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Back, neck, and shoulder pain in Finnish adolescents: national cross sectional surveys

Paula Hakala, Arja Rimpelä, Jouko J Salminen, Suvi M Virtanen, Matti Rimpelä

Abstract

Objectives To study changes in pain of the back and neck in adolescents between 1985 and 2001 and pain of the neck, shoulder, and lower back between 1991 and 2001.

Design Biennial nationwide postal surveys, 1985-2001, and annual classroom surveys, 1996-2001.

Setting Finland.

Participants 62 677 12, 14, 16, and 18 year olds and 127 217 14-16 year olds.

Main outcome measures Pain in the back and neck, neck and shoulder, or lower back, at least weekly.

Results Prevalence of pain in the back and neck was greater in the 1990s than in the 1980s and increased steadily from 1993 to 1997. Pain of the neck and shoulder and pain of the lower back was much more common in 1999 than in 1991 and in 2001 than in 1999. Pain was more common among girls and older groups: pain of the neck and shoulder affected 24% of girls and 12% of boys in 14 year olds, 38% of girls and 16% of boys in 16 year olds, and 45% of girls and 19% of boys in 18 year olds; pain in the lower back affected 8% of girls and 7% of boys in 14 year olds, 14% of girls and 11% of boys in 16 year olds, and 17% of boys and 13% of girls in 18 year olds.

Conclusion Pain in the neck, shoulder, and lower back is becoming more common in Finnish adolescents. This pain suggests a new disease burden of degenerative musculoskeletal disorders in future adults.

Introduction

Among adults, back pain can be disabling and lead to economic loss.¹ Most people experience pain of the back, neck, and shoulder at some time, although few have pain over long periods. In Finland, 80% of people aged 30 years and older have experienced some back pain; half these people have had pain more than five times.²

Pain in the neck and shoulder and in the back in adolescence has not been considered as a widespread problem, and only a few studies have been published.

We studied changes in back and neck-shoulder pain in Finnish adolescents from 1985 to 2001. In these 16 years, the everyday life of adolescents changed substantially, particularly because of their use of new technology.³ We used two Finnish population surveys: the adolescent health and lifestyle survey, which covers the entire period, and the school health promotion survey, which covers 1996-2001.

Participants and methods

Adolescent health and lifestyle survey

The nationwide adolescent health and lifestyle survey started in 1977.⁴ Questionnaires for self completion were sent to nationally representative samples of 12, 14, 16, and 18 year olds biennially. We used data from 1985 to 2001 (see bmj.com).

In 1985-9 and 1993-7, one question on back-neck pain was used: "Have you had back or neck pain during the past half a year?" In the analysis, we compared "pain at least weekly" category with "seldom or not at all" and "about once a month" in the contrasting category.

In 1991, 1999, and 2001, neck-shoulder and lower back pain was elicited by separate questions: "Have you had neck or shoulder pain during the past half a year?" and, "Have you had low back pain during the past half a year?" The alternatives provided were the same as for back-neck pain. Depending on age and sex, 2-4% of the data were missing.

School health promotion survey

The school health promotion survey is a classroom survey focusing on adolescent health, health behaviour, and behaviour in school and has been carried out annually in Finland, since 1996. Only schools that participated in all three years were included. The 12% who did not respond were absent from school on the day of the study. Depending on age and sex, 2-6% of the data were missing. The questions were phrased as in the adolescent health and lifestyle surveys in 1991, 1999, and 2001.



This is an abridged version; the full version is on bmj.com

Tampere School of Public Health, University of Tampere, FIN-33014 Tampere, Finland

Paula Hakala
research fellow
Arja Rimpelä
professor of community health
Suvi M Virtanen
senior researcher of Finnish Academy

Department of Physical and Rehabilitation Medicine, University Hospital of Turku, Box 52, FIN-20520 Turku, Finland
Jouko J Salminen
chief physician

National Research and Development Centre for Welfare and Health, Box 220, FIN-00531 Helsinki, Finland
Matti Rimpelä
professor

Correspondence to: P Hakala
paula.hakala@hel.fi

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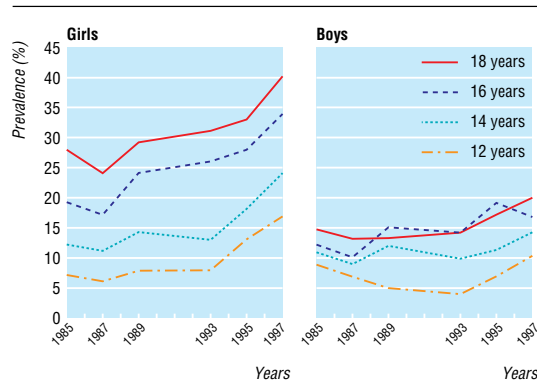


