A school-based survey of recurrent non-specific low-back pain prevalence and consequences in children

M. A. Jones¹,²,⁶, G. Stratton²,³, T. Reilly⁴ and V. B. Unnithan⁵

Abstract

The aim of this investigation was to provide evidence of the prevalence and consequences of recurrent low-back pain in children from Northwest England. A cross-sectional survey was conducted involving a standardized questionnaire with established reliability and validity. A cross-sectional sample of 500 boys (n = 249) and girls (n = 251) aged between 10 and 16 years participated in the study. Average lifetime prevalence of low-back pain was 40.2% [95% confidence interval (CI) = 38.7–41.6]. Most cases of low-back pain were acute episodes that did not lead to disabling consequences. In contrast, 13.1% (95% CI = 12.5–13.7) experienced recurrent low-back pain that led to disabling consequences; 23.1% visited a medical practitioner, 30.8% experienced loss of physical activity/sports and 26.2% had been absent from school because of low-back pain. Recurrent low-back pain was particularly evident during late adolescence where one in five children were cases. The health education implications of low-back pain in children are discussed. It was concluded that low-back pain is a common complaint during childhood, although most cases are acute episodes that represent little health consequence. In contrast, some children experience recurrent low-back pain that can lead to disabling consequences. Future research should focus on recurrent low-back pain cases since they often led to disabling consequences.

Introduction

It has been recognized that low-back pain is a common phenomenon that affects public health (Maniakis and Gray, 2000). Although a less globally recognized problem, low-back pain has also been described as a public health problem in children (Olsen et al., 1992). Epidemiological evidence indicates that non-specific low-back pain presents during childhood. Estimates of lifetime prevalence for low-back pain in children vary from 13 to 51%, point prevalence ranges from 1 to 33% and prevalence of recurrent low-back pain ranges from 7 to 27% (Salminen et al., 1992; Burton et al., 1996; Leboeuf-Yde and Kyvik, 1998; Harreby et al., 1999; Vikat et al., 2000). The prevalence of pain necessitating medical consultation varies from 8 to 16%, and pain interfering with activities such as school and leisure varies between 7 and 27% (Salminen et al., 1992; Burton et al., 1996; Vikat et al., 2000). The variation in results between investigations may be more related to methodological differences than to population differences (Balague et al., 1999). Investigations have varied in the research design (cross-sectional...
or longitudinal), method of data collection (questionnaire, interview or examination), and the localization and definition of low-back pain.

Conclusions from existing research indicate that low-back pain is a common complaint during childhood. Furthermore, biannual nationwide surveys in Finland revealed that prevalence of low-back pain in children is on the increase (Vikat et al., 2000). It appears that most of these cases were mild in nature; they can be considered as a natural part of growing and represent little consequence to health (Burton et al., 1996; Salminen et al., 1999). In contrast, some children suffer from recurrent low-back pain. These cases have a more chronic evolution, lead to greater disability and require increased medical attention (Salminen et al., 1992; Harreby et al., 1999). Further research needs to focus on evaluating prevalence and consequences of recurrent low-back pain, since it is this group that is likely to suffer health consequences as a result of the low-back pain. Moreover, recurrent low-back pain during the adolescent years may be a precursor for chronic low-back pain during adulthood (Harreby et al., 1995; Salminen et al., 1995, 1999). The aim of this investigation was to provide evidence of the prevalence and consequences of recurrent low-back pain in children from England.

Methods

Sample and design

In total, 538 questionnaires were issued to seven schools in Greater Manchester, Lancashire and Merseyside; a response rate of 93% was recorded. The survey was conducted between September 1998 and November 1998. A cross-sectional sample of 500 boys (n = 249) and girls (n = 251) participated in the study. Subjects were aged between 10 and 16 years [13.5 (2.0) years] and were distributed across this age range (n > 66 in each age group). Verbal assent was obtained and the study was granted ethical approval by The Human Ethics Committee of Liverpool John Moores University.

Low-back pain evaluation

Subjects were required to complete a questionnaire to assess for low-back pain history. The questionnaire was designed to identify lifetime prevalence, point prevalence, recurrent prevalence and duration of the low-back pain. Lifetime prevalence was defined as the proportion of the population that had experienced an episode at some point in their lifetime. Point prevalence was defined as the proportion of the population that had been cases within the previous week. Recurrent low-back pain was identified by the question ‘do you get back pain regularly’; this question referred to the previous 12 months and was classified by repeated acute episodes. An anatomical drawing was used to identify the localization of the back pain (Department of Health, 1998). The consequences of the low-back pain experience were also examined. Questions were asked relating to absence from school, medical treatment and limitation of activity.

Questionnaire reliability and validity

The reliability of the questionnaire was established with a repeated measures study involving 119 children aged 11–16 years (7 days between test and re-test). The criterion validity of the questionnaire was evaluated through comparison with interview. Concordance between repeated measures of the questionnaire, and between the questionnaire and interview was greater than 90%. These findings indicated that a questionnaire approach is both reliable and valid, which concurs with other research concerning the reliability and validity of a questionnaire approach (Staes et al., 1999, 2000).

