

Do pain problems in young school children persist into early adulthood? A 13-year follow-up

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Abstract

Design. In a longitudinal study, 335 children ages 8, 11 and 14, first studied in 1989 were followed-up on two occasions in 1991 and 2002. The subjects filled in questionnaires on pain, the first two times in school, the last as a postal survey.

Purposes. To determine if headache and back pain during the school years were transitory or if they grew into pain problems in adulthood; to determine predictors of pain.

Results. In the 2002 study, 59% of the women and 39% of the men reported pain at 21, 24 and 27 years. A total of 68 (52 women, 16 men) or 20% of the subjects reported pain symptoms in all three studies. The cumulative incidence rate for the presence of pain in the cohort studied was 31% for 1989–2002 and 43% for 1991–2002. Four of the 10 individuals with pain also reported signs of stress. Three predictors were found: reported back pain in 8–14-year-olds ($p < 0.0001$); reported headaches once a week or more in the same age group ($p < 0.0001$); and a positive response in the ages 10–16 to the question: “Do you often feel nervous?” (OR = 2.1, 95% CI 1.3–3.4). When adjusted for age, sex and all psychosocial risk determinants studied in multiple logistic regression, a positive answer to this question was a significant predictor of pain in young adulthood. A positive response by the 10–16-year-olds to “Do you find it difficult to describe your feelings?” was a predictor of pathological anxiety in early adulthood, but stress perceived in childhood/adolescence did not predict future pain or stress.

Conclusions. Since pain reports in childhood and early adolescence seem to be associated with the report of pain in early adulthood, more attention should be given to the way ill-health is managed in adolescence in this vulnerable group.

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1. Introduction

In 2002, healthcare insurance costs in Sweden increased at a rate of 25 million Swedish crowns (about 2.5 million Euros) a day (Rydh, 2002). Different types of pain and burnout were the dominating causes and the largest relative increase was among young people (Åsberg et al., 2002; National Social Insurance Board, 2003).

A questionnaire survey of 1245 pupils in the county of Gävleborg, Sweden was undertaken in 1989 to determine the prevalence of headache and back pain

(Brattberg and Wickman, 1992). Two years later in 1991, 471 of the same pupils were studied in a new investigation (Brattberg, 1993). In connection with this second survey, the correlation between reported headache and back pain and a series of background factors was also investigated (Brattberg, 1994). The occurrence of headache and back pain was defined as positive answers to the questions: “Do you usually have headaches?” “Do you usually have back pain?” Fifteen percent of the girls reported back pain and 40% reported headaches in both 1989 and 1991. There were no correlations with their menstrual cycles. For boys, the corresponding values for 1989 and 1991 were 4% and 20%, respectively. Five percent (24 pupils) of the 471 pupils studied reported both headache and back pain on both occasions.

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The response pattern from the 1991 study indicated that the young persons' ineffective handling of stress, their poor self-esteem, and insufficient adult contact were factors that might be associated with the high occurrence of back pain and headaches. Balague et al. (1994, 1995) have studied correlations between *low back pain* and psychological, familial and social factors. Psychological factors, parental history of treated low back pain as reported by the offspring, competitive sports activity and time spent watching television were shown to play a role in children's reporting of non-specific low back pain. In a review study, an increase in age, history of spinal trauma, family history of back pain, smoking, female gender, competitive sports, high level of physical activity, depression and emotional or stress factors were all found to be significantly correlated with low back pain (Balague et al., 1999). Correlations between psychosomatic symptoms and *pain in the neck, shoulder and lower back* were demonstrated among 12–18-year-olds (Vikat et al., 2000). Mikkelsen et al. (1997, 1998, 1999) reported correlations between psychological stress, depressive symptoms and sleep problems and the persistence of non-specific *musculoskeletal pain* in different locations in preadolescents. Another indication of the presence of psychological factors in young persons' pain was the strong evidence that psychological treatments, principally relaxation and cognitive behavioural therapy, were highly effective in reducing the severity and frequency of *headaches* in children and adolescents (Eccleston et al., 2002).

There is evidence indicating that back pain and/or headaches can affect identity development in young people (Kelly and Field, 1996). Pain may function as an excuse for young people to escape the pressures and stress of daily life. Although there is evidence that a significant amount of back pain is already recurrent or chronic in 14-year-old adolescents (Taimela et al., 1997), few studies have been carried out in which the occurrence of pain in children and adolescents has been followed-up into adulthood.

1.1. Longitudinal studies

Hotopf et al. (1998) studied children suffering from *stomach pain* later in life. The results indicated that these children did not have an increased risk for physical symptoms in adulthood. On the other hand, there was a strong correlation between stomach pain in childhood and psychiatric diseases in adulthood. Magni et al. (1987) followed individuals with stomach pain from the time they were 16 until they reached 26 years of age. The results of the study indicated that the symptoms disappeared in 50% of the cases while in 25%, the symptoms still remained about 10 years later. In addition, 25% of the persons developed other pain conditions. Pine et al.

(1996) reported a correlation between depression in the teen years and headaches in adulthood.

