School-based interventions for spinal pain: a systematic review
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CRD summary
This well-conducted review evaluated the effectiveness of school-based spinal health interventions. The authors concluded that interventions may be effective in increasing spinal health knowledge and in decreasing pain prevalence, but effects on spinal care behaviours were deemed inconclusive. Although the quality of the included studies was poor, the authors’ conclusions generally reflect the evidence presented and are likely to be reliable.

Authors’ objectives
To evaluate the effectiveness of spinal health interventions delivered in the school setting.

Searching
Academic Search Elite, AusportMed, Australasian Medical Index, APAIS-Health, CINAHL, the Cochrane Controlled Trials Register, ERIC, Health and Society Database, Health Source: Nursing/Academic Edition, PsycINFO and PubMed were searched from inception to March 2004. The search terms were reported. Additional searches were carried out by scanning the reference lists of retrieved papers; by handsearching the journals Spine (1990 to 2004), Acta Paediatrica (1990 to 2003) and Work (1991 to 2003); and by reference to a list that included unpublished literature compiled by experts in the field. Authors of retrieved papers were contacted to help identify further studies. English abstracts of non-English papers were considered only where the study design was of a higher level than that reported in any of the English literature.

Study selection
Study designs of evaluations included in the review
The following designs were eligible for inclusion in the review: randomised controlled trials including cluster designs; non-randomised cluster controlled trials; controlled before-and-after trials; interrupted time series trials; and uncontrolled before-and-after trials.

Specific interventions included in the review
Studies of school-based interventions to prevent the onset of spinal pain were eligible for inclusion. The comparator was any ‘usual’ school-based health and physical education programme. The included studies considered a range of strategies focusing on safety issues and postural development in relation to performing daily tasks. Where specified, the intensity and duration of the intervention ranged from a single session (in half of the included studies) to another programme delivered over a 3-year period. Classroom teachers and physical therapists delivered the intervention (where specified).

Participants included in the review
Studies of children and/or adolescents under the age of 18 years attending primary (elementary) or secondary (high) school were eligible for inclusion. Where specified, the included studies contained equal proportions of males and females and the mean age was between 9.8 and 12.7 years.

Outcomes assessed in the review
Studies were eligible for inclusion if they assessed at least one of the following measures: spine/spinal care knowledge, spinal care behaviours and spinal pain prevalence. These outcomes were all represented in the included studies. Follow-up of the outcomes ranged from immediately, to 3 years post-intervention. The outcome measures were not specified but many were reported to be untested for reliability and validity.

How were decisions on the relevance of primary studies made?
One reviewer carried out the literature searches, while a second reviewer verified the correct application of the inclusion criteria on 10% of potentially relevant studies. Any disagreements were resolved by consensus.
Assessment of study quality
Two reviewers (the second was blinded to publication and authorship details) independently carried out the quality assessment using a recognised tool. Data were collected on selection and allocation biases, confounders, blinding, data collection methods, and withdrawals and drop-outs. Global ratings were interpreted for each study as strong, moderate or weak.

Data extraction
Two reviewers independently extracted the data. Evidence of effectiveness was recorded as positive or negative, according to whether data had been reported in the paper, or as inconclusive, where appropriate, across the three outcomes of interest.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative.

How were differences between studies investigated?
The results were grouped according to knowledge, behaviours and pain prevalence. Other study differences could be observed in tables provided in the paper.

Results of the review
Twelve studies (n=4,444) were included in the review. Half of the included studies were uncontrolled before-and-after designs.

The quality of all included studies was considered to be weak.

Knowledge.

In all 8 studies measuring knowledge (n=1,493), higher scores were reported in the intervention groups compared with the control or pre-intervention results. In 2 studies this was observed up to 1 year post-intervention.

Behaviours (10 studies).

In 7 studies (n=1,789) the indications were that spinal care behaviours could be improved as a result of participation in a spinal health intervention. In 2 studies this was observed up to 1 year post-intervention. Three studies were inconclusive, or had statistically insignificant results. One of these studies contained the largest sample size of all those included in the review.

Pain prevalence (2 studies).

One study (n=1,128) measuring pain prevalence reported a significant decrease (from 32% to 23%, p<0.05) in the intervention group at 1 year post-intervention. In the other study (n=1,715), significantly lower prevalence was reported in the study cohort at post-intervention testing (p=0.0000). The authors reported that only 38% of the original study participants were involved in the post-test stage.

Authors' conclusions
School-based spinal health interventions may be effective in increasing spinal health knowledge and in decreasing pain prevalence. The effect on spinal care behaviours was inconclusive. The poor quality of the studies means that the results should be interpreted with caution.

CRD commentary
The review question and inclusion criteria were clear and a wide range of data sources was searched. Unpublished
material was sought and there was some consideration of non-English language papers in order to maximise the retrieval of relevant papers for this review. Adequate attempts were made to minimise bias and error in most aspects of the review process, perhaps with the exception of study selection. A validity assessment was carried out and this was used to formulate the discussion of the results.

The narrative synthesis of the results was appropriate given the heterogeneity of the studies, and the authors highlighted some important and relevant directions for research and practice in this topic area. Although it was not entirely clear why the results for spinal care behaviours were deemed inconclusive, the authors’ cautious conclusions generally reflect the limited evidence presented and are likely to be reliable.

**Implications of the review for practice and research**

Practice: The authors stated that future school-based spinal health interventions should be based on empirical evidence in terms of content and design.

Research: The authors stated that future research should be based on controlled trials incorporating sample size calculations; consider a range of potential confounding factors; use reliable and valid outcome measures; conduct follow-up over a meaningful time period; and employ appropriate quality assessment tools.

**Bibliographic details**


**PubMedID**

16418645

**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Back Pain /epidemiology /therapy; Child; Female; Humans; Male; School Health Services /trends; Spinal Diseases /epidemiology /therapy

**AccessionNumber**

12006000400

**Date bibliographic record published**

31/12/2007

**Date abstract record published**

31/12/2007

**Record Status**

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.