A pilot survey to investigate the incidence of low back pain in school children

by Kathleen Prendeville and Sara Dockrell

Kathleen Prendeville, BSc (Physiotherapy), MISCP
Sara Dockrell, MA, MEd, DipTP, MISCP
is a lecturer in physiotherapy at Trinity College, Dublin.

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Summary
The aim of this study was to investigate the incidence of low back pain (LBP) among secondary school children. It also aimed to investigate possible contributing factors to adolescent LBP.
Two hundred questionnaires were distributed. One hundred and eighty-eight (94%) completed questionnaires were returned. Forty-one percent of those who replied had experienced LBP. An equal number of boys and girls had experienced LBP. Sixty-nine percent of the LBP group had episodes of LBP in the previous year. Forty-one percent of the LBP group had LBP at the time of study. Eighteen percent had had to take time off school due to their symptoms.
Sitting was found to be the most prevalent aggravating factor.
All subjects reported taking part in some form of exercise or sporting activity.

Introduction
Low back pain is a common complaint among adult populations. Impairments of the back and spine are the most frequent causes of chronic limitation of physical activity among persons under 45 years of age (Ashton-Miller and Schultz, 1988).
Hard work and excessive lifting strains have caused injury through the millennia. In recent years more subtle stresses i.e. static and faulty postures are the usual root of back trouble. Today's lifestyle, more than any other in history, creates an insidious strain on the back, stressing the soft tissues and predisposing them to injury (McKenzie, 1987).

Epidemiology
Research to date has been primarily on adult populations. Studies have focussed on occupations that involve manual handling (Scholey and Hair, 1989; Biering-Sorensen, 1984; Stubbs et al, 1983). Research on back pain in children and adolescents has been minimal (McGrath, 1990) as the disorder in this age group was previously thought to be rare. Studies of LBP in this age group are of particular importance, as back pain that occurs initially during this time may foreshadow the subsequent, severe, chronic morbidity seen in adulthood (Olsen et al 1992; Balague et al, 1988).
Comparison of studies in the area is difficult. Some have used a clinically based diagnosis of LBP and therefore claim a low incidence. Turner et al (1989) found that back pain in children under 15 years of age accounted for less than 2% of all new consultations in a paediatric orthopaedic department. King (1984) also reported low clinical evidence of back pain in children. Other studies have used a self-reported incidence of LBP and found it to be quite high.
Studies by Salminen (1984) and Balague et al (1988) reported quite high incidence of LBP. Salminen (1984) found that 19.7% of the subjects complained of LBP or neck pain at the time of the study. The latter's study of teenagers found that 27% had suffered from LBP at some point in their lives. Olsen et al (1992) report that 30% of their adolescent study population experienced LBP at some point in their lives. The reporting rate was

similar for males (30.7%) and females (30%). Fairbank et al (1984) found that 26% of their study population reported a history of low back-ache.
The high prevalence rates can be misleading as there are no measures of frequency and duration of symptoms (Liston, 1987). Also, minor pain occurring infrequently is not distinguished from severe pain (Twomey and Taylor, 1987). However, despite the inadequacies of studies, LBP has been shown to exist among children and adolescents, and some risk factors have been identified. These include growth spurt (Micheli, 1986), too little activity (Karvonen, 1980), prolonged sitting on poorly designed furniture (Mandal, 1984) and anthropometric factors (Fairbank et al, 1984).
There is no known study on the extent of the problem for Irish schoolchildren, therefore the purpose of this study was to investigate the incidence of low back pain in a population of secondary school children. It also aimed to investigate possible associated factors.

Methodology

Definition of low back pain

For the purpose of this study, LBP was defined as "an episode of low back pain and/or discomfort that interrupted your normal daily activities and/or required you to seek treatment. Low back pain due to any structural deformities of the spine or to menstruation is excluded."

Subjects

Two hundred subjects took part in the survey. The subjects comprised two hundred secondary school students from both rural (n=100) and urban (n=100) regions. An equal number of males and females were included. Subjects were between 13 and 17 years of age.

Procedure

A questionnaire consisting of closed and multi-choice questions was designed. The first part of the questionnaire aimed at eliciting information about physical characteristics of the subjects. The second part investigated the prevalence, severity and aggravating factors of reported LBP. The final part focussed on leisure activities of the subjects.
A pilot study was conducted, and some amendments were made to the questionnaire.
Once permission to carry out the study had been granted by the school principals, and written consent had been given by the pupils' parent/guardian, the questionnaires were issued randomly by teachers in the schools.
Results were analysed statistically using the chi-square test ($p>.005$) and the Pearson's Rank correlation coefficient.