A review of the literature showed that both the prevalence and incidence of *back pain* increased with age (Balague et al., 1999). According to this review, the prevalence of back pain appeared to be higher among girls than boys. Burton et al. (1996) followed 216 11-year-olds with back pain over a 4-year period. The authors found that the symptoms increased with age and that they were recurrent, but that it was not likely that the symptoms were connected to disabling symptoms in adulthood. In Finland, a longitudinal study between 1985 and 2001 showed that the prevalence of *back, neck and shoulder pain* among adolescents had become much more common during this period (Hakala et al., 2002). In a 2-year prospective study of school children 9–12 years of age, walking to school predicted less low back pain (Szpalski et al., 2002). The authors concluded that psychological factors appear to play a role in the experience of low back pain in adolescents as well as in adults. Harreby et al. (1996, 1997) have, in a cohort study performed in Denmark ($n = 640$), demonstrated a positive correlation between a history of low back pain during adolescence and the presence of lumbar pain as adults.

1.2. Aims of the study

The main aim of the present study was to follow up the 471 individuals who were studied in 1989 and 2 years later in 1991 regarding the occurrence of headache and back pain and to determine if these pain problems were of a transitory nature or had become chronic. As widespread musculoskeletal pain is a large problem today, the present survey included all types of pain. A second aim was to determine predictors of long-term pain in young adults.

2. Method

The study was approved by the Research Ethics Review Committees at all the medical faculties in Sweden.

2.1. Study group

The pupils selected for the 1991 study comprised all the pupils (597) aged 10, 13 and 16 years in the city of Gävle, Sweden. Of these, 471 (241 boys and 230 girls) actually participated in the 1991 study by completing the questionnaire. The addresses of 21 of the 471 pupils included in the 1991 study population were unavailable in 2002. They had emigrated or were missing according to the national registration files. Consequently, the questionnaire was sent to a sample of 450 pupils in 2002 (Fig. 1).

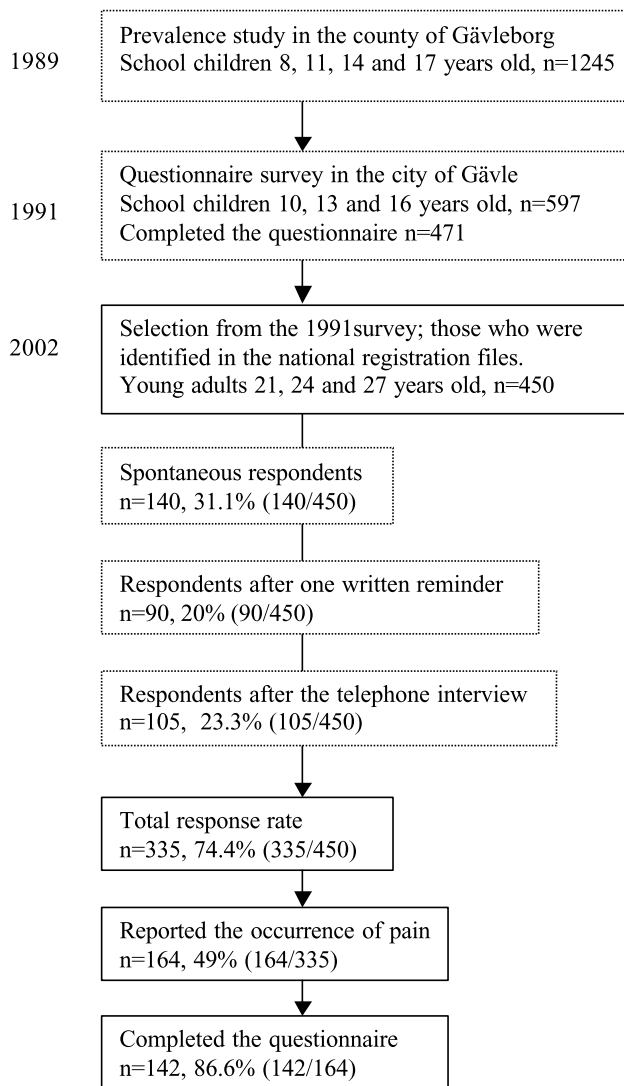


Fig. 1. The selection process and the response rate.

2.2. Procedure

A comprehensive questionnaire was mailed to each participant along with a self-addressed, stamped envelope. The questionnaire consisted of items focusing on the occurrence of the individual's aches and pain, including localization, intensity, characteristics, frequency and duration. Those participants who reported some kind of pain were asked to describe how it affected them, where they believed the pain originated, its cause, and their description of the symptoms. The pain description used in the questionnaire followed the IASP (International Association for the Study of Pain) classification of chronic pain (Merskey and Bogduk, 1994). The participants also reported on treatment, medication, sleep and stress. The comprehensive questionnaire included the Hospital Anxiety and Depression Scale (HAD) (Zigmond and Snaith, 1983), as well as the validated SF-36 Health Survey (Sullivan et al., 1995) in which the

participants registered different aspects of quality of life. Background information, including education, occupation when applicable, and how the participants supported themselves, was also collected. The questionnaire, excluding the HAD and the SF-36, can be found in Appendix A.

