Effects of passive body heating on body temperature and sleep regulation in the elderly: a systematic review.

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Authors' objectives
To assess the effect of passive body heating on changes in body temperature and the quality of sleep in elderly people.

Searching
MEDLINE, PsycINFO, CINAHL, the Cochrane Library, DARE and current contents databases were searched from 1966 to 2001 for published and unpublished studies. The search terms were stated.

Study selection
Study designs of evaluations included in the review
The inclusion criteria were not explicitly defined for the study design. All of the included studies were crossover randomised controlled trials (RCTs).

Specific interventions included in the review
Studies of passive body heating were eligible for inclusion. The included studies compared the heating of bodies using immersion to mid-thorax or neck level in a warm bath (40.2 or 40.3 degrees C for 10 to 30 minutes, 0.5 to 2 hours before bedtime) with either no bath or a lukewarm bath (38 degrees C). The interventions were conducted at home or in a sleep laboratory, and appear to have been conducted over one night only. Cointerventions included the use of foot warmers or electric blankets.

Participants included in the review
Studies of people aged 60 years and older were eligible for inclusion. The participants in the included studies were healthy people with and without insomnia who were recruited through advertisements in newspapers, were free of mental impairment and were not taking any sleeping tablets. The participants were predominantly female (75%).

Outcomes assessed in the review
Studies that assessed the change in body temperature and subjective measures of sleep quality were eligible for inclusion. The included studies measured the rectal temperature before and after the warm bath, 24-hour rectal temperature and skin temperature. Sleep quality was assessed using sleep efficiency, sleep maintenance, wake after sleep onset (WASO) and slow wave sleep. In the included studies, sleep quality was measured using overnight polysomnography, sleep diary, self-reported post-sleep inventory, 24-hour wrist actigraphy and overnight body movement.

How were decisions on the relevance of primary studies made?
The author did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
Validity was not formally assessed, but some aspects of validity were discussed in the text: the representativeness of the sample compared with the general population of the elderly; sample size; and the completeness of the information reported.

Data extraction
The author did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Information on the characteristics of the participants, study design, outcome measures, intervention details and outcomes were tabulated.
Methods of synthesis
How were the studies combined?
A narrative synthesis of the studies was undertaken.

How were differences between studies investigated?
Differences between the studies were not discussed.

Results of the review
Three crossover RCTs (53 people) were included.

Body temperature.
All 3 studies found that a hot bath increased the rectal temperature by 0.60 to 0.92 degrees C. The one study measuring skin temperature found no change. Two studies found that a hot bath delayed the occurrence of lowest rectal temperature by 88 to 94 minutes.

Sleep quality.
All 3 studies found that a hot bath improved some measure of sleep quality.

Two studies assessing sleep quality using overnight polysomnography found that a hot bath significantly increased slow wave sleep; increases of 18 minutes (P<0.05) and 13.5 minutes (95% confidence interval, CI: 1.3, 25.7) were observed. One study found that a hot bath decreased intermittent wakefulness (WASO reduced by 21.6 minutes, P<0.0), while another found no significant difference (WASO 8.35 minutes, 95% CI: -3.9, 20.6).

Two studies assessing sleep efficiency and sleep maintenance found no significant difference. The only study measuring body movement during sleep found that a hot bath significantly reduced body movement (P<0.001).

All 3 studies found that a hot bath improved subjective sleep quality: one RCT found an increase in the depth of sleep (P<0.01); one RCT found reduced restlessness (P<0.05); and one RCT found an increase in the speed of falling asleep (P<0.001).

Authors' conclusions
Passive body heating before bed increased slow wave sleep and decreased broken sleep, thereby increasing sleep quality.

CRD commentary
The review question was clear in terms of the intervention, participants and outcomes. The inclusion criteria were not explicitly defined in terms of the study design. Several relevant sources were searched, the search terms were stated, and attempts were made to locate unpublished studies. However, it was unclear whether any language limitations had been applied. The methods used to select the studies, assess validity and extract the data were not described; hence, the adequacy of the methods used cannot be judged. Some relevant information on the included studies was tabulated, but validity was not formally assessed; hence, the quality of the evidence cannot be judged. A narrative synthesis was appropriate given the small number of studies.

The included studies used several different measures to assess sleep quality, but the problems of multiple outcomes were not mentioned in the review. The author discussed some of the limitations of the review, such as the small sample size, limited generalisability of the results due to the inclusion of healthy people, and insufficient information on the interventions. In addition, two of the studies were conducted by the same authors. Any conclusions based on such a small number of participants in only three studies that reported results for only one occasion must be treated as suggestive rather than definitive.
Implications of the review for practice and research

Practice: The author did not state any implications for practice.

Research: The author stated that research is required to clarify different components of sleep, to explore the effect of body temperature change in people according to gender and health status, and to examine the effectiveness of passive body heating on sleep.

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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.