Analysis

Statistical analysis was conducted using Microsoft Excel 97. Descriptive statistics including means, standard deviations and 95% confidence intervals (CIs) were performed to represent the low-back pain data. Chi-square analysis was used to evaluate the effect of sex and age on lifetime prevalence, point prevalence and recurrent low-back pain. Significance was set at P < 0.01.
Results

Low-back pain prevalence

The prevalence data are in Table I. Lifetime prevalence of low-back pain was 40.2%. Chi-square analysis identified a significant difference between age groups ($P < 0.01$); Table I indicates that lifetime prevalence increases with advancing chronological age. Point prevalence indicated 15.5% of the children had recently experienced low-back pain. Chi-square analysis revealed no significant age effect for point prevalence. The prevalence of recurrent low-back pain was 13.1%. Chi-square analysis revealed a significant age effect for recurrent low-back pain prevalence ($P < 0.01$); Table I indicates that recurrent low-back pain prevalence increases with advancing chronological age. No significant sex effect was identified for lifetime, point or recurrent low-back pain prevalence.

Consequences of all types of low-back pain

Absence from school due to low-back pain was reported to occur in 7.8% (95% CI = 7.3–8.2) of the low-back pain cases. Of the low-back pain cases 6.5% (95% CI = 6.0–7.0) visited a medical practitioner about low-back pain. Girls (8.9%, 95% CI = 8.3–9.5) appeared to be more likely to visit a medical practitioner than boys (3.7%, 95% CI = 3.3–4.1). The low-back pain experiences led to 9.9% (95% CI = 9.6–10.3) of the cases being prevented from taking part in sport or physical activity. The duration of low-back pain experiences revealed most episodes lasted less than 7 days (78.2%); a small proportion of low-back pain episodes lasted more than 1 (19.3%) or 2 (2.5%) weeks.

Recurrent cases

The consequences of low-back pain were considered separately for those children who reported recurrent low-back pain. Chi-square analysis identified a significant difference in each of the consequences between the recurrent cases of low-back pain and the other cases ($P < 0.01$). The recurrent low-back pain cases were absent from school more often (26.2%), visited a medical practitioner more frequently (23.1%) and were prevented from participating in sports or physical activity more frequently (30.8%) than the other cases (1.5%) because of low-back pain.

Discussion

This investigation aimed to evaluate the prevalence and consequences of low-back pain, with particular emphasis on recurrent low-back pain. An epidemiological school-based survey was carried out. The extent of existing data on low-back pain prevalence in children is limited with just occurrence or non-occurrence being measured in several

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### Table I. Lifetime, point and recurrent low-back pain across the age groups

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Lifetime prevalence</th>
<th>Point prevalence</th>
<th>Recurrent prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys (%)</td>
<td>Girls (%)</td>
<td>Boys (%)</td>
</tr>
<tr>
<td>10.0–10.9</td>
<td>17.6</td>
<td>18.8</td>
<td>5.9</td>
</tr>
<tr>
<td>11.0–11.9</td>
<td>21.2</td>
<td>23.7</td>
<td>9.1</td>
</tr>
<tr>
<td>12.0–12.9</td>
<td>28.6</td>
<td>33.3</td>
<td>11.4</td>
</tr>
<tr>
<td>13.0–13.9</td>
<td>35.9</td>
<td>50.0</td>
<td>12.8</td>
</tr>
<tr>
<td>14.0–14.9</td>
<td>50.0</td>
<td>55.9</td>
<td>18.4</td>
</tr>
<tr>
<td>15.0–15.9</td>
<td>54.3</td>
<td>57.6</td>
<td>22.9</td>
</tr>
<tr>
<td>16.0–16.9</td>
<td>57.1</td>
<td>59.0</td>
<td>22.9</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>37.8</td>
<td>42.6</td>
<td>14.8</td>
</tr>
<tr>
<td><strong>95% CI</strong></td>
<td>36.4–39.2</td>
<td>41.1–44.1</td>
<td>14.2–15.4</td>
</tr>
</tbody>
</table>

**Lifetime and point prevalence**

Lifetime prevalence of low-back pain was 40.2% and point prevalence 15.5%. These values are similar to previous research that has identified a range of 13–51 and 1–33% for lifetime and point prevalence respectively (Salminen et al., 1992; Burton et al., 1996; Leboeuf-Yde and Kyvik, 1998; Harreby et al., 1999; Vikat et al., 2000). The average lifetime prevalence of low-back pain in children (40.2%) is lower than the 59% reported for British adults (Walsh et al., 1992; Mason, 1994; Leighton and Reilly, 1995). The average point prevalence (15.5%) observed in the sample is actually higher than the 14% reported for British adults (Walsh et al., 1992; Mason, 1994). When comparing the data between children and adults, the different definitions of low-back pain must be considered. Investigations involving adults have specified a ‘case’ as low-back pain leading to activity limitation, whereas studies involving children have not specified the low-back pain must lead to activity limitation. Only two cases (1.5%) reported consequences from lifetime prevalence of low-back pain in the current study. This finding suggests that a lifetime experience of low-back pain, although common during childhood, represents little health consequence, agreeing with previous research (Burton et al., 1996; Harreby et al., 1999).