A written reminder including the questionnaire and another self-addressed, stamped envelope was sent one month after the first questionnaire to persons who had not responded. Those who still did not return the questionnaire were contacted by telephone. If there was no response by the 10th call, they were considered to be inaccessible.

2.3. Statistical methods

The statistical tests used were *t*-tests for comparison of means, McNemar's test when linked categorical data over time were compared (Altman et al., 2000), and multiple logistic regression analyses with 95% confidence intervals, giving the Odds Ratio. In the multivariate analysis of predictors of pain, all but one of the statistically significant psychosocial variables from the univariate analysis have been included ("Often/sometimes feel nervous", "Unsatisfied with my appearance", "Doing well in school"). The response rate to "Self-perception of not feeling completely healthy" was too low, and consequently this item was excluded. In the multivariate analysis of predictors of anxiety all statistically significant psychosocial variables from the univariate analysis have been included ("I often feel lonely", "When I am upset, I don't know if I'm sad, afraid, or angry", "I often do not understand why I am angry", "I find it difficult to describe my feelings"). The multivariate analysis was controlled for age and sex. The statistical program SPSS was used for all analysis.

3. Results

Of the 450 comprehensive questionnaires that were first sent, 140 were returned within one month. Ninety were returned after one written reminder. Ten of the questionnaires were returned without answers. In six of these cases the respondents were out of the country at the time; in three cases no reason was given and in one case the person expressed an unwillingness to participate in the study. Of the 210 persons who did not return the questionnaire, telephone numbers were available for 114. Of those who were phoned, 3 were living abroad and another 6 were inaccessible. Of the remaining 105 persons who answered the questionnaire by phone, 32 reported that they had recurrent aches or pain. A few of these respondents ended up sending in the questionnaire while the majority responded to a few more questions by phone. Consequently, the response rate was 74% (Fig. 1).

The cohort in the longitudinal study consisted of the 335 persons, 168 men and 167 women (96, 21-year-olds; 123, 24-year-olds and 116, 27-year-olds), who answered if they had recurrent aches or pain in some part of their body of late. Of these 335 persons, 164 (49%) reported the occurrence of these symptoms. One hundred and forty two persons responded to all the questionnaire items. The description that follows of the characteristics of the pain, treatment, occurrence of stress, health and quality of life is based on those persons who answered that they had some kind of pain and who completed the comprehensive questionnaire ($n = 142$).

3.1. Analysis of the response rate

The percentage of individuals who reported pain did not differ between the questionnaires that were returned spontaneously and those that came in after the written reminder (55%). On the other hand, a lower percentage (35%) of those who were queried by phone reported the occurrence of pain. Several reasons were given as to why they failed to answer the mailed version of the questionnaire including: lack of interest in completing the questionnaire, lack of awareness that they had been sent a questionnaire, they had forgotten or had not got around to answering the questionnaire, the questionnaire was not relevant to them because they did not have any pain. The respondents and non-respondents did not differ in the occurrence of back pain and headaches in 1989 or 1991.

3.2. Pain, health, and quality of life in young adults (cross-sectional data from the 2002 study)

3.2.1. Characteristics of the pain

The occurrence of pain did not vary between the age groups. However, significantly more women (59%) than men (39%) reported pain ($p < 0.0001$). Four of 10 respondents reported pain in several parts of their body. After pain in multiple locations, pain in the lumbar or sacral region was the most commonly reported pain. Pain in the shoulders, neck or arms was the third most commonly reported pain problem. Seven percentage of the respondents reported having headaches. The maximum value of pain intensity was 96 and the mean value 37 on a visual analogue scale ($SD = 23$, median = 32). Nine of 10 persons reported that the intensity of their symptoms was comparable to “muscle soreness after physical exercise” or worse. Half of the respondents were affected by pain “to a high degree”. Seventy-four percent had pain that affected their ability to concentrate, required pain-relieving medication, or required them to go on sick leave or interrupt their education. The reported pain was, for the most part, irregular in occurrence or continuous with fluctuating severity. Two-thirds (64%) of the respondents reported having pain for

a longer period than 2 years and one-third for over 5 years. Half of the respondents reported that the origin of their pain was the musculoskeletal system; 11% reported that their pain included more than one organ system. Twenty-one percent of the respondents reported that their pain was caused by an accident, injury or surgery. Almost half of the respondents reported that their pain resulted from degeneration or was of unknown origin. In earlier research, the notion *obvious pain* has been used and defined as pain comparable with “muscle soreness after physical exercise” or worse that significantly affects the daily life of the individual (Brattberg et al., 1989). *Obvious pain* was reported by 66 persons (42 women and 24 men), which means 44% of those who reported the occurrence of pain and 20% of the total study sample, including both persons who did and who did not report the occurrence of pain.