Fig 1 Prevalence of pain of back and neck occurring at least weekly, 1985-97

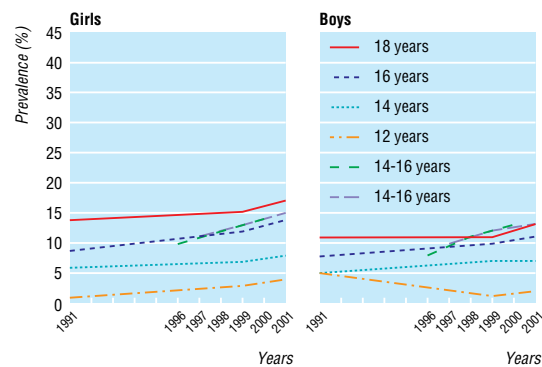


Fig 3 Prevalence of at least weekly lower back pain in 1991-2001 (adolescent health and lifestyle survey; 12, 14, 16, and 18 year olds groups) and in 1996-2000 and 1997-2001 (school health promotion survey; 14-16 year olds group)

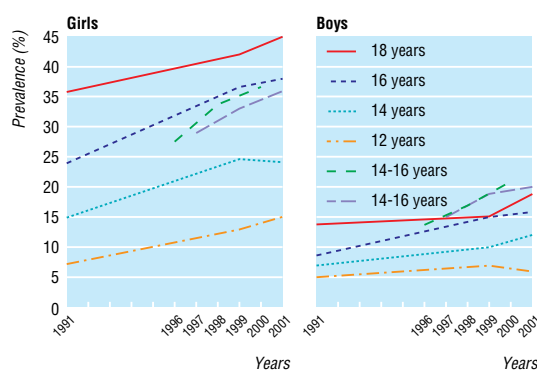


Fig 2 Prevalence of at least weekly neck-shoulder pain in 1991-2001 (adolescent health and lifestyle survey; 12, 14, 16, and 18 year olds groups) and in 1996-2000 and 1997-2001 (school health promotion survey; 14-16 year olds group)

Results

Adolescent health and lifestyle survey, 1985-2001

Back and neck pain was measured in 1985-9 and 1993-7. Prevalence increased with age and was more common in girls (fig 1).

Mean prevalence of weekly pain in the back and neck was greater in 1993-7 than in 1985-9, and there was a steady increase from 1993 to 1997 (fig 1). Odds ratios for 14-18 year olds, adjusted for age, in 1989 compared to 1985 were not significantly different (table 1). After 1993 in girls and after 1995 in boys, however, differences were significant and increasing. In 12 year old girls (fig 1), an increasing trend was observed and the differences between the years were significant ($P < 0.001$), but among boys the curve was U shaped ($P = 0.006$). There was a similar increase in the number with pain every day.

Adolescent health and lifestyle survey

Both, neck-shoulder and lower back pain were more common among girls and in older groups (fig 2 and bmj.com).

Among 12-18 year olds, prevalence of neck-shoulder and lower back pain was higher in 1999-2001 than in 1991, with an increasing trend between these years, for most groups (figure 2). Odds ratios, adjusted for age, were significantly higher in 1999-2001 than in 1991 among both sexes (table 2).

Prevalence of weekly neck-shoulder and lower back pain was much lower in 12 year olds than in older age groups (figs 2 and 3). The differences in prevalence of neck-shoulder pain between the years were significant ($P = 0.001$) for girls, but not for boys ($P = 0.57$). For weekly lower back pain, significant differences were observed for girls ($P = 0.006$) but not for boys ($P = 0.074$). Having daily neck-shoulder or lower back pain showed a similar increase.

The school health promotion survey

Increase in pain of the neck, shoulder, and lower back was significant during 1996-2000 and 1997-2001 (figs 2 and 3 and table 2). Prevalence in 14-16 year olds was higher than in the corresponding age groups in the adolescent health and lifestyle survey (figures 2 and 3).

Discussion

Pain of the neck, shoulder, and lower back of adolescents increased in the 1990s, and this trend is continuing. In Finland, no increase in back pain among adults has been observed since 1985,⁵ but, in the United Kingdom, a recent survey has suggested an increase.⁶

Our results show that neck-shoulder pain is a common and increasing problem in adolescents, especially girls, suggesting more problems in the young adults of the future.