**Recurrent low-back pain**

The prevalence of recurrent low-back pain was 13.1%; this figure is in accordance with previous research that has indicated a range from 7 to 27% (Burton et al., 1996; Harreby et al., 1999; Vikat et al., 2000). Comparison across studies is difficult due to different definitions of recurrent low-back pain, specifically the duration over which recurrence is considered. Prevalence of recurrent low-back pain significantly increased with advancing chronological age in the current study. Olsen et al. (Olsen et al., 1992) also found an increase from 6.2% at 10 years to 15.5% at 14 years; these figures are comparable to the current study. The increase of recurrent low-back pain with age indicates a worrying finding. Frequent low-back pain is of much greater consequence both now and in the future (Olsen et al., 1992; Harreby et al., 1999).

**Health implications**

Over a quarter of the recurrent low-back pain cases had experienced consequences as a result of their low-back pain, which suggests that recurrent low-back pain represents a potentially serious health problem in this population. This finding agrees with previous research which suggests recurrent low-back pain has a more chronic evolution and leads to greater levels of disability (Salminen et al., 1992; Harreby et al., 1999). Salminen et al. (Salminen et al., 1992) identified 7.8% of children were low-back pain chronics, and experienced recurrent low-back pain and disability. Harreby et al. (Harreby et al., 1999) found that children who reported recurrent or continuous low-back pain utilized increased medical attention and use of analgesics, and experienced reduced quality of life. The economic and public health burden of recurrent low-back pain during childhood is substantial when one considers the young age and potential tracking into adulthood.

**Health education implications**

Research into children’s health and health behaviour and the factors that influence them is essential for the development of effective health education and health promotion policy, programmes and practice targeted at young people (Currie et al., 2000). Historically, back health and posture have internationally been important elements of the national curriculum for physical education; by the mid-1980s when heart health became the priority it was largely forgotten (Tinning, 2001). National cross-sectional surveys evaluating the prevalence of back, neck and shoulder pain in Finnish adolescents have identified that the prevalence of low-back pain increased between 1985 to 2001, particularly during the
mid-1990s with the trend still continuing (Hakala et al., 2002). It appears from the evidence that there is a strong case to re-introduce the concept of back health into the curriculum or as part of the healthy school initiative.

The WHO has identified the school as an effective setting in which to improve children’s health (WHO, 1996). Schools health programmes can simultaneously reduce health problems, increase efficiency of the education system and advance social development. The cause of low-back pain in children appears to be multifactorial, including biological, psychological, social and individual factors (Balague et al., 1999). Given the multifactorial causes of low-back pain, several health education strategies within the school setting have the potential to reduce the incidence of low-back pain. Linking to the WHO healthy schools initiative seems plausible; key areas would be elements of (1) promoting a healthy environment, (2) health education, (3) opportunities for physical education and recreation, and (4) offering programmes for social support.

Currently there is limited research to evaluate the effectiveness of either primary or secondary prevention strategies for low-back pain in children. Plausibly impacting the school environment, including issues such as school chair design and daily load carriage may be an effective strategy. Recent research has suggested that the load carried by school children daily during school-life may impact on low-back pain and is often greater than the legal limits set for adults (Negrini et al., 1999). Health education strategies in school could include advice along the lines of adult back-schools regarding back health and ergonomic advice; preliminary studies have suggested that education about back health may be effective at reducing the incidence of low-back pain in children (Balague et al., 1996; Cardon et al., 2001). Furthermore, the introduction of ergonomic backpacks may be an effective health education strategy (Negrini and Carabolona, 2002). Regarding physical education and recreation, the conditioning of the low-back region and general physical activity of children is considered to be a risk indicator for low-back pain, and so the introduction of specific exercises and increasing opportunity for recreational activities is likely to positively impact on low-back pain. In terms of social support, it has been identified that many pain states, including low-back pain, may be linked to other psychosocial correlates and may be psychosomatic in nature (Vikat et al., 2000).

Limitations

The main limitation of the current study was the cross-sectional nature of the data collected. The variations across chronological age and sex are inferred, and other factors such as environment, heredity and sports participation could intervene. An inherent limitation to all studies of low-back pain is the subjective nature of low-back pain and the need to rely on subject recall. To counteract the effect of this, the reliability and validity of the questionnaire were appraised prior to the study. Moreover, since pain is a subjective phenomenon, personal recall is the only valid way to assess pain (Goodman and McGrath, 1991).

Future directions

Future research should focus on recurrent cases of low-back pain in children to identify risk indicators for recurrent low-back pain, coping strategies employed to deal with recurrent low-back pain, and the efficacy of a range of primary and secondary prevention strategies. When evaluating primary and secondary prevention strategies, both randomized controlled research designs and action research in community settings are needed to evaluate both the short-term efficacy and long-term effectiveness.

Conclusions

It was concluded that low-back pain is a common complaint during childhood, although most cases are acute episodes that represent little health consequence. In contrast, some children experience recurrent low-back pain that can lead to disabling consequences. Future research should focus on these recurrent low-back pain cases, since these cases led to disabling consequences.
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