3.2.2. Pain treatment

Thirty percent were treated with physical therapy, relaxation training and/or acupuncture. Thirty-eight percent had visited a chiropractor, naprapath, or masseur. Seven percent were ingesting pain-relieving medication daily, 7% were taking antidepressants every day and 3% used sedatives regularly. Forty-six percent reported “not refreshed when I wake up” several times per week and 20% reported “disturbed sleep”. However, only 2% regularly used hypnotics.

3.2.3. Occurrence of stress

Nine percent had experienced stressful events before they were 15 years of age, 21% after 15 years of age, and 45% during the past year. Six percent had experienced stressful events both before and after 15 years of age. Thirty-eight percent reported stress related to time, 23% reported work-related stress, and 16% reported stress related to social relationships to the extent that they experienced it as a problem. Twenty-three percent reported poor self-esteem. On the HAD scale, 43% reported a significant degree of restlessness, 34% had signs of pathological anxiety, and 13% showed signs of depression.

3.2.4. Health

The results from the SF-36 Health Survey are summarized in Table 1, where the values are also compared with the means of the corresponding age groups in the Swedish population. Comparisons with those who did not report pain were impossible, as they did not complete the entire questionnaire. The results indicated that the general, social, emotional and mental health of the respondents was more affected than their physical health.

3.2.5. Quality of life

In general, quality of life was dissatisfactory in 16% of the respondents who reported pain symptoms. One fourth of these persons were dissatisfied with their

Table 1
Self-perception of health in individuals with pain symptoms as described in the SF-36 Health Survey compared to normal values for the age groups

Variable SF-36	21- and 24-year-olds (n = 91)		Normal value for the group 15–24-year-olds (n = 1451)			27-year-olds (n = 49)		Normal value for the group 25–34-year-olds (n = 1688)		
	Mean	SD	Mean	SD	p-Value	Mean	SD	Mean	SD	p-Value
<i>Function</i>										
Physical function	91.6	12.6	94.9	12.5	0.03	93.2	11.8	94.0	13.0	0.59
Role physical	68.1	36.3	90.7	22.1	0.0001	76.7	34.0	89.3	25.2	0.001
Role emotional	70.0	37.9	88.2	25.9	0.0001	76.4	35.6	88.4	26.7	0.002
Social function	79.3	24.0	91.7	15.4	0.0001	82.1	22.6	89.6	19.1	0.004
Pain	56.3	18.1	81.2	21.7	0.0001	64.1	23.2	78.9	24.1	0.0001
<i>Well being</i>										
Mental health	66.4	20.2	81.8	16.2	0.0001	73.5	18.6	80.9	18.5	0.01
Vitality	49.0	19.9	70.8	19.4	0.0001	56.0	23.4	68.8	21.0	0.0001
General health	66.8	21.0	82.0	18.1	0.0001	74.8	17.5	80.2	20.0	0.08

t-test was used for comparison of means.

finances, one-tenth with their leisure time, and two-tenths with their sex life and marriage/cohabitation.

3.2.6. Education and occupation

Six percent had only completed elementary school, 76% had completed high school studies and 18% university studies. Twenty-two percent were still studying at the time of the survey, 49% worked full-time, 9% part-time and 5% were sick-listed. The rest were in military service or unemployed. Of those who worked, 61% were blue-collar workers, 38% white-collar workers and 1% were employers.

3.3. Changes over time in occurrence of pain (Longitudinal data from 1989/1991 to 2002)

The cumulative incidence rate of pain in the cohort group for the period 1989–2002 was 31%. The corresponding figure for 1991–2002 was 43%, 36% for men and 52% for women. The occurrence of headache or back pain in the 1991 study was quite large (59%), which accounts for why the denominator was low in the calculation of the cumulative incidence rate.

Fifty-six persons (17%) reported no symptoms of pain in 1989, 1991 or in 2002, while 68 (20%) reported

pain in all three studies. The number of cases with long-term pain symptoms – in 1989, 1991 and 2002 – was more than three times as large in women (31%) as in men (10%). Similarly, the number of persons who reported the absence of pain in 1989, 1991 and in 2002 was larger in men (30%) as compared with women (18%). Reported pain in 2002 in relation to reported headache or back pain in 1989 and 1991 is shown in Table 2. There were significant correlations between reported back pain both in 1989 and 1991 and reported pain in 2002, but no comparable correlations between positive answers to the questions, “Do you usually have headaches?” (1989/1991) and “Have you had recurring aches or pain in any part of your body of late?” (2002). However, there were significant correlations between more severe headaches in 1991 and pain in 2002. Those who reported headaches that affected their ability to concentrate, suffered from headaches at least once a week or reported headaches even on non-school days, were over represented among the individuals with reported pain in 2002 ($p < 0.0001$).

One hundred and fifty four individuals answered the pain location question (see Appendix A) in the 2002 questionnaire. Table 3 shows the prevalence of headache and back pain in a long-term perspective. There is a high

Table 2
Reported pain in 2002 in relation to reported headache and back pain in 1989 and 1991 (percentage in brackets), $n = 335$

		Pain 2002		p-Value
		Yes	No	
Headache 1989	Yes	80 (23.9)	63 (18.8)	0.10
	No	84 (25.1)	108 (32.2)	
Headache 1991	Yes	93 (27.8)	82 (24.4)	0.42
	No	71 (21.2)	89 (26.6)	
Back pain 1989	Yes	37 (11.0)	23 (6.9)	<0.0001
	No	127 (37.9)	148 (44.2)	
Back pain 1991	Yes	51 (15.2)	38 (11.4)	<0.0001
	No	113 (33.7)	133 (39.7)	

Analysis with McNemar's test.