Results

Epidemiology

The overall response rate of completed questionnaires was 94%. The return rate for males was 98% and for females was 90%. The lowest return rate was for the 16-year-old urban females, where only 30% of them completed the questionnaire.
The lifetime prevalence of LBP was 41.5% (see figure 4). An equal number of males and females had experienced LBP. The difference between rural and urban subjects was not significant ($p<0.2$). Despite the lack of statistically significant differences in the number of males and females with LBP in the various age groups, differences in percentages were seen (see figure 1). There was a higher incidence among 13-year-old females (30%) than 13-year-old males (20%). The pattern was reversed for 14-year-old, with 45% of males and 25% of females having had LBP. There was a higher incidence among 15-year-old males (60%) than females (35%). Ninety-two percent of 16-year-old females reported LBP compared to 40% of the males. The high percentage most likely being influenced by the very low return rate of completed questionnaires by the 16-year-old urban females. In the 17-year-olds, a higher incidence was reported among females (50%) than among males (33%).

Sixty-nine percent of the LBP group had an annual prevalence of LBP. The number of episodes is shown in figure 2.

Forty-one percent of the LBP group had LBP at the time of the study. Eighteen percent of the LBP group had had to take time off school as a result of their symptoms.

There was a positive correlation (.739) between age and incidence i.e. an increase in incidence with age for both sexes. The increase continued until 16 years of age in the females and 15 years in the males (see figure 1).

Weight and height

Correlation coefficients of .342 and –0.18 were calculated between the association of weight and height respectively and incidence of LBP. This would indicate that neither weight nor height were influential factors in the incidence of LBP.

Aggravating factors

Sitting for long periods of time was the most common aggravating factor. This was followed by lifting, bending, carrying and standing for long periods of time (see figure 3).

Leisure activities

There was no significant difference between the amount of time the LBP group spent watching television compared to the group without LBP ($p<0.7$). The greatest percentage of subjects with (46%) and without (41%) LBP spent between one and two hours watching TV each day.

All subjects took part in some sporting activity at school, with a local club or under other circumstances e.g. exercising at home. Thirty percent of the study group exercised or took part in sports three times a week. Twenty-six percent exercised twice a week, 28% exercised once a week. Sixteen percent exercised four or more times a week. No significant difference was found between the frequency of participation in sport of the LBP group and those without LBP ($p<0.95$).

Discussion

The main aim of this study was to investigate the incidence of LBP in a group of secondary school children. The overall incidence of LBP in the subjects in this study was 41.5%. Despite the small sample size, the results would indicate that there is an existing back pain problem among Irish school going adolescents. The incidence found in this study was higher than that of others e.g. Balague et al (1988) found an incidence of 27% among Swiss teenagers and Olsen et al (1992) reported an incidence of 30%. Fairbank et al (1984) reported an even lower incidence of 17.6%.

Comparison of the studies is difficult due to differences in methodology, population sample and size. The variety of incidence may also be due to the definitions of LBP used. It is difficult to standardise the definition of LBP due to the many factors involved and the variability in the perception and effects of pain. In this study a broad definition of LBP was used, therefore subjects with minor symptoms may have contributed to the increased incidence.

Similar to Olsen et al (1992) this study found no difference in incidence between the sexes. Previous studies have found higher incidence of LBP among females compared to males (Salminen, 1984; Fairbank et al, 1984; Nissinen et al, 1994).

A higher percentage of the rural pupils reported LBP than the urban pupils. Previous studies have not investigated the influence of different backgrounds on the incidence of LBP. Salminen (1984) did suggest that the economic structure of a region may influence results. Children from an agricultural setting might participate in the work of their parents, and this may affect the condition of their muscles and joints, leaving them more susceptible to injury.

Sitting was the most prevalent aggravating factor in this study, with 38% of the LBP group experiencing symptoms in this position. The finding is consistent with that of Salminen (1984), Balague et al (1988) and Nissinen et al (1994). Symptoms associated with stress to the structures of the lower back during sitting depend on the

actual sitting position and also on the design features of the desk and chair. Mandal (1984) concluded that incorrect sitting posture of school children was a sizeable contributor to adolescent LBP. Many schools still contain furniture that was designed and made to be durable rather than ergonomically sound. More attention needs to be given to ergonomic improvements in chair and desk design and to the sitting posture of children in the classroom.

All of the subjects exercised or took part in some sporting activity. Therefore participation or non-participation in sport could not be considered to predispose to LBP in adolescents. There was no significant difference in the amount of time spent participating in sport by the LBP and non-LBP groups. Also, the types of sport that the two groups engaged in were similar.

Conclusion

The results from this pilot study demonstrate that LBP does occur in adolescence and that it has an effect on the lives of those who suffer from it. This gives cause for concern because preventative strategies for the development of back pain are currently only introduced to persons in employment. It has not yet been established that preventative strategies can decrease the incidence of LBP. Perhaps this is because back pain prevention programmes are targeted at adults when it already may be too late. One of the main risk indicators for LBP is a previous history of LBP.

If, as has been shown in this study, back pain occurs in adolescence, perhaps there is a need to tackle the problem earlier. This may be achieved through the introduction of back care advice into the primary and secondary school curricula in the hope that the initial episode of LBP may be prevented or at least delayed.

Further research is necessary to identify the extent of the problem, and to further the knowledge of risk factors involved, so that appropriate measures can be put in place.