The two large scale population surveys, representing the whole of Finland, give weight to the results. The studies were carried out independently and data were collected by different methods: postal or classroom surveys. Still, prevalences and trends were similar. The

Table 1 Odds ratio of pain in back and neck in 14-18 year olds, adjusted for age (adolescent health and lifestyle survey)

	1985	1987	1989	1993	1995	1997
Girls	1	0.84 (0.72 to 0.98)	1.14 (0.94 to 1.38)	1.22 (1.05 to 1.42)*	1.49 (1.29 to 1.74)*	1.95 (1.68 to 2.26)*
Boys	1	0.87 (0.71 to 1.06)	1.11 (0.87 to 1.42)	1.01 (0.83 to 1.23)	1.35 (1.11 to 1.64)*	1.50 (1.24 to 1.82)*

* $P < 0.05$.

Table 2 Odds ratios for pain at least weekly in 14-18 year old Finns

	Adolescent health and lifestyle survey			School health promotion survey*			School health promotion survey*		
	1991	1999	2001	1996	1998	2000	1997	1999	2001
Neck-shoulder pain:									
Girls	1	1.63 (1.48 to 1.80) [†]	1.72 (1.56 to 1.91) [†]	1	1.31 (1.25 to 1.38) [†]	1.50 (1.43 to 1.58) [†]	1	1.23 (1.17 to 1.29) [†]	1.36 (1.29 to 1.43) [†]
Boys	1	1.42 (1.22 to 1.66) [†]	1.70 (1.46 to 1.99) [†]	1	1.23 (1.15 to 1.31) [†]	1.63 (1.53 to 1.74) [†]	1	1.29 (1.21 to 1.37) [†]	1.42 (1.33 to 1.51) [†]
Lower back pain:									
Girls	1	1.26 (1.09 to 1.46) [†]	1.50 (1.30 to 1.75) [†]	1	1.14 (1.06 to 1.24) [†]	1.47 (1.37 to 1.59) [†]	1	1.19 (1.11 to 1.29) [†]	1.44 (1.34 to 1.55) [†]
Boys	1	1.08 (0.91 to 1.28)	1.23 (1.03 to 1.47) [†]	1	1.24 (1.14 to 1.34) [†]	1.50 (1.38 to 1.62) [†]	1	1.27 (1.18 to 1.36) [†]	1.36 (1.26 to 1.47) [†]

* Carried out in Helsinki, southwestern Finland, eastern Finland, central Finland, and Lapland in 1996, 1998, and 2000 and western Finland in 1997, 1999, and 2001.

† P<0.05.

What is already known on this topic

Back pain, particularly of the lower back, is common in children and adolescents, and the lifetime prevalence of back pain is in the range 30-51%

Neck-shoulder pain has been little studied in children and adolescents

Degeneration of lower lumbar discs has been observed at the age of 15 and is a significant risk factor for chronic lower back pain in early adulthood

What this study adds

In two independent data sets—one for the lower back and another for neck-shoulder—the prevalence of pain increased in adolescents through the 1990s, particularly in the latter half of the decade

Neck-shoulder pain is common in 12-18 year olds

overall response rate in the adolescent health and lifestyle survey decreased gradually, to being the lowest in 2001. Selection bias did not become evident, however, with diminishing response rates, and test-retest reliability was good.

In the 1990s, information technology began to have a tremendous impact on the everyday life of 12-18 year olds. At the end of the 1980s, computer use at schools or at home was still negligible,³ but in 2001, according to the adolescent health and lifestyle survey, 86% of 12-18 year olds use the internet, 27% daily, and 93% used computer and console games, 54% daily. Musculoskeletal symptoms may be related to risk factors such as repetitive movements, static postures, and static muscular activation patterns in work with computer mice.⁷

Unemployment and cuts in healthcare and school budgets during and after the economic recession of the early 1990s are still being felt today. Biological maturity is reached at a younger age,⁸ and other health indicators, in addition to pain of the neck, shoulder, and lower back, have shown adverse development—for example, increasing obesity.⁹⁻¹⁰ The reports of health behaviour in schoolchildren from several European countries support our findings,¹¹⁻¹² suggesting that the factors behind the increase might apply throughout the Western world.

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Contributors: see bmj.com

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Endpiece Observation

How odd it is that anyone should not see that all observation must be for or against some view if it is to be any service!

Charles Darwin, 18 September 1861.

Burkhardt F, Porter DM, Harvey J, Richmond M, eds. *The correspondence of Charles Darwin*. Cambridge: Cambridge University Press, 1994

Submitted by Jeremy Hugh Baron, honorary professorial lecturer, Mount Sinai School of Medicine, New York