Table 3

Reported headache and back pain 2002 in relation to reported headache and back pain in 1989 and 1991 (percentage in brackets), $n = 154$

		Headache 2002			Back pain 2002		
		Yes	No	<i>p</i> -Value	Yes	No	<i>p</i> -Value
Headache 1989	Yes	8 (5.2)	69 (44.8)	<0.0001			
	No	2 (1.3)	75 (48.7)				
Headache 1991	Yes	8 (5.2)	84 (54.5)	<0.0001			
	No	2 (1.3)	60 (39.0)				
Back pain 1989	Yes				8 (5.2)	27 (17.5)	0.37
	No				35 (22.7)	84 (54.5)	
Back pain 1991	Yes				9 (5.8)	39 (25.3)	0.64
	No				34 (22.1)	72 (46.8)	

Analysis with McNemar's test.

correlation between reported headaches in 1989/1991 and 2002 but no such correlation for back pain.

3.4. Psychosocial predictors in 1991 for pain and nervousness in 2002

In the 1991 study, the pupils answered questions about their health and their opinion of themselves to determine possible psychosocial predictors of illness later in life. The occurrence of pain in 2002 was analysed relative to these background factors. Although self-perceptions of not feeling completely healthy and being dissatisfied with appearance in childhood adolescence were associated with pain in young adults, they did not show independent explanatory power in the multiple logistic regression analysis. The same was observed for pupils who described themselves as being clever. However, a question that alone seems to have predictive value is: "How often do you feel nervous?" (Table 4). Those who answered "often/sometimes" more often reported pain in adulthood. There was no correlation between frequency or intensity of physical training in the school years and the occurrence of pain in adulthood.

3.4.1. Stress symptoms as precursors to anxiety states or burnout

Forty-three percent of the young adults who reported experiencing pain also scored high on one of the questions in the HAD Scale: "I feel restless as I have to be on the move." Every third person showed signs of heightened anxiety levels compared with the normal HAD values. There were correlations between reported headaches in 1989 and increased anxiety levels in 2002 ($p < 0.02$) as well as between headaches in 1991 and anxiety in 2002 ($p < 0.0001$). Based on these findings, the correlations between heightened anxiety level and the background factors in the 1991 study were also analysed. A positive answer to the question, "Do you find it difficult to describe your feelings?" had predictive value for pathological anxiety with explanatory power in the multiple logistic regression analysis (Table 5). Positive responses to other statements indicating alexithymia ("When I am upset, I don't know if I'm sad, afraid or angry." "I often do not understand why I am angry.") and to the statement, "I often feel lonely" were also associated with heightened anxiety levels but were not found to be significant predictors when adjusted for age, sex and all the other risk determinants studied.

Table 4

Associations between reported pain in 2002 and background variables in 1991

Background variables in 1991	<i>N</i>	Reported pain in 2002			
		Univariate associations		Multivariate associations	
		OR	95% CI	OR	95% CI
Duration of back pain episodes over 3 hours	50	3.1	1.1–8.2		
Back pain that makes it difficult for me to concentrate. I must take pain medication or sometimes miss school entirely.	50	2.9	1.2–7.1		
Headaches one or more times a week	93	2.3	1.1–4.5		
Headaches on non-school days	90	3.1	1.3–7.3		
Self-perception of not feeling completely healthy	63	1.7	1.1–2.8		
Often/sometimes feel nervous	162	2.3	1.4–3.7	2.1	1.3–3.4
Unsatisfied with my appearance	161	1.6	1.1–2.5	0.7	0.5–1.2
Doing well in school	162	1.8	1.1–2.9	1.6	1.0–2.7
Sex	164			1.8	1.1–2.9
Age	164			0.2	0.9–1.1

Odds ratio using 95% confidence interval.

Table 5
Associations between increased anxiety in 2002 and background variables in 1991

Background variables in 1991	N	Increased anxiety level 2002 (≥ 8 on HAD)			
		Univariate associations		Multivariate associations	
		OR	95% CI	OR	95% CI
Commonly have headaches ($n = 164$)	164	2.2	1.1–4.5		
Headaches when doing my homework	60	3.9	1.1–13.7		
Commonly have stomach aches	154	2.9	1.4–6.0		
Often feel lonely	163	2.2	1.1–4.5	2.1	1.0–4.3
When I am upset, I don't know if I'm sad, afraid, or angry	161	2.2	1.1–4.6	1.4	0.6–3.2
I often do not understand why I am angry	163	2.6	1.2–5.8	1.9	0.8–4.6
Find it difficult to describe my feelings	161	2.6	1.2–5.4	2.4	1.1–5.2
Sex	164			2.1	1.0–4.7
Age	164			0.9	0.7–1.0

Odds Ratio using 95% confidence interval.