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Figure 1: Incidence of LBP

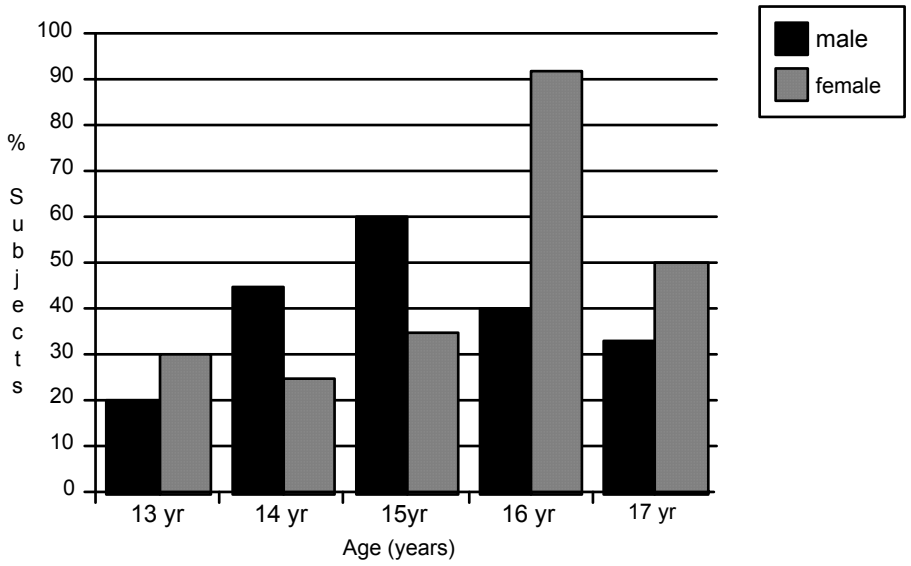

Figure 2. No. of episodes of LBP in previous year

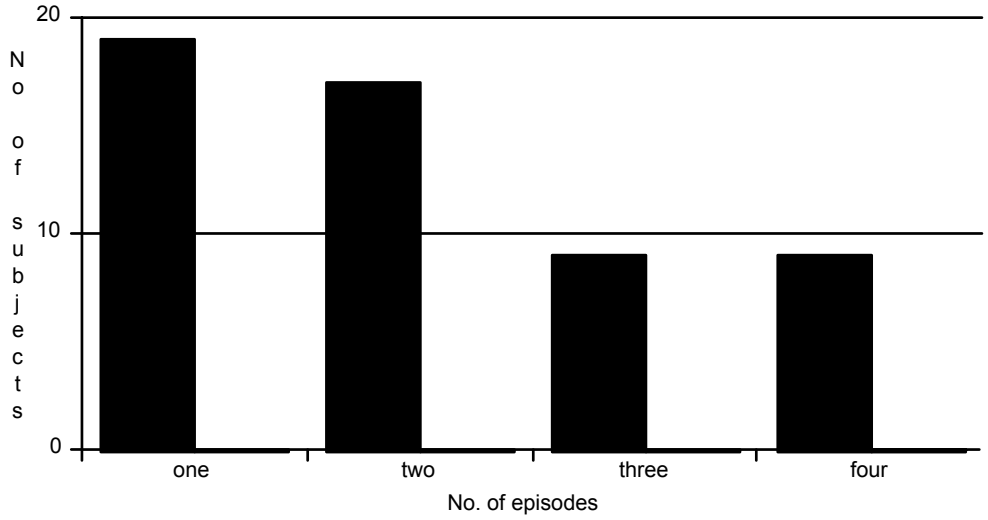

Figure 3. Aggravating factors

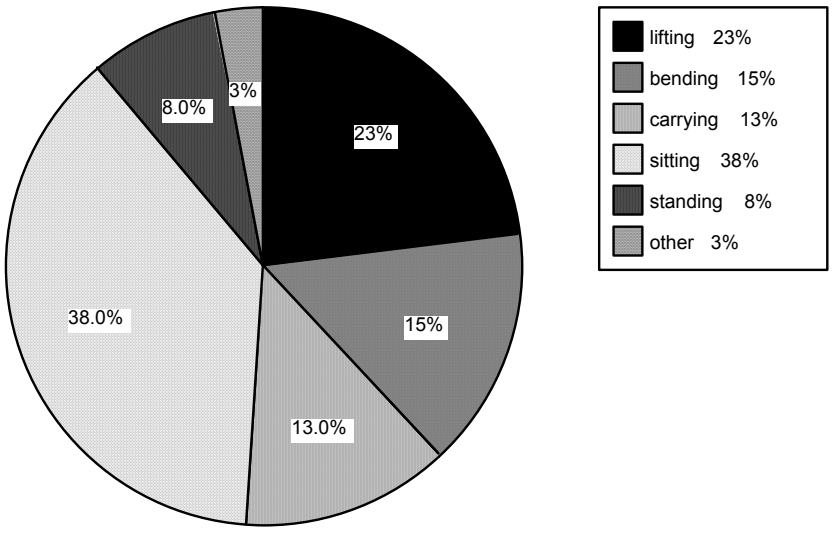

Figure 4. LBP Incidence