in order to increase their knowledge and skills in caring for their febrile child and to decrease any anxiety. There is a lack of evidence to support routine sponging, and the administration of antipyretics should also be used selectively and with caution. The child (and the parents) should be the focus of nursing care, not the thermometer.

Research: The authors state that further studies on sponging in the management of moderate fever in children are warranted. The authors also state that there is a need to report all results in full when publishing the study, to facilitate further review such as this systematic review.

Bibliographic details

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Subject indexing assigned by CRD

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.