There were clear correlations between pathological anxiety states and the experience of work-related stress (OR = 3.4, 95% CI 1.3–9.0), and stress related to social relationships (OR = 4.8, 95% CI 1.7–13.6) but not for stress related to lack of time. Of 141 persons, 115 (82%) reported one or more stress-related life situations. There was no statistically significant correlation between these stress-related life events and the individuals' present day anxiety level, whether they had occurred before or after the age of 15, or during the past year.

The correlation between stress and depression was significant only for relationship stress (OR = 9.6, 95% CI 3.2–28.7). The correlation between the individual's self-esteem and heightened anxiety and depression levels was also readily apparent. Persons with low self-esteem experienced an increase in anxiety (OR = 7.0, 95% CI 2.9–16.6) and an increase in depressive symptoms (OR = 10.0, 95% CI 3.4–29.8).

There was no correlation between reported stress¹ in the 1991 study and the occurrence of stress 11 years later in 2002; no correlation between headaches in childhood and stress in the adult years; and no correlation between experiencing stress in adolescence and pain symptoms in adulthood.

4. Discussion

The response rate in this study was acceptable, and the response rate analysis indicated no differences between individuals who reported headaches or back pain in 1989 or 1991 and those who were free from pain these years. A slightly lower occurrence of symptoms was

noted among respondents who were telephoned as compared with those who responded spontaneously to the written questionnaire. This finding likely mirrors the true situation, though it can also be the result of feelings of uneasiness among the respondents: the telephone reminder caused them to answer that the reason for not returning the questionnaire was that they did not have any pain symptoms to report. If there is an actual difference, the given frequency of the occurrence of aches and pain was overestimated by 5%.

As descriptions and analyses of the associations in 2002 are based on the individuals with pain, who were the ones who completed the comprehensive questionnaire, the study does not describe the persons who reported absence of pain in 2002. It was judged to be impossible to motivate the age group in question to answer such an extensive questionnaire if they did not have any pain. Furthermore, the primary purpose of the investigation was to study how pain changes over a 13-year period. Thus, it is not possible to extrapolate these figures to the entire cohort because we do not know if those who did not report pain experienced some form of stress, for example. Concerning their own personal experiences of health, the individuals with pain deviated significantly from the normal population in the same age groups. However, the normal values are from the early 1990s, which may also explain the differences.

4.1. The magnitude of pain problems among young adults

In the current study of young adults, half of the participants reported the occurrence of pain, with women reporting pain problems to a considerably larger extent. An alarming 59% of the women reported symptoms of pain. However, this figure included mild pain problems, provided these were "recurrent or late." On the other hand, the majority of individuals (89%) described their pain intensity as either comparable to muscle soreness after physical exercise or more intensive, and in 75% of the cases the pain affected the person's

¹ In the 1991 study only stress related to lack of time was asked for in six separate questions: (1) Is it difficult for you to get to school on time in the morning? (2) Are breaks too short? (3) Is it difficult for you to find time to finish your homework? (4) Is it difficult for you to find time for leisure activities? (5) Is it difficult for you to find time to eat dinner? (6) Is it difficult for you to get enough sleep?

ability to concentrate, suggesting that in most of the cases the pain problems were of a more serious nature. The consumption of healthcare was nevertheless rather modest with only 4 of the 10 people studied receiving treatment from a chiropractor, naprapath or a masseur.

In a population study in 1988 in southern Sweden (Andersson, 1998), it was found that 33% of persons in the age range 25–29 years reported some form of pain. However, in this study no gender differences were noted. In the present study 49% reported pain in the ages 24 and 27 years (57% women and 39% men). The results imply an increase of at least 10%, an increase in which girls/women are highly over represented. In the earlier study, 19% reported feelings of restlessness. The corresponding value in the present study was 43%, a figure based on persons who felt signs of restlessness and pain simultaneously. In a Dutch study on headaches in 10–17-year-olds, the authors observed an increase in the prevalence of pain of 6% from 1985 to 2001 (Bandell-Hoekstra et al., 2001).

4.2. *Stressful life situations*

In addition to pain, burnout is the diagnosis that accounts for the increased number of people on sick leave in Sweden (National Social Insurance Board, 2003). In this survey (2002), many more of the individuals who reported pain, experienced stress and anxiety as opposed to those who experienced depression. These individuals may run an increased risk for depression from exhaustion, the diagnosis which now is used in Sweden instead of burnout, which indicates a permanent condition. Work and relationship stress were both associated with an increased anxiety level while stress that results in depression appeared to be primarily relationship stress. The significance of psychological and stress factors in young people's musculoskeletal pain has previously been reported (Balague et al., 1994, 1995; Mikkelsson et al., 1998). Mikkelsson et al. (1997, 1999) have also shown correlations between depressive symptoms and chronic pain problems in children and adolescents. Negative effects of earlier stressful life events on coping and health were found by Kobasa (1979) and Lydeard and Jones (1989). Theorell and Elmlund (1993) have also reported physiological effects of negative life events. In the present study, stressful events that occurred more recently in a person's life were more harmful than those that occurred earlier. However, there was no correlation between stressful life events and anxiety or depression. The findings suggest that the major problem is stress caused by the daily irritations of life, especially those that appear in social relationships.

Waldie's (2001) finding of a relationship between headaches in childhood and stress later in life was not confirmed in the present study. No support was found in Waldie's study or the current study for the opposite

trend, i.e., that stress experienced in childhood is related to pain in adulthood. A previously reported correlation between stomach pain and psychiatric illness in adulthood (Hotopf et al., 1998) was confirmed in the present study from the finding that stomach aches in childhood were related to increased anxiety levels in young adulthood. The findings in the present study of a correlation between self-esteem and anxiety may show that low self-esteem creates anxiety, but low self-esteem can also be a consequence of anxiety and/or depression, of course.

Self-efficacy has been shown to be a significant determinant of disability in chronic pain patients. Pain patients change in the way they think, feel and act, factors that, in turn, determine their general health status (Arnstein, 2000). McBeth et al. (2002) have demonstrated that pain per se does not result in increased stress; rather, stress, in association with long-standing pain, has more to do with other simultaneously occurring physical and psychological factors. Even the individual's identity is affected by pain with accompanying changes in the attitude one has toward self-perception and body image (Kelly and Field, 1996). Stress and stressful life situations, such as aches and pain, are likely to play a major role in the complicated process of becoming an adult.

4.3. *Predictors of pain in young adults*

It appears in the longitudinal study that at an early age (8–14 years), future pain problems can make their appearance. Perhaps it is possible to predict pain at an even earlier age, but the present study does not address this question. Feeling nervous in the ages 10–16 was found to be a predictor of pain later in life. As mental problems increase among children and adolescents (National Board for Youth Affairs, 2003), this may predict an increase of pain symptoms in the next adult generation. Difficulties in describing feelings predicted mental problems later in life. The most common diagnosis for sick leave in Sweden today is pain due to musculoskeletal diseases and mental disorders, mainly depression (Åsberg et al., 2002). Therefore adequate interventions among children and adolescents ought to be taken to prevent ill-health in the next generation.

5. **Conclusions**

The present findings show:

1. Fifty-nine percent of the woman and 39% of the men reported pain as young adults.
2. Forty-three percent of young adults reported significant degree of restlessness and 34% pathological anxiety.

3. Predictors for pain in young adulthood were found to be back pain, headaches once a week or more often and reported nervousness in the ages 10–16.
4. A predictor for pathological anxiety in young adulthood was reported difficulties in describing ones feelings in the ages 10–16.
5. Reported stress related to lack of time in the ages 10–16 did not predict pain or stress in young adulthood.
6. Stress related to social relationships was, more than stress related to lack of time and work, correlated to pathological anxiety and depression.
The relationship between reports of pain, feeling nervous and having difficulties in describing one's feelings in childhood and pain reports in adulthood suggests that more attention should be given to problems of pain and ill-health in childhood, especially among young girls.

Appendix A. How do you feel today?

Have you had recurring aches or pain in any part of your body of late?

- Yes
 No

If your answer to the first question is *no*, there is no need to fill in the rest of the questionnaire. Please, return it in the self-addressed, stamped envelope. If your answer to the first question is *yes*, please answer all the questions and then return the questionnaire in the self-addressed, stamped envelope.

Where do you have pain?

In my:

0. Head and face
1. Neck
2. Shoulders and upper limbs
3. Chest region
4. Abdominal region
5. Upper back
6. Lower back
7. Lower limbs
8. Pelvic region
9. Anal or genital region
10. More than three major sites

How intense is your pain?

Put an x on the scale indicating how intense your pain has been on average during the last week.
 No pain _____ Maximal pain

My pain is comparable to:

1. Almost imperceptible
2. Pressure from clothing
3. Muscle soreness after physical exercise
4. Recently sprained ankle, pulled muscle, tonsillitis
5. Intense, dull toothache
6. Fractured leg, severe bruising, renal colic

How are you affected by the pain?

1. Almost to the point of paralysis
 2. To a very high degree
 3. To a high degree
 4. To a moderate degree
 5. To a slight degree
 6. Not at all
1. Pain present, but can easily be ignored
 2. Pain which affects my ability to concentrate
 3. Pain which sometimes makes me need a pain killer
 4. Pain which sometimes leads to absence from school

How would you characterize your pain?

- 0. () Difficult to say
- 1. () Single episodes
- 2. () Continuous or nearly continuous, non-fluctuating
- 3. () Continuous or nearly continuous, fluctuating
- 4. () Recurring irregularly
- 5. () Recurring regularly
- 6. () Paroxysmal
- 7. () Sustained with superimposed paroxysms
- 8. () Other combinations
- 9. () None of the above

How often do you have pain?

- 0. () Seldom
- 1. () Almost every week, can be pain free some weeks
- 2. () Almost every day, can be pain free some days
- 3. () Constantly, but can be pain free some hours
- 4. () Constantly, never pain free

How long have you had pain?

- 0. () Difficult to say
 - 1. () Mild pain, 1 month or less
 - 2. () Mild pain, 1–6 months
 - 3. () Mild pain, more than 6 months
 - 4. () Moderate pain, 1 month or less
 - 5. () Moderate pain, 1–6 months
 - 6. () Moderate pain, more than 6 months
 - 7. () Severe pain, 1 month or less
 - 8. () Severe pain, 1–6 months
 - 9. () Severe pain, more than 6 months
- 1. () I have had pain less than 2 years
 - 2. () I have had pain more than 2 years but less than 5 years
 - 3. () I have had pain longer than 5 years

Where do you think your pain originates?

- 0. () Nervous system (brain, spine, nerves)
- 1. () Nervous system (psychological or social)
- 2. () Respiratory and cardiovascular system
- 3. () Musculoskeletal system or connective tissue
- 4. () Cutaneous and subcutaneous
- 5. () Gastrointestinal system
- 6. () Genito-urinary system
- 7. () Other organs or viscera
- 8. () More than one system
- 9. () Unknown

What do you think is the cause of your pain?

- 0. () Genetic or congenital disorders
- 1. () Accident, injury or surgery
- 2. () Infection
- 3. () Inflammation
- 4. () Tumour, cancer
- 5. () Toxic influence
- 6. () Degeneration
- 7. () Dysfunction, e.g., stress
- 8. () Unknown or other
- 9. () Psychological origin

What kind of treatment have you received in the last 6 months?

	No such treatment	Yes, without improvement	Yes, with some improvement	Yes, with considerable improvement
1. Medical treatment (e.g. medication)	1 ()	2 ()	3 ()	4 ()
2. Operation	1 ()	2 ()	3 ()	4 ()
3. Cortisone injections	1 ()	2 ()	3 ()	4 ()
4. Physical therapy	1 ()	2 ()	3 ()	4 ()
5. Relaxation training	1 ()	2 ()	3 ()	4 ()
6. Electrical stimulation	1 ()	2 ()	3 ()	4 ()
7. Acupuncture	1 ()	2 ()	3 ()	4 ()
8. Supportive dialogue	1 ()	2 ()	3 ()	4 ()
9. Treatment by chiropractor, naprapath, masseur . . .	1 ()	2 ()	3 ()	4 ()
10. Other treatment, specify . . .	1 ()	2 ()	3 ()	4 ()

Have you taken any drugs to alleviate the pain?

	Not at all last month	Several times	Every day	Every other day	Some days a week	More seldom
Analgesics	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
Sedatives	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
Antidepressants	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
Hypnotics	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()

How do you sleep?

Have you had the following symptoms during the last 6 months?

	Never	Seldom (few times/year)	Sometimes (few times/month)	Often (several times/week)	Always (every day)
Difficulties falling asleep	1 ()	2 ()	3 ()	4 ()	5 ()
Difficulties waking up	1 ()	2 ()	3 ()	4 ()	5 ()
Difficulties falling back to sleep	1 ()	2 ()	3 ()	4 ()	5 ()
Nightmares	1 ()	2 ()	3 ()	4 ()	5 ()
Not refreshed when I wake up	1 ()	2 ()	3 ()	4 ()	5 ()
I wake up too early	1 ()	2 ()	3 ()	4 ()	5 ()
Disturbed sleep	1 ()	2 ()	3 ()	4 ()	5 ()
Tired during work or leisure time	1 ()	2 ()	3 ()	4 ()	5 ()
Irritations and tiredness of my eyes	1 ()	2 ()	3 ()	4 ()	5 ()
Tired in my head	1 ()	2 ()	3 ()	4 ()	5 ()

Yes, it is a problem

Yes, but it is not a problem

No

How stressed are you?

I do not have enough time	1 ()	2 ()	3 ()
I feel stressed at work	1 ()	2 ()	3 ()
I feel stressed due to bad relationships with others	1 ()	2 ()	3 ()

	Yes, during the last year	Yes, before 15 years of age	Yes, after 15 years of age	No
Have you experienced stressful life events (e.g. severe disease, injury, accident, deaths, divorce, moving, changes at work, financial problems)?	1 ()	2 ()	3 ()	4 ()

How is your self-esteem?

Very good	1 ()
Rather good	2 ()
Not as good	3 ()
Bad	4 ()

How satisfied are you with different aspects of your life?

1 = Very dissatisfied				4 = Rather satisfied		
2 = Dissatisfied				5 = Satisfied		
3 = Rather dissatisfied				6 = Very satisfied		
My life in general	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
My finances	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
My leisure time	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
My sexual life	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
My marriage	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
My family life	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
My contacts with friends	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
My independence	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()

What is your highest level of education?

1. () Elementary school
2. () High school
3. () University

How do you support yourself?

1. () Study loan
2. () Work full-time
3. () Work part-time
4. () Sickness benefits
5. () Disability pension
6. () Other, please specify ...

*If you work, what kind of work do you do?***